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(54) Title: DETERGENT COMPOSITIONS AND USES THEREOF

(57) Abstract: The present invention relates to compositions such as cleaning compositions comprising a mix of enzymes. The invention further relates use of compositions comprising such enzymes in cleaning processes.

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DETERGENT COMPOSITIONS AND USES THEREOF**Reference to a Sequence Listing**

This application contains a Sequence Listing in computer readable form, which is
5 incorporated herein by reference.

Background of the Invention

The present invention relates to compositions such as cleaning compositions comprising a
mix of enzymes. The invention further relates i) use of compositions comprising such enzymes
10 in cleaning processes and/or for deep cleaning of biofilm soiling, and ii) methods for removal or
reduction of biofilm related soiling.

Description of the Related Art

Enzymes have been used in detergents for decades. Usually a cocktail of various enzymes
15 is added to detergent compositions. The enzyme cocktail often comprises various enzymes,
wherein each enzyme targets a specific substrate e.g. amylases are active towards starch stains,
proteases on protein stains and so forth. Textiles surface and hard surfaces, such as dishes or
the inner space of a laundry machine enduring a number of wash cycles, become soiled with
many different types of soiling which may compose of proteins, grease, starch etc. One type of
20 soiling may be organic matter, such as biofilm, EPS, etc. Organic matter composes different
molecules such as polysaccharides, extracellular DNA (eDNA), and proteins. Some organic
matter composes an extracellular polymeric matrix, which may be sticky or gluey, which when
present on textile, attracts soils and may cause redeposition or backstaining of soil resulting in
a greying of the textile. Additionally, organic matters such as biofilms often cause malodor issue
25 as various malodor molecules can be adhered by the polysaccharides, extracellular DNA
(eDNA), and proteins in the complex extracellular matrix and be slowly released out to cause
consumer noticeable malodor issue.

Enzymes having hexosaminidase activity include Dispersins such as Dispersin B (DspB),
which as described is β -N-acetylglucosaminidases belonging to the Glycoside Hydrolase 20
30 family. Enzymes having hexosaminidase activity include chitinase and the use of such enzymes
is described in WO9850512 (Proctor and Gamble). WO04061117 A2 (Kane Biotech INC)
describe compositions comprising DspB for reducing and preventing biofilm caused by poly-N-

cetylglucosamine-producing bacteria and describes the use of the compositions comprising DspB for reduction/ removing biofilm on medical devices and for wound care.

WO 2015/155350 (Novozymes A/S) discloses the use of a polypeptide having DNase activity for preventing, reducing or removing a biofilm component e.g. DNA from an item, wherein the polypeptide is obtained from a fungal source, such as *Aspergillus oryzae* and the item is a textile.

WO 2014/087011(Novozymes A/S) discloses the use of a polypeptide having DNase activity for preventing, reducing or removing a biofilm component e.g. DNA from an item, wherein the polypeptide is obtained from a bacterial source such as bacillus.

WO 2017/059082 (Novozymes A/S) discloses the use of a polypeptide having DNase activity for preventing, reducing or removing a biofilm component e.g. DNA from an item.

There is still a need for cleaning compositions, which effectively prevent, reduce or remove components of organic soiling an effect also described in the present application as "deep cleaning. The present invention provides new compositions fulfilling such need.

Summary of the Invention

In a first aspect, the present invention relates to a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning component. In a second aspect, the present invention relates to cleaning composition comprising at least 0.01 ppm DNase, at least 0.01 ppm hexosaminidase and one or more cleaning component(s), wherein the cleaning component(s) is selected from a group consisting of:

- a. at least a surfactant;
 - b. a builder;
 - c. a bleach component,
- and combinations thereof.

The present invention further relates to a cleaning composition comprising at least 0.01 ppm DNase, at least 0.01 ppm hexosaminidase and cleaning component(s), wherein the cleaning component(s) is selected from a group consisting of:

- a. 0.1 to 60 wt% of at least one surfactant;
 - b. 0 to 50 wt% of a builder; and
 - c. 0 to 20 wt% of a bleach component,
- and combinations thereof.

The invention further relates to the use of the cleaning composition for deep cleaning of an item, wherein the item is a textile or a surface. The invention further relates to the use of a cleaning composition claims for cleaning of an item, wherein the item is a textile or a surface. The invention further relates to the use of a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning component for deep cleaning of an item, wherein the item is a textile or a surface. The

invention further relates to the use of the cleaning composition for deep cleaning of an item, wherein the item is a textile or a surface.

The invention further relates to a method of formulating a cleaning composition comprising adding a DNase, a hexosaminidase and one or more cleaning components.

- 5 The invention further relates to a kit intended for deep cleaning, wherein the kit comprises a solution of an enzyme mixture comprising a DNase and a hexosaminidase. The invention further relates to a kit intended for deep cleaning, wherein the kit comprises a solution of an enzyme mixture comprising a DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin.
- 10 The invention further relates to a method of deep cleaning of an item, comprising the steps of: a) contacting the item with a wash liquor solution comprising an enzyme mixture comprising at least 0.00001 ppm of a DNase, at least 0.00001 ppm of a hexosaminidase and a cleaning component, wherein the cleaning component comprises at least a surfactant; optionally a builder, and optionally a bleach component; and b) optionally rinsing the item, wherein the item
- 15 is preferably a textile. The invention further relates to a method of deep cleaning an item, comprising the steps of:
- a) contacting the item with a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning component; and
 - 20 b) and optionally rinsing the item, wherein the item is preferably a textile.

Detailed Description of the Invention

Various enzymes are applied in cleaning processes each targeting specific types of soiling such as protein, starch and grease soiling. Enzymes are now standard ingredients in detergents for laundry and dish wash. The effectiveness of these commercial enzymes provides cleaning

25 compositions such as detergents which removes much of the soiling. However, organic matters such as EPS (extracellular polymeric substance) comprised in much biofilm constitute a challenging type of soiling due to the complex nature of such organic matters. None of the commercially available cleaning compositions effectively remove or reduce EPS and/or biofilm

30 related soiling. Biofilm may be produced when cells from a group of microorganisms stick to each other or stick to a surface, such as a textile, dishware or hard surface or another kind of surface. These adherent cells are frequently embedded within a self-produced matrix of extracellular polymeric substance (EPS), which constitute 50% to 90% of the biofilm's total organic matter. EPS is mostly composed of polysaccharides (exopolysaccharides) and proteins,

35 but include other macro-molecules such as eDNA, lipids and other organic substances. Organic matter like biofilm may be sticky or gluey, which when present on textile, may give rise to redeposition or backstaining of soil resulting in a greying of the textile. Another drawback of organic matter e.g. biofilm is the malodor as various malodor related molecules are often

associated with organic matter e.g. biofilm. Further, when dirty laundry items are washed together with less dirty laundry items the dirt present in the wash liquor tend to stick to organic matter e.g. biofilm or biofilm components as a result, hereof the laundry item is more "soiled" after wash than before wash. This is effect may also be termed re-deposition.

5 The composition of the invention is preferably a cleaning composition, the composition comprises at least one DNase and at least one hexosaminidase, preferable a dispersin. Examples of useful DNases and glycosyl hydrolase are mentioned below in the sections "Polypeptides having DNase activity" and "Polypeptides having hexosaminidase activity", respectively.

10 The compositions of the invention comprising a blend of DNase and hexosaminidase e.g. dispersin and are effective in reducing or removing organic components and soiling from organic matter.

Polypeptides having DNase activity

15 The term "DNase" means a polypeptide having DNase activity that catalyzes the hydrolytic cleavage of phosphodiester linkages in a DNA backbone, thus degrading DNA. The term "DNases" and the expression "a polypeptide with DNase activity" are used interchangeably throughout the application. For purposes of the present invention, DNase activity is determined according to the procedure described in the Assay I or IV.

20 Preferably the DNase is selected from any of the enzyme classes E.C. 3.1.21.X, where X = 1, 2, 3, 4, 5, 6, 7, 8 or 9, e.g. Deoxyribonuclease I, Deoxyribonuclease IV, Type I site-specific deoxyribonuclease, Type II site-specific deoxyribonuclease, Type III site-specific deoxyribonuclease, CC-preferring endo-deoxyribonuclease, Deoxyribonuclease V, T(4) deoxyribonuclease II, T(4) deoxyribonuclease IV or E.C. 3.1.22.Y where Y = 1, 2, 4 or 5, e.g.
25 Deoxyribonuclease II, *Aspergillus* deoxyribonuclease K(1), Crossover junction endo-deoxyribonuclease, Deoxyribonuclease X.

Preferably, the polypeptide having DNase activity is obtained from a microorganism and the DNase is a microbial enzyme. The DNase is preferably of fungal or bacterial origin.

30 The DNase may be obtainable from *Bacillus* e.g. *Bacillus*, such as a *Bacillus licheniformis*, *Bacillus subtilis*, *Bacillus sp-62451*, *Bacillus horikoshii*, *Bacillus sp-62451*, *Bacillus sp-16840*, *Bacillus sp-62668*, *Bacillus sp-13395*, *Bacillus horneckiae*, *Bacillus sp-11238*, *Bacillus cibi*, *Bacillus idriensis*, *Bacillus sp-62520*, *Bacillus sp-16840*, *Bacillus sp-62668*, *Bacillus algicola*, *Bacillus vietnamensis*, *Bacillus hwajinpoensis*, *Bacillus indicus*, *Bacillus marisflavi*, *Bacillus luciferensis*, *Bacillus sp. SA2-6*.

35 The DNase may also be obtained from any of the following *Pyrenochaetopsis sp.*, *Vibrissia flavovirens*, *Setosphaeria rostrate*, *Endophragmiella valdina*, *Corynespora cassiicola*, *Paraphoma sp. XZ1965*, *Monilinia fructicola*, *Curvularia lunata*, *Penicillium reticulisporum*, *Penicillium quercetorum*, *Setophaeosphaeria sp.*, *Alternaria*, *Alternaria sp. XZ2545*,

Trichoderma reesei, *Chaetomium thermophilum*, *Scytalidium thermophilum*, *Metapochonia suchlasporia*, *Daldinia fissa*, *Acremonium sp. XZ2007*, *Acremonium sp. XZ2414*, *Acremonium dichromosporum*, *Sarocladium sp. XZ2014*, *Metarhizium sp. HNA15-2*, *Isaria tenuipes*, *Scytalidium circinatum*, *Metarhizium lepidiotae*, *Thermobispora bispora*, *Sporormia fimetaria*,
 5 *Pycnidophora cf. dispersa*, *Environmental sample D*, *Environmental sample O*, *Clavicipitaceae sp-70249*, *Westerdykella sp. AS85-2*, *Humicolopsis cephalosporioides*, *Neosartorya massa*, *Rousoella intermedia*, *Pleosporales*, *Phaeosphaeria* or *Didymosphaeria futilis*.

The DNases to be used in a composition of the invention preferable belong to the NUC1 group of DNases. The NUC1 group of DNases comprises polypeptides which in addition to
 10 having DNase activity, may comprise one or more of the motifs [T/D/S][G/N]PQL (SEQ ID NO 69), [F/L/Y/I]A[N/R]D[L/I/P/V] (SEQ ID NO: 70), or C[D/N]T[A/R] (SEQ ID NO: 71). One embodiment of the invention relates to a composition comprising polypeptides having DNase activity, wherein the polypeptides comprises one or more of the motifs [T/D/S][G/N]PQL (SEQ ID NO 69), [F/L/Y/I]A[N/R]D[L/I/P/V] (SEQ ID NO: 70) or C[D/N]T[A/R] (SEQ ID NO: 71).

The DNases of the invention preferably comprises a NUC1_A domain [D/Q][I/V]DH (SEQ ID NO
 15 72). In addition to comprising any of the domains [T/D/S][G/N]PQL, [F/L/Y/I]A[N/R]D[L/I/P/V] or C[D/N]T[A/R] the polypeptides having DNase activity, to be used in a composition of the invention, belongs to the NUC1_A domain and may share the common motif [D/Q][I/V]DH (SEQ ID NO 72). One embodiment the invention relates to compositions comprising polypeptides,
 20 which comprises one or more motifs selected from the motifs [T/D/S][G/N]PQL, [F/L/Y/I]A[N/R]D[L/I/P/V], C[D/N]T[A/R] and [D/Q][I/V]DH, wherein the polypeptides have DNase activity. The DNases to be added to a composition of the invention preferably belong to the group of DNases comprised in the GYS-clade, which are NUC1 and NUC1_A DNases further comprising the conservative motifs [D/M/L][S/T]GYSR[D/N] (SEQ ID NO: 73) and/or
 25 ASXNRSKG (SEQ ID NO: 74) and which share similar structural and functional properties. The DNases of the GYS-clade are preferably obtained from *Bacillus* genus.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide of the GYS clade having DNase activity, optionally wherein the polypeptide comprise
 30 one or both of the motifs [D/M/L][S/T]GYSR[D/N] (SEQ ID NO: 73), ASXNRSKG (SEQ ID NO: 74) and wherein the polypeptide is selected from the group of polypeptides:

- a) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 1,
- b) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 2,
- 35 c) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 3,
- d) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 4,

- e) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 5,
- f) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 6,
- 5 g) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 7,
- h) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 8,
- i) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 9,
- 10 j) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 10,
- k) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 11,
- 15 l) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 12,
- m) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 13,
- n) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 14,
- 20 o) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 15,
- p) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 16,
- 25 q) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 17,
- r) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 18,
- s) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 19,
- 30 t) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 20,
- u) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 21,
- 35 v) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 22,
- w) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 23,

x) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 24, and

y) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 25.

5 Polypeptides having DNase activity and which comprise the GYS-clade motifs have shown particularly good cleaning properties e.g. the DNases are particularly effective in removing or reducing components of organic matter, such as biofilm associated DNA, from an item such as a textile or a hard surface.

10 In one embodiment the DNases to be added in a composition of the invention preferably belong to the group of DNases comprised in the NAWK-clade, which are NUC1 and NUC1_A DNases further comprising the conservative motifs [V/I]PL[S/A]NAWK (SEQ ID NO: 75) or NPQL (SEQ ID NO: 76).

15 In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide of the NAWK-clade having DNase activity, which are NUC1 and NUC1A DNase, wherein the polypeptide comprise one or both of the motifs [V/I]PL[S/A]NAWK (SEQ ID NO: 75) or NPQL (SEQ ID NO: 76) and wherein the polypeptide is selected from the group of polypeptides:

a) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 26,

20 b) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 27,

c) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 28,

25 d) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 29,

e) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 30,

f) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 31,

30 g) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 32,

h) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 33,

35 i) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 34,

j) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 35,

k) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 36,

l) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 37, and

5 m) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 38.

Polypeptides having DNase activity and which comprise the NAWK-clade motifs have shown particularly good cleaning properties e.g. the DNases are particularly effective in removing or reducing components of organic matter, such as biofilm associated DNA, from an item such as a textile or a hard surface.

The DNases to be added in a composition of the invention preferably belong to the group of DNases comprised in the KNAW-clade, which are NUC1 and NUC1_A DNases further comprising the conservative motifs P[Q/E]L[W/Y] (SEQ ID NO: 77) or [K/H/E]NAW (SEQ ID NO: 78).

15 In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide of the KNAW clade having DNase activity, which are NUC1 and NUC1_A DNases, wherein the polypeptide comprise one or both of the motifs P[Q/E]L[W/Y] (SEQ ID NO: 77) or [K/H/E]NAW (SEQ ID NO: 78), and wherein the polypeptide is selected from the group of polypeptides:

20 a) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 39,

b) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 40,

25 c) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 41,

d) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 42,

e) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 43

30 f) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 44,

g) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 45,

35 h) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 46,

i) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 47,

j) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 48,

k) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 49,

5 l) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 50, and

m) a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 51.

10 Polypeptides having DNase activity and which comprise the KNAW-clade motifs have shown particularly good cleaning properties e.g. the DNases are particularly effective in removing or reducing components of organic matter, such as biofilm associated DNA, from an item such as a textile or a hard surface.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 1 of at least 15 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 81%, at least 82%, at least 83%, at least 84%, at least 85%, at least 86%, at least 87%, at least 88%, at least 89%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus*. In one aspect, the polypeptides differ by up to 10 amino 20 acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 1.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 2 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 81%, at least 82%, at 25 least 83%, at least 84%, at least 85%, at least 86%, at least 87%, at least 88%, at least 89%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus* e.g. obtainable from *Bacillus horikoshii*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 2.

30 In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 3 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 81%, at least 82%, at least 83%, at least 84%, at least 85%, at least 86%, at least 87%, at least 88%, at least 89%, at 35 least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 3.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 4 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 81%, at least 82%, at least 83%, at least 84%, at least 85%, at least 86%, at least 87%, at least 88%, at least 89%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 4.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 5 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 81%, at least 82%, at least 83%, at least 84%, at least 85%, at least 86%, at least 87%, at least 88%, at least 89%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus* e.g. obtainable from *Bacillus horikoshii*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 5.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 6 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus* e.g. obtainable from *Bacillus horikoshii*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 6.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 7 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 7.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 8 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 8.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 9 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 9.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 10 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 10.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 11 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus* e.g. obtainable from *Bacillus horneckiae*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 11.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 12 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 12.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 13 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus* e.g. obtainable from *Bacillus cibi*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 13.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 14 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at

least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 14.

5 In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 15 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus* e.g. obtainable from
10 *Bacillus idriensis*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 15.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 16 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at
15 least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus* e.g. obtainable from *Bacillus algicola*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 16.

In one embodiment the DNases to be added in the cleaning composition of the invention is a
20 polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 17 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 17.

25 In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 18 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus* e.g. obtainable from
30 *Bacillus vietnamensis*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 18.

In one embodiment the DNases to be added in the cleaning composition of the invention is a
35 polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 19 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus* e.g. obtainable from *Bacillus hwajinpoensis*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 19.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 20 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Paenibacillus mucilaginosus*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 20.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 21 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus* e.g. obtainable from *Bacillus indicus*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 21.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 22 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus* e.g. obtainable from *Bacillus marisflavi*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 22.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 23 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus* e.g. obtainable from *Bacillus luciferensis*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 23.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 24 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus* e.g. obtainable from *Bacillus marisflavi*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 24.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 25 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at

least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Bacillus*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 25.

5 In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 26 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Pyrenochaetopsis sp.* In one
10 aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 26.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 27 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at
15 least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Vibrisssea flavovirens*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 27.

In one embodiment the DNases to be added in the cleaning composition of the invention is a
20 polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 28 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Setosphaeria rostrate*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from
25 the mature polypeptide shown in SEQ ID NO: 28.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 29 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at
30 least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Endophragmiella valdina*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 29.

In one embodiment the DNases to be added in the cleaning composition of the invention is a
35 polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 30 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Corynespora cassiicola*. In one

aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 30.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 31 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Paraphoma sp.* In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 31.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 32 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Monilinia fructicola*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 32.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 33 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Curvularia lunata*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 33.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 34 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Penicillium reticulisporum*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 34.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 35 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Penicillium quercetorum*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 35.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 36 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have
5 DNase activity. Preferably, the polypeptide is obtainable from *Setophaeosphaeria sp.* In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 36.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 37 of at least
10 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Alternaria sp.* In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 37.

In one embodiment the DNases to be added in the cleaning composition of the invention is a
15 polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 38 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Alternaria*. In one aspect, the
20 polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 38.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 39 of at least
25 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Trichoderma reesei*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 39.

In one embodiment the DNases to be added in the cleaning composition of the invention is a
30 polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 40 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Chaetomium thermophilum*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from
35 the mature polypeptide shown in SEQ ID NO: 40.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 41 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at

least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Scytalidium thermophilum*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 41.

5 In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 42 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Metapochonia suchlasporia*. In
10 one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 42.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 43 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at
15 least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Daldinia fissa*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 43.

In one embodiment the DNases to be added in the cleaning composition of the invention is a
20 polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 44 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Acremonium sp.* In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the
25 mature polypeptide shown in SEQ ID NO: 44.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 45 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at
30 least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Acremonium dichromosporum*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 45.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 46 of at least
35 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Sarocladium sp.* In one aspect,

the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 46.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 47 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Metarhizium sp.* In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 47.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 48 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Acremonium sp.* In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 48.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 49 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Isaria tenuipes.* In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 49.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 50 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Scytalidium circinatum.* In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 50.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 51 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Metarhizium lepidiotae.* In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 51.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 52 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Thermobispora bispora*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 52.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 53 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Sporormia fimetaria*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 53.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 54 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Pycnidioophora cf. dispersa*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 54.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 55 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 55.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 56 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 56.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 57 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Clavicipitaceae*. In one aspect, the

polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 57.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 58 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Westerdykella sp.* In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 58.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 59 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Humicolopsis cephalosporioides*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 59.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 60 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Neosartorya massa*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 60.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 61 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Rousoella intermedia*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 61.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 62 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Pleosporales*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 62.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 63 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Phaeosphaeria*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 63.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 64 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Didymosphaeria futilis*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 64.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 65 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from Bacillus e.g. obtainable from *Bacillus licheniformis*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 65.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 66 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from Bacillus e.g. obtainable from *Bacillus subtilis*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 66.

In one embodiment the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 67 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Aspergillus* e.g. obtainable from *Aspergillus oryzae*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 67.

In one embodiment, the DNases to be added in the cleaning composition of the invention is a polypeptide having a sequence identity to the polypeptide shown in SEQ ID NO: 68 of at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at

least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% and which have DNase activity. Preferably, the polypeptide is obtainable from *Trichoderma* e.g. obtainable from *Trichoderma harzianum*. In one aspect, the polypeptides differ by up to 10 amino acids, e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, from the mature polypeptide shown in SEQ ID NO: 68.

5 The preparation of the polypeptide having DNase activity as described under this section can refer to the description in the Nucleic acid Construct, Expression Vectors, Host Cells, Methods of Production and Fermentation Broth Formulations sections in WO 2017/059802 (Novozymes A/S).

10 The DNase can be included in the cleaning composition of the present invention at a level of from 0.01 to 1000ppm, from 1ppm to 1000 ppm, from 10 ppm to 1000 ppm, from 50 ppm to 1000 ppm, from 100 ppm to 1000 ppm, from 150 ppm to 1000 ppm, from 200 ppm to 1000 ppm, from 250 ppm to 1000 ppm, from 250 ppm to 750 ppm, from 250 ppm to 500 ppm.

15 The DNases above may be combined with hexosaminidase to form a blend to be added to the wash liquor solution according to the invention. The concentration of the DNase in the wash liquor solution is typically in the range of wash liquor from 0.00001ppm to 10 ppm, from 0.00002 ppm to 10 ppm, from 0.0001 ppm to 10 ppm, from 0.0002 ppm to 10 ppm, from 0.001 ppm to 10 ppm, from 0.002 ppm to 10 ppm, from 0.01 ppm to 10 ppm, from 0.02 ppm to 10 ppm, 0.1 ppm to 10 ppm, from 0.2ppm to 10 ppm, from 0.5 ppm to 5 ppm.

20 The DNases may be combined with any of the hexosaminidases below to form a blend to be added to a composition according to the invention.

Polypeptides having Hexosaminidase activity (hexosaminidases)

25 The term hexosaminidase includes “dispersin” and the abbreviation “Dsp”, which means a polypeptide having hexosaminidase activity, EC 3.2.1.- that catalyzes the hydrolysis of β -1,6-glycosidic linkages of N-acetyl-glucosamine polymers found e.g. in biofilm. The term hexosaminidase includes polypeptides having N-acetylglucosaminidase activity and β -N-acetylglucosaminidase activity. The term “polypeptide having hexosaminidase activity” may be used interchangeably with the term hexosaminidases and similarly the term “polypeptide having β -N-acetylglucosaminidase activity” may be used interchangeably with the term β -N-

30 acetylglucosaminidases. For purposes of the present invention, hexosaminidase activity is determined according to the procedure described in Assay II. In a preferred embodiment, the polypeptide having hexosaminidase activity is a dispersin. In a preferred embodiment, the polypeptide having hexosaminidase activity is a β -N-acetylglucosaminidase targeting poly- β -1,6-N-acetylglucosamine.

35 The hexosaminidase to be used in a composition of the invention is selected among polypeptides which in addition to having hexosaminidase activity, may comprise the motifs GXDE (SEQ ID NO 90), [EQ][NRSHA][YVFL][AGSTC][IVLF][EAQYN][SN] (SEQ ID NO: 91), and

[VLIM][LIV]G[GAV]DE[VI][PSA] (SEQ ID NO: 92); and one of the motifs D[IV]AR[TK] (SEQ ID NO: 93) and [GK]A[IL][IL][KSR][LQ]L (SEQ ID NO: 94).

In one embodiment, the invention relates to a composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin, and a cleaning component.

One embodiment of the invention relates to a composition comprising a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin, polypeptide wherein the polypeptide is selected from the group consisting of polypeptides comprising the the motifs GXDE (SEQ ID NO 90), [EQ][NRSHA][YVFL][AGSTC][IVLF][EAQYN][SN] (SEQ ID NO: 91), [VLIM][LIV]G[GAV]DE[VI][PSA] (SEQ ID NO: 92); and [GK]A[IL][IL][KSR][LQ]L (SEQ ID NO: 94):

- a) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,
- b) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83, and
- c) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84.

Another embodiment of the invention relates to a composition comprising a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin, polypeptide wherein the polypeptide is selected from the group consisting of polypeptides comprising the the motifs GXDE (SEQ ID NO 90), [EQ][NRSHA][YVFL][AGSTC][IVLF][EAQYN][SN] (SEQ ID NO: 91), [VLIM][LIV]G[GAV]DE[VI][PSA] (SEQ ID NO: 92); and D[IV]AR[TK] (SEQ ID NO: 93):

- d) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and
- e) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86.

A polypeptide having hexosaminidase activity may be obtained from microorganisms of any genus. Preferably the hexosaminidase or the β -N-acetylglucosaminidase targeting poly- β -1,6-N-acetylglucosamine e.g. a dispersin is obtained from *Lactobacillus* or *Staphylococcus*.

In another aspect, the polypeptide having hexosaminidase activity is a *Lactobacillus* polypeptide, e.g., a polypeptide obtained from *Lactobacillus paraplantarum*. In a preferred aspect, the polypeptide is a polypeptide having at least 60%, at least 65%, at least 70%, at least

75%, at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99% or 100% sequence identity to SEQ ID NO: 82 and is obtained from *Lactobacillus* preferably, *Lactobacillus paraplantarum*.

5 In another aspect, the polypeptide is a *Lactobacillus* polypeptide, e.g., a polypeptide obtained from *Lactobacillus apinorum*. In a preferred aspect, the polypeptide is a polypeptide having at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99% or 100% sequence identity to SEQ ID NO: 83 and is obtained from
10 *Lactobacillus* preferably, *Lactobacillus apinorum*.

In another aspect, the polypeptide is a *Lactobacillus* polypeptide, e.g., a polypeptide obtained from *Lactobacillus paraplantarum*. In a preferred aspect, the polypeptide is a polypeptide having at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%,
15 at least 98%, at least 99% or 100% sequence identity to SEQ ID NO: 84 and is obtained from *Lactobacillus* preferably, *Lactobacillus paraplantarum*.

In another aspect, the polypeptide is a *Staphylococcus* polypeptide, e.g., a polypeptide obtained from *Staphylococcus cohnii* subsp. In a preferred aspect, the polypeptide is a polypeptide having at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99% or 100% sequence identity to SEQ ID NO: 85 and
20 is obtained from *Staphylococcus* preferably, *Staphylococcus cohnii* subsp.

In another aspect, the polypeptide is a *Staphylococcus* polypeptide, e.g., a polypeptide obtained from *Staphylococcus fleurettii*. In a preferred aspect, the polypeptide is a polypeptide
25 having at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99% or 100% sequence identity to SEQ ID NO: 86 and is obtained from *Staphylococcus* preferably, *Staphylococcus fleurettii*.

The polypeptides useful in the present invention belong to the Glycoside Hydrolase family 20
30 (GH20, www.cazy.org). This family includes dispersins such as Dispersin B (DspB) which is β -N-acetylglucosaminidases belonging to the Glycoside Hydrolase 20 family.

The preparation of the polypeptide having hexosaminidase activity as described under this section can refer to the description in the Nucleic acid Construct, Expression Vectors, Host Cells. The hexosaminidase can be included in the cleaning composition of the present invention at a
35 level of from 0.01 to 1000 ppm, from 1ppm to 1000 ppm, from 10 ppm to 1000 ppm, from 50 ppm to 1000 ppm, from 100 ppm to 1000 ppm, from 150 ppm to 1000 ppm, from 200 ppm to 1000 ppm, from 250 ppm to 1000 ppm, from 250 ppm to 750 ppm, from 250 ppm to 500 ppm.

The hexosaminidase can be included in the wash liquor solution of the present invention at a level of from 0.00001ppm to 10 ppm, from 0.00002 ppm to 10 ppm, from 0.0001ppm to 10 ppm, from 0.0002 ppm to 10 ppm, from 0.001 ppm to 10 ppm, from 0.002 ppm to 10 ppm, from 0.01 ppm to 10 ppm, from 0.02 ppm to 10 ppm, from 0.1 ppm to 10 ppm, from 0.2 ppm to 10 ppm, from 0.5 ppm to 5 ppm.

Synergy

The inventors have surprisingly discovered that the disclosed DNases and the disclosed hexoaminodases exhibit a synergistic effect when used in the cleaning compositions of the invention.

Synergy is understood with the usual meaning within the field as the phenomena that the combined effect of two components exceed the sum of the effect of each of the two components. Thus, according to the invention the wash performance of the cleaning compositions of the invention exceeds the wash performance of the sum of the wash performance of a cleaning composition comprising a DNase as disclosed but not a hexoaminidase as disclosed; and the wash performance of a cleaning composition comprising a DNase as disclosed but not a hexoaminidase as disclosed.

The synergy can be expressed as the the wash performance synergi (WP_{syn}), measured as the difference between the wash performance of the combination of the DNase and the hexoaminidase minus the sum of the wash performances of the individual wash performances. A preferred method for measuring the wash performance synergi is the method disclosed in Example 1.

According to the invention, the wash performance synergy as measured according to the method of Example 1 is at least 1.0, at least 2.0, at least 3.0, at least 4.0, at least 5.0, at least 6.0, at least 7.0, at least 8.0, at least 9.0 or at least 10.0,

Cleaning composition

The invention relates to cleaning compositions comprising at least one DNase and at least one hexosaminidase in combination with one or more additional cleaning components. The choice of additional components is within the skill of the artisan and includes conventional ingredients, including the exemplary non-limiting components set forth below. An enzyme blend of the current invention comprises a DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin. One embodiment of the invention relates to a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning component. The DNase is preferably microbial, preferably obtained from bacteria or fungi. One embodiment of the invention relates to a cleaning composition comprising a DNase,

a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning component, wherein the DNase is microbial preferably bacteria or fungi.

In one embodiment, the DNase is obtained from bacteria. One embodiment of the invention relates to a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning component, wherein the DNase is
5 obtained from *Bacillus*, preferably *Bacillus cibi*, *Bacillus horikoshii*, *Bacillus licheniformis*, *Bacillus subtilis*, *Bacillus horneckiae*, *Bacillus idriensis*, *Bacillus algicola*, *Bacillus vietnamensis*, *Bacillus hwajinpoensis*, *Bacillus indicus*, *Bacillus marisflavi* or *Bacillus luciferensis*.

The hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin is preferably
10 selected from the genus *Lactobacillus* preferably, *Lactobacillus paraplantarum* or *Lactobacillus apinorum*. Alternatively, the hexosaminidase may be obtained from the genus *Staphylococcus* preferably, *Staphylococcus cohnii* subsp or *Staphylococcus fleurettii*. One embodiment of the invention relates to a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning component, wherein the DNase is
15 obtained from *Bacillus*, preferably *Bacillus cibi*, *Bacillus horikoshii*, *Bacillus licheniformis*, *Bacillus subtilis*, *Bacillus horneckiae*, *Bacillus idriensis*, *Bacillus algicola*, *Bacillus vietnamensis*, *Bacillus hwajinpoensis*, *Bacillus indicus*, *Bacillus marisflavi* or *Bacillus luciferensis* and wherein the hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin is selected from *Lactobacillus* such as *Lactobacillus paraplantarum* or *Lactobacillus apinorum*. One embodiment
20 of the invention relates to a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning component, wherein the DNase is obtained from *Bacillus*, preferably *Bacillus cibi*, *Bacillus horikoshii*, *Bacillus licheniformis*, *Bacillus subtilis*, *Bacillus horneckiae*, *Bacillus idriensis*, *Bacillus algicola*, *Bacillus vietnamensis*, *Bacillus hwajinpoensis*, *Bacillus indicus*, *Bacillus marisflavi* or *Bacillus luciferensis*
25 and wherein the hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin is selected from *Staphylococcus* such as *Staphylococcus cohnii* subsp or *Staphylococcus fleurettii*.

One embodiment of the invention relates to a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning component, wherein the DNase is obtained from *Bacillus*, preferably *Bacillus cibi*, *Bacillus
30 horikoshii*, *Bacillus licheniformis*, *Bacillus subtilis*, *Bacillus horneckiae*, *Bacillus idriensis*, *Bacillus algicola*, *Bacillus vietnamensis*, *Bacillus hwajinpoensis*, *Bacillus indicus*, *Bacillus marisflavi* or *Bacillus luciferensis* and wherein the hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin is selected from the group consisting of;

- a) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%,
35 at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,

- b) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,
- 5 c) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,
- d) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and
- 10 e) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86.

The DNases preferable belong to the NUC1 group of DNases and comprise one or more of the motifs [T/D/S][G/N]PQL (SEQ ID NO 69), [F/L/Y/I]A[N/R]D[L/I/P/V] (SEQ ID NO: 70), or
15 C[D/N]T[A/R] (SEQ ID NO: 71). The DNases even more preferably comprises a NUC1_A domain [D/Q][I/V]DH (SEQ ID NO 72). In addition to comprising any of the domain motifs [T/D/S][G/N]PQL, [F/L/Y/I]A[N/R]D[L/I/P/V] or C[D/N]T[A/R]. The DNases to be added to a composition of the invention preferably belong to the group of DNases comprised in the GYS-clade, which are group of DNases on the same branch of a phylogenetic tree having both
20 structural and functional similarities. These NUC1 and/or NUC1_A DNases comprise the conservative motifs [D/M/L][S/T]GYSR[D/N] (SEQ ID NO: 73) or ASXNRSKG (SEQ ID NO: 74) and share similar structural and functional properties. The DNases of the GYS-clade are preferably obtained from *Bacillus* genus. One embodiment of the invention relates to a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase
25 e.g. a dispersin and a cleaning component, wherein the DNase comprises one or both of the motif(s) [D/M/L][S/T]GYSR[D/N] (SEQ ID NO: 73) or ASXNRSKG (SEQ ID NO: 74). One embodiment of the invention relates to a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning component, wherein the DNase comprises one or both of the motif(s) [D/M/L][S/T]GYSR[D/N]
30 (SEQ ID NO: 73) or ASXNRSKG (SEQ ID NO: 74), wherein the hexosaminidase is selected from the group consisting of;

- a) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,
- 35 b) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,

- c) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,
- d) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%,
5 at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and
- e) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86.
- 10 One embodiment of the invention relates to a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin, and a cleaning component, wherein the DNase comprises one or both of the motifs [D/M/L][S/T]GYSR[D/N] (SEQ ID NO: 73), ASXNRSKG (SEQ ID NO: 74) and wherein the DNase is selected from the group consisting of polypeptides:
- 15 a) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 1,
- b) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the
20 polypeptide shown in SEQ ID NO: 2,
- c) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 3,
- d) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%,
25 at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 4,
- e) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 5,
- 30 f) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 6,
- g) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the
35 polypeptide shown in SEQ ID NO: 7,
- h) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 8,

- i) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 9,
- 5 j) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 10,
- k) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 11,
- 10 l) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 12,
- m) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 13,
- 15 n) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 14,
- o) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 15,
- 20 p) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 16,
- 25 q) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 17,
- r) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 18,
- 30 s) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 19,
- t) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 20,
- 35

- u) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 21,
- 5 v) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 22,
- w) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 23,
- 10 x) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 24, and
- y) a polypeptide having at least 60%, at least 65%, at least 70%, at least 75% at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 25.
- 15

The DNase is preferably a bacillus DNase, such as a *Bacillus cibi*, *Bacillus subtilis* or *Bacillus licheniformis*.

One embodiment of the invention relates to a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning
20 component, wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 13.

One embodiment of the invention relates to a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning
25 component, wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO: 65.

One embodiment of the invention relates to a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning
30 component, wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO: 66.

The DNase may also be fungal, one embodiment of the invention relates to a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase
35 e.g. a dispersin and a cleaning component, wherein the DNase is fungal, preferably obtained from *Aspergillus* and even more preferably from *Aspergillus oryzae* and wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ

ID NO: 67.

One embodiment relates to a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning component, wherein the DNase is fungal, preferably obtained from *Trichoderma* and even more preferably from *Trichoderma harzianum* and wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO: 68.

One embodiment of the invention relates to a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning component, wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 13 and wherein the hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin is selected from the group consisting of hexosaminidase, comprising an amino acid sequence with;

- i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,
- ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,
- iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,
- iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and
- v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86.

One embodiment of the invention relates to a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning component, wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 65 and wherein the hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin is selected from the group consisting of hexosaminidases, comprising an amino acid sequence with;

- 5
- i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82
 - ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83
 - iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,
 - 10 iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and
 - v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86.
- 15

One embodiment of the invention relates to a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning component, wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 66 and wherein the hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin is selected from the group consisting of hexosaminidase, comprising an amino acid sequence with;

20

- i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,
- 25 ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,
- iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,
- 30 iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and
- 35 v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86.

One embodiment of the invention relates to a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning component, wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 67 and wherein the hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin is selected from the group consisting of hexosaminidase, comprising an amino acid sequence with;

- i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,
- ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,
- iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,
- iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and
- v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86.

One embodiment of the invention relates to a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning component, wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 68 and wherein the hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin is selected from the group consisting of hexosaminidase, comprising an amino acid sequence with;

- i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,
- ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,
- iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,

- iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and
- v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86.

One embodiment of the present invention relates to a cleaning composition comprising;

- a) at least 0.01 ppm of at least one polypeptide having DNase activity, wherein the DNase is selected for the group consisting of:

- i) a NUC1 or NUC1A DNase comprising one or more of the motifs [T/D/S][G/N]PQL (SEQ ID NO 69), [F/L/Y/I]A[N/R]D[L/I/P/V] (SEQ ID NO: 70), or C[D/N]T[A/R] (SEQ ID NO: 71);
- ii) a NUC1 or NUC1A DNase comprising the motif [D/Q][I/V]DH (SEQ ID NO 72);
- iii) a NUC1 or NUC1A DNase comprising one or both of the motifs [D/M/L][S/T]GYSR[D/N] (SEQ ID NO: 73) or ASXNRSKG (SEQ ID NO: 74);
- iv) a NUC1 or NUC1A DNase comprising one or both of the motifs [V/I]PL[S/A]NAWK (SEQ ID NO: 75) or NPQL (SEQ ID NO: 76);
- v) a NUC1 or NUC1A DNase comprising one or both of the motifs P[Q/E]L[W/Y] (SEQ ID NO: 77) or [K/H/E]NAW (SEQ ID NO:78);
- vi) a polypeptide having DNase activity selected from: a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 1, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 2, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 3, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 4, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 5, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 6, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 7, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 8, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 9, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 10, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 11, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 12, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 13, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 14, a polypeptide

5 polypeptide shown in SEQ ID NO: 45, a polypeptide having at least 80%
sequence identity to the polypeptide shown in SEQ ID NO: 46, a polypeptide
having at least 80% sequence identity to the polypeptide shown in SEQ ID NO:
47, a polypeptide having at least 80% sequence identity to the polypeptide shown
10 in SEQ ID NO: 48, a polypeptide having at least 80% sequence identity to the
polypeptide shown in SEQ ID NO: 49, a polypeptide having at least 80%
sequence identity to the polypeptide shown in SEQ ID NO: 50, a polypeptide
having at least 80% sequence identity to the polypeptide shown in SEQ ID NO:
51, a polypeptide having at least 80% sequence identity to the polypeptide shown
15 in SEQ ID NO: 52, a polypeptide having at least 80% sequence identity to the
polypeptide shown in SEQ ID NO: 53, a polypeptide having at least 80%
sequence identity to the polypeptide shown in SEQ ID NO: 54, a polypeptide
having at least 80% sequence identity to the polypeptide shown in SEQ ID NO:
55, a polypeptide having at least 80% sequence identity to the polypeptide shown
20 in SEQ ID NO: 56, a polypeptide having at least 80% sequence identity to the
polypeptide shown in SEQ ID NO: 57, a polypeptide having at least 80%
sequence identity to the polypeptide shown in SEQ ID NO: 58, a polypeptide
having at least 80% sequence identity to the polypeptide shown in SEQ ID NO:
59, a polypeptide having at least 80% sequence identity to the polypeptide shown
25 in SEQ ID NO: 60, a polypeptide having at least 80% sequence identity to the
polypeptide shown in SEQ ID NO: 61, a polypeptide having at least 80%
sequence identity to the polypeptide shown in SEQ ID NO: 62, a polypeptide
having at least 80% sequence identity to the polypeptide shown in SEQ ID NO:
63, a polypeptide having at least 80% sequence identity to the polypeptide shown
30 in SEQ ID NO: 64, a polypeptide having at least 80% sequence identity to the
polypeptide shown in SEQ ID NO: 65, a polypeptide having at least 80%
sequence identity to the polypeptide shown in SEQ ID NO: 66, a polypeptide
having at least 80% sequence identity to the polypeptide shown in SEQ ID NO:
67, and a polypeptide having at least 80% sequence identity to the polypeptide
shown in SEQ ID NO: 68;

b) at least 0.01 ppm hexosaminidase selected from the group consisting of

35 I. a polypeptide having hexosaminidase activity selected from the group
consisting of: a polypeptide having at least 80% sequence identity to the
polypeptide shown in SEQ ID NO: 82, a polypeptide having at least 80%
sequence identity to the polypeptide shown in SEQ ID NO: 83, a polypeptide
having at least 80% sequence identity to the polypeptide shown in SEQ ID NO:
84, a polypeptide having at least 80% sequence identity to the polypeptide shown

in SEQ ID NO: 85, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 86;

II. a polypeptide having N-acetylglucosaminidase activity, preferably β -N-acetylglucosaminidase activity; and

5 III. a polypeptide comprising a GH20 domain.

c) one or more cleaning components, optionally a surfactant, builders, bleach components, polymers, dispersing agents and additional enzymes.

One preferred embodiment relates to a cleaning composition comprising at least 10 ppm of a NUC1 or NUC1A DNase comprising one or both of the motifs [D/M/L][S/T]GYSR[D/N] (SEQ ID
10 NO: 73) or ASXNRSKG (SEQ ID NO: 74), preferably the polypeptide having DNase activity is selected from the group consisting of: a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 1, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 2, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 3, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 4, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 5, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 6, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 7, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 8, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 9, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 10, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 11, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 12, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 13, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 14, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 15, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 16, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 17, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 18, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 19, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 20, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 21, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 22, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 23, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 24, and a polypeptide having at least 80% sequence
25 identity to the polypeptide shown in SEQ ID NO: 25; and at least 10 ppm of hexosaminidase having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 82, and at least one cleaning component.

One preferred embodiment relates to a cleaning composition comprising at least 10 ppm of a NUC1 or NUC1A DNase comprising one or both of the motifs [D/M/L][S/T]GYSR[D/N] (SEQ ID NO: 73) or ASXNRSKG (SEQ ID NO: 74) preferably the polypeptide having DNase activity is selected from the group consisting of: a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 1, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 2, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 3, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 4, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 5, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 6, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 7, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 8, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 9, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 10, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 11, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 12, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 13, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 14, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 15, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 16, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 17, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 18, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 19, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 20, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 21, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 22, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 23, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 24, and a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 25; and at least 10 ppm of hexosaminidase having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 83 and at least one cleaning component.

One preferred embodiment relates to a cleaning composition comprising at least 10 ppm of a NUC1 or NUC1A DNase comprising one or both of the motifs [D/M/L][S/T]GYSR[D/N] (SEQ ID NO: 73) or ASXNRSKG (SEQ ID NO: 74) preferably the polypeptide having DNase activity is selected from the group consisting of: a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 1, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 2, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 3, a polypeptide having at least 80% sequence identity to

the polypeptide shown in SEQ ID NO: 4, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 5, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 6, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 7, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 8, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 9, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 10, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 11, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 12, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 13, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 14, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 15, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 16, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 17, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 18, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 19, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 20, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 21, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 22, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 23, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 24, and a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 25; and at least 10 ppm of hexosaminidase having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 84 and at least one cleaning component.

One preferred embodiment relates to a cleaning composition comprising at least 10 ppm of a NUC1 or NUC1A DNase comprising one or both of the motifs [D/M/L][S/T]GYSR[D/N] (SEQ ID NO: 73) or ASXNRSKG (SEQ ID NO: 74) preferably the polypeptide having DNase activity is selected from the group consisting of: a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 1, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 2, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 3, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 4, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 5, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 6, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 7, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 8, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 9, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 10, a polypeptide having at least 80% sequence identity

to the polypeptide shown in SEQ ID NO: 11, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 12, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 13, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 14, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 15, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 16, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 17, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 18, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 19, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 20, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 21, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 22, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 23, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 24, and a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 25; and at least 10 ppm of hexosaminidase having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 85 and at least one cleaning component.

One preferred embodiment relates to a cleaning composition comprising at least 10 ppm of a NUC1 or NUC1A DNase comprising one or both of the motifs [D/M/L][S/T]GYSR[D/N] (SEQ ID NO: 73) or ASXNRSKG (SEQ ID NO: 74) preferably the polypeptide having DNase activity is selected from the group consisting of: a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 1, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 2, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 3, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 4, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 5, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 6, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 7, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 8, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 9, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 10, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 11, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 12, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 13, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 14, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 15, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 16, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 17, a polypeptide having at least 80% sequence identity

to the polypeptide shown in SEQ ID NO: 18, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 19, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 20, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 21, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 22, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 23, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 24, and a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 25; and at least 10 ppm of hexosaminidase having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 86 and at least one cleaning component.

One preferred embodiment relates to a cleaning composition comprising at least 10 ppm of a NUC1 or NUC1A DNase comprising one or both of the motifs [V/I]PL[S/A]NAWK (SEQ ID NO: 75) or NPQL (SEQ ID NO: 76) preferably the polypeptide having DNase activity is selected from the group consisting of: a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 26, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 27, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 28, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 29, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 30, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 31, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 32, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 33, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 34, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 35, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 36, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 37, and a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 38; and at least 10 ppm of hexosaminidase having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 82 and at least one cleaning component.

One preferred embodiment relates to a cleaning composition comprising at least 10 ppm of a NUC1 or NUC1A DNase comprising one or both of the motifs [V/I]PL[S/A]NAWK (SEQ ID NO: 75) or NPQL (SEQ ID NO: 76) preferably the polypeptide having DNase activity is selected from the group consisting of: a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 26, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 27, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 28, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 29, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 30, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 31, a polypeptide having at least 80% sequence identity to the polypeptide

shown in SEQ ID NO: 32, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 33, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 34, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 35, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 36, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 37, and a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 38; and at least 10 ppm of hexosaminidase having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 83 and at least one cleaning component.

One preferred embodiment relates to a cleaning composition comprising at least 10 ppm of a NUC1 or NUC1A DNase comprising one or both of the motifs [V/I]PL[S/A]NAWK (SEQ ID NO: 75) or NPQL (SEQ ID NO: 76) preferably the polypeptide having DNase activity is selected from the group consisting of: a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 26, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 27, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 28, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 29, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 30, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 31, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 32, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 33, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 34, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 35, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 36, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 37, and a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 38; and at least 10 ppm of hexosaminidase having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 84 and at least one cleaning component.

One preferred embodiment relates to a cleaning composition comprising at least 10 ppm of a NUC1 or NUC1A DNase comprising one or both of the motifs [V/I]PL[S/A]NAWK (SEQ ID NO: 75) or NPQL (SEQ ID NO: 76) preferably the polypeptide having DNase activity is selected from the group consisting of: a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 26, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 27, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 28, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 29, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 30, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 31, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 32, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 33, a polypeptide having at least 80% sequence identity to the polypeptide

shown in SEQ ID NO: 34, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 35, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 36, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 37, and a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 38; and at least 10 ppm of hexosaminidase having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 85 and at least one cleaning component.

One preferred embodiment relates to a cleaning composition comprising at least 10 ppm of a NUC1 or NUC1A DNase comprising one or both of the motifs [V/I]PL[S/A]NAWK (SEQ ID NO: 75) or NPQL (SEQ ID NO: 76) preferably the polypeptide having DNase activity is selected from the group consisting of: a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 26, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 27, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 28, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 29, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 30, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 31, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 32, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 33, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 34, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 35, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 36, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 37, and a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 38; and at least 10 ppm of hexosaminidase having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 86 and at least one cleaning component.

One preferred embodiment relates to a cleaning composition comprising at least 10 ppm of a NUC1 or NUC1A DNase comprising one or both of the motifs P[Q/E]L[W/Y] (SEQ ID NO: 77) or [K/H/E]NAW (SEQ ID NO: 78) preferably the polypeptide having DNase activity is selected from the group consisting of: a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 39, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 40, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 41, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 42, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 43, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 44, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 45, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 46, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 47, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 48, a polypeptide having at least 80% sequence identity to the polypeptide

shown in SEQ ID NO: 49, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 50, and a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 51; and at least 10 ppm of hexosaminidase having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 82 and at least one cleaning component.

5 One preferred embodiment relates to a cleaning composition comprising at least 10 ppm of a NUC1 or NUC1A DNase comprising one or both of the motifs P[Q/E]L[W/Y] (SEQ ID NO: 77) or [K/H/E]NAW (SEQ ID NO: 78) preferably the polypeptide having DNase activity is selected from the group consisting of: a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 39, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 40, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 41, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 42, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 43, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 44, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 45, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 46, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 47, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 48, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 49, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 50, and a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 51; and at least 10 ppm of hexosaminidase having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 83 and at least one cleaning component.

One preferred embodiment relates to a cleaning composition comprising at least 10 ppm of a NUC1 or NUC1A DNase comprising one or both of the motifs P[Q/E]L[W/Y] (SEQ ID NO: 77) or [K/H/E]NAW (SEQ ID NO: 78) preferably the polypeptide having DNase activity is selected from the group consisting of: a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 39, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 40, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 41, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 42, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 43, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 44, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 45, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 46, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 47, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 48, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 49, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 50, and a polypeptide having at least 80% sequence identity to the

polypeptide shown in SEQ ID NO: 51; and at least 10 ppm of hexosaminidase having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 84 and at least one cleaning component.

One preferred embodiment relates to a cleaning composition comprising at least 10 ppm of a NUC1 or NUC1A DNase comprising one or both of the motifs P[Q/E]L[W/Y] (SEQ ID NO: 77) or [K/H/E]NAW (SEQ ID NO: 78) preferably the polypeptide having DNase activity is selected from the group consisting of: a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 39, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 40, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 41, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 42, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 43, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 44, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 45, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 46, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 47, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 48, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 49, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 50, and a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 51; and at least 10 ppm of hexosaminidase having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 85 and at least one cleaning component.

One preferred embodiment relates to a cleaning composition comprising at least 10 ppm of a NUC1 or NUC1A DNase comprising one or both of the motifs P[Q/E]L[W/Y] (SEQ ID NO: 77) or [K/H/E]NAW (SEQ ID NO: 78) preferably the polypeptide having DNase activity is selected from the group consisting of: a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 39, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 40, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 41, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 42, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 43, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 44, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 45, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 46, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 47, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 48, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 49, a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 50, and a polypeptide having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 51; and at least 10 ppm of hexosaminidase having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 86 and at least one cleaning component.

One preferred embodiment relates to a cleaning composition comprising;

a) at least 0.01 ppm of a DNase selected from; a obtainable from *Bacillus licheniformis* having at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% sequence identity to the polypeptide shown in SEQ ID NO: 65, a DNase obtainable from *Bacillus subtilis* having at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% sequence identity to the polypeptide shown in SEQ ID NO: 66, a DNase obtainable from *Aspergillus oryzae* having at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% sequence identity to the polypeptide shown in SEQ ID NO: 67 or a DNase obtainable from *Trichoderma harzianum* having at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% sequence identity to the polypeptide shown in SEQ ID NO: 68; and

b) at least 0.01 ppm of hexosaminidase having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 82, and

c) at least one cleaning component.

One preferred embodiment relates to a cleaning composition comprising;

a) at least 0.01 ppm of a DNase selected from; a obtainable from *Bacillus licheniformis* having at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% sequence identity to the polypeptide shown in SEQ ID NO: 65, a DNase obtainable from *Bacillus subtilis* having at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% sequence identity to the polypeptide shown in SEQ ID NO: 66, a DNase obtainable from *Aspergillus oryzae* having at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% sequence identity to the polypeptide shown in SEQ ID NO: 67 or a DNase obtainable from *Trichoderma harzianum* having at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% sequence identity to the polypeptide shown in SEQ ID NO: 68; and

b) at least 0.01 ppm of hexosaminidase having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 83, and

c) at least one cleaning component.

One preferred embodiment relates to a cleaning composition comprising;

a) at least 0.01 ppm of a DNase selected from; a obtainable from *Bacillus licheniformis* having at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% sequence

- identity to the polypeptide shown in SEQ ID NO: 65, a DNase obtainable from *Bacillus subtilis* having at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% sequence identity to the polypeptide shown in SEQ ID NO: 66, a DNase obtainable from *Aspergillus oryzae*
- 5 having at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% sequence identity to the polypeptide shown in SEQ ID NO: 67 or a DNase obtainable from *Trichoderma harzianum* having at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or
- 10 100% sequence identity to the polypeptide shown in SEQ ID NO: 68; and
- b) at least 0.01 ppm of hexosaminidase having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 84, and
- c) at least one cleaning component.

One preferred embodiment relates to a cleaning composition comprising;

- 15 a) at least 0.01 ppm of a DNase selected from; a obtainable from *Bacillus licheniformis* having at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% sequence identity to the polypeptide shown in SEQ ID NO: 65, a DNase obtainable from *Bacillus subtilis* having at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at
- 20 least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% sequence identity to the polypeptide shown in SEQ ID NO: 66, a DNase obtainable from *Aspergillus oryzae* having at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% sequence identity to the polypeptide shown in SEQ ID NO: 67 or a DNase obtainable from *Trichoderma*
- 25 *harzianum* having at least 60%, e.g., at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% sequence identity to the polypeptide shown in SEQ ID NO: 68; and
- b) at least 0.01 ppm of hexosaminidase having at least 80% sequence identity to the polypeptide shown in SEQ ID NO: 86, and
- 30 c) at least one cleaning component.

The choice of cleaning components may include, for textile care, the consideration of the type of textile to be cleaned, the type and/or degree of soiling, the temperature at which cleaning is to take place, and the formulation of the detergent product. Although components mentioned below are categorized by general header according to a particular functionality, this is not to be construed

35 as a limitation, as a component may comprise additional functionalities as will be appreciated by the skilled artisan.

Surfactants

The cleaning composition may comprise one or more surfactants, which may be anionic and/or cationic and/or non-ionic and/or semi-polar and/or zwitterionic, or a mixture thereof. In a particular embodiment, the detergent composition includes a mixture of one or more nonionic surfactants and one or more anionic surfactants. The surfactant(s) is typically present at a level of from about 0.1% to 60% by weight, such as about 1% to about 40%, or about 3% to about 20%, or about 3% to about 10%. The surfactant(s) is chosen based on the desired cleaning application, and may include any conventional surfactant(s) known in the art.

When included therein the detergent will usually contain from about 0.1% to about 40% by weight of an anionic surfactant, such as from about 0.25% to about 30%, including from about 0.5% to about 15%, from about 1% to about 10%, from about 5% to about 15%, or from about 15% to about 20%, or from about 20% to about 25% of an anionic surfactant. Non-limiting examples of anionic surfactants include sulfates and sulfonates, in particular, linear alkylbenzenesulfonates (LAS), isomers of LAS, branched alkylbenzenesulfonates (BABS), phenylalkanesulfonates, alpha-olefinsulfonates (AOS), olefin sulfonates, alkene sulfonates, alkane-2,3-diylbis(sulfates), hydroxyalkanesulfonates and disulfonates, alkyl sulfates (AS) such as sodium dodecyl sulfate (SDS), fatty alcohol sulfates (FAS), primary alcohol sulfates (PAS), alcohol ethersulfates (AES or AEOS or FES, also known as alcohol ethoxysulfates or fatty alcohol ether sulfates), secondary alkanesulfonates (SAS), paraffin sulfonates (PS), ester sulfonates, sulfonated fatty acid glycerol esters, alpha-sulfo fatty acid methyl esters (alpha-SFMe or SES) including methyl ester sulfonate (MES), alkyl- or alkenylsuccinic acid, dodecenylyl/tetradecenylyl succinic acid (DTSA), fatty acid derivatives of amino acids, diesters and monoesters of sulfo-succinic acid or salt of fatty acids (soap), and combinations thereof.

When included therein the detergent will usually contain from about 0.1% to about 40% by weight of a cationic surfactant, for example from about 0.5% to about 30%, in particular from about 1% to about 20%, from about 3% to about 10%, such as from about 3% to about 5%, from about 8% to about 12% or from about 10% to about 12%. Non-limiting examples of cationic surfactants include alkyldimethylethanolamine quat (ADMEAQ), cetyltrimethylammonium bromide (CTAB), dimethyldistearylammonium chloride (DSDMAC), and alkylbenzyltrimethylammonium, alkyl quaternary ammonium compounds, alkoxyated quaternary ammonium (AQA) compounds, ester quats, and combinations thereof.

When included therein the detergent will usually contain from about 0.2% to about 40% by weight of a nonionic surfactant, for example from about 0.5% to about 30%, in particular from about 1% to about 20%, from about 3% to about 10%, such as from about 3% to about 5%, from about 8% to about 12%, or from about 10% to about 12%. Non-limiting examples of nonionic surfactants include alcohol ethoxylates (AE or AEO), alcohol propoxylates, propoxylated fatty alcohols (PFA), alkoxyated fatty acid alkyl esters, such as ethoxylated and/or propoxylated fatty acid alkyl esters, alkylphenol ethoxylates (APE), nonylphenol ethoxylates (NPE), alkylpolyglycosides (APG),

alkoxylated amines, fatty acid monoethanolamides (FAM), fatty acid diethanolamides (FADA), ethoxylated fatty acid monoethanolamides (EFAM), propoxylated fatty acid monoethanolamides (PFAM), polyhydroxyalkyl fatty acid amides, or N-acyl N-alkyl derivatives of glucosamine (glucamides, GA, or fatty acid glucamides, FAGA), as well as products available under the trade names SPAN and TWEEN, and combinations thereof.

When included therein the detergent will usually contain from about 0.01 to about 10 % by weight of a semipolar surfactant. Non-limiting examples of semipolar surfactants include amine oxides (AO) such as alkyldimethylamineoxide, N-(coco alkyl)-N,N-dimethylamine oxide and N-(tallow-alkyl)-N,N-bis(2-hydroxyethyl)amine oxide, , and combinations thereof.

When included therein the detergent will usually contain from about 0.01 % to about 10 % by weight of a zwitterionic surfactant. Non-limiting examples of zwitterionic surfactants include betaines such as alkyldimethylbetaines, sulfobetaines, and combinations thereof.

Builders and Co-Builders

The detergent composition may contain about 0-65% by weight, such as from about 0.1% to about 65%, about 0.5% to about 60%, from about 1% to about 60%, from about 5% to about 60%, of a detergent builder or co-builder, or a mixture thereof. In a dish wash detergent, the level of builder is typically 40-65%, particularly 50-65%. The builder and/or co-builder may particularly be a chelating agent that forms water-soluble complexes with Ca and Mg. Any builder and/or co-builder known in the art for use in cleaning detergents may be utilized. Non-limiting examples of builders include zeolites, diphosphates (pyrophosphates), triphosphates such as sodium triphosphate (STP or STPP), carbonates such as sodium carbonate, soluble silicates such as sodium metasilicate, layered silicates (e.g., SKS-6 from Hoechst), ethanolamines such as 2-aminoethan-1-ol (MEA), diethanolamine (DEA, also known as 2,2'-iminodiethan-1-ol), triethanolamine (TEA, also known as 2,2',2''-nitrilotriethan-1-ol), and (carboxymethyl)inulin (CMI), and combinations thereof.

The detergent composition may also contain 0-50% by weight, such as about 5% to about 30%, of a detergent co-builder. The detergent composition may include a co-builder alone, or in combination with a builder, for example a zeolite builder. Non-limiting examples of co-builders include homopolymers of polyacrylates or copolymers thereof, such as poly(acrylic acid) (PAA) or copoly(acrylic acid/maleic acid) (PAA/PMA). Further non-limiting examples include citrate, chelators such as aminocarboxylates, aminopolycarboxylates and phosphonates, and alkyl- or alkenylsuccinic acid. Additional specific examples include 2,2',2''-nitrilotriacetic acid (NTA), ethylenediaminetetraacetic acid (EDTA), diethylenetriaminepentaacetic acid (DTPA), iminodisuccinic acid (IDS), ethylenediamine-N,N'-disuccinic acid (EDDS), methylglycinediacetic acid (MGDA), glutamic acid-N,N'-diacetic acid (GLDA), 1-hydroxyethane-1,1-diphosphonic acid (HEDP), ethylenediaminetetra(methylenephosphonic acid) (EDTMPA), diethylenetriaminepentakis(methylenephosphonic acid) (DTMPA or DTPMPA), N-(2-hydroxyethyl)iminodiacetic acid (EDG), aspartic acid-N-monoacetic acid (ASMA), aspartic acid-N,N'-diacetic acid (ASDA), aspartic acid-N-monopropionic acid (ASMP), iminodisuccinic acid (IDA),

N-(2-sulfomethyl)-aspartic acid (SMAS), N-(2-sulfoethyl)-aspartic acid (SEAS), N-(2-sulfomethyl)-glutamic acid (SMGL), N-(2-sulfoethyl)-glutamic acid (SEGL), N-methyliminodiacetic acid (MIDA), α -alanine-N,N-diacetic acid (α -ALDA), serine-N,N-diacetic acid (SEDA), isoserine-N,N-diacetic acid (ISDA), phenylalanine-N,N-diacetic acid (PHDA), anthranilic acid-N,N-diacetic acid (ANDA), sulfanilic acid-N,N-diacetic acid (SLDA), taurine-N,N-diacetic acid (TUDA) and sulfomethyl-N,N-diacetic acid (SMDA), N-(2-hydroxyethyl)ethylenediamine-N,N',N''-triacetic acid (HEDTA), diethanolglycine (DEG), diethylenetriamine penta(methylenephosphonic acid) (DTPMP), aminotris(methylenephosphonic acid) (ATMP), and combinations and salts thereof. Further exemplary builders and/or co-builders are described in, e.g., WO 09/102854, US 5977053.

10

Bleaching Systems

The cleaning composition may contain 0-30% by weight, such as from about 0.1% to about 25%, from about 0.5% to about 25%, from about 1% to about 20%, of a bleaching system. Any bleaching system comprising components known in the art for use in cleaning detergents may be utilized. Suitable bleaching system components include sources of hydrogen peroxide; sources of peracids; and bleach catalysts or boosters.

15

Sources of hydrogen peroxide:

Suitable sources of hydrogen peroxide are inorganic persalts, including alkali metal salts such as sodium percarbonate and sodium perborates (usually mono- or tetrahydrate), and hydrogen peroxide—urea (1/1).

20

Sources of peracids:

Peracids may be (a) incorporated directly as preformed peracids or (b) formed in situ in the wash liquor from hydrogen peroxide and a bleach activator (perhydrolysis) or (c) formed in situ in the wash liquor from hydrogen peroxide and a perhydrolase and a suitable substrate for the latter, e.g., an ester.

25

a) Suitable preformed peracids include, but are not limited to, peroxybenzoic acid and its ring-substituted derivatives, peroxy- α -naphthoic acid, peroxyphthalic acid, peroxyauric acid, peroxysebacic acid, ϵ -phthalimidoperoxyacaproic acid [phthalimidoperoxyhexanoic acid (PAP)], and o-carboxybenzamidoperoxyacaproic acid; aliphatic and aromatic diperoxydicarboxylic acids such as diperoxydodecanedioic acid, diperoxyazelaic acid, diperoxysebacic acid, diperoxybrassylic acid, 2-decyldiperoxybutanedioic acid, and diperoxyphthalic, -isophthalic and -terephthalic acids; perimidic acids; peroxymonosulfuric acid; peroxydisulfuric acid; peroxyphosphoric acid; peroxyasilicic acid; and mixtures of said compounds. It is understood that the peracids mentioned may in some cases be best added as suitable salts, such as alkali metal salts (e.g., Oxone®) or alkaline earth-metal salts.

30

b) Suitable bleach activators include those belonging to the class of esters, amides, imides, nitriles or anhydrides and, where applicable, salts thereof. Suitable examples are tetraacetythylenediamine (TAED), sodium 4-[(3,5,5-trimethylhexanoyl)oxy]benzene-1-sulfonate

(ISONOBS), sodium 4-(dodecanoyloxy)benzene-1-sulfonate (LOBS), sodium 4-(decanoyloxy)benzene-1-sulfonate, 4-(decanoyloxy)benzoic acid (DOBA), sodium 4-(nonanoyloxy)benzene-1-sulfonate (NOBS), and/or those disclosed in WO98/17767. A particular family of bleach activators of interest was disclosed in EP624154 and particularly preferred in that family is acetyl triethyl citrate (ATC). ATC or a short chain triglyceride like triacetin has the advantage that they are environmentally friendly. Furthermore, acetyl triethyl citrate and triacetin have good hydrolytical stability in the product upon storage and are efficient bleach activators. Finally, ATC is multifunctional, as the citrate released in the perhydrolysis reaction may function as a builder.

10

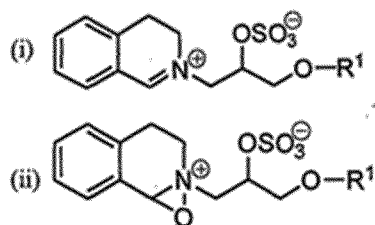
Bleach catalysts and boosters

The bleaching system may also include a bleach catalyst or booster.

Some non-limiting examples of bleach catalysts that may be used in the compositions of the present invention include manganese oxalate, manganese acetate, manganese-collagen, cobalt-amine catalysts and manganese triazacyclononane (MnTACN) catalysts; particularly preferred are complexes of manganese with 1,4,7-trimethyl-1,4,7-triazacyclononane (Me₃-TACN) or 1,2,4,7-tetramethyl-1,4,7-triazacyclononane (Me₄-TACN), in particular Me₃-TACN, such as the dinuclear manganese complex [(Me₃-TACN)Mn(O)₃Mn(Me₃-TACN)](PF₆)₂, and [2,2',2''-nitriлотris(ethane-1,2-diylazanylylidene-κN-methanylylidene)triphenolato-κ3O]manganese(III). The bleach catalysts may also be other metal compounds; such as iron or cobalt complexes.

15

In some embodiments, where a source of a peracid is included, an organic bleach catalyst or bleach booster may be used having one of the following formulae:



20

(iii) and mixtures thereof; wherein each R₁ is independently a branched alkyl group containing from 9 to 24 carbons or linear alkyl group containing from 11 to 24 carbons, preferably each R₁ is independently a branched alkyl group containing from 9 to 18 carbons or linear alkyl group containing from 11 to 18 carbons, more preferably each R₁ is independently selected from the group consisting of 2-propylheptyl, 2-butyloctyl, 2-pentylonyl, 2-hexyldecyl, dodecyl, tetradecyl, hexadecyl, octadecyl, isononyl, isodecyl, isotridecyl and isopentadecyl.

25

Other exemplary bleaching systems are described, e.g. in WO2007/087258, WO2007/087244, WO2007/087259, EP1867708 (Vitamin K) and WO2007/087242. Suitable photobleaches may for example be sulfonated zinc or aluminium phthalocyanines.

Metal care agents

Metal care agents may prevent or reduce the tarnishing, corrosion or oxidation of metals, including aluminium, stainless steel and non-ferrous metals, such as silver and copper. Suitable examples include one or more of the following:

- 5 (a) benzotriazoles, including benzotriazole or bis-benzotriazole and substituted derivatives thereof. Benzotriazole derivatives are those compounds in which the available substitution sites on the aromatic ring are partially or completely substituted. Suitable substituents include linear or branch-chain C₁-C₂₀- alkyl groups (e.g., C₁-C₂₀- alkyl groups) and hydroxyl, thio, phenyl or halogen such as fluorine, chlorine, bromine and iodine.
- 10 (b) metal salts and complexes chosen from the group consisting of zinc, manganese, titanium, zirconium, hafnium, vanadium, cobalt, gallium and cerium salts and/or complexes, the metals being in one of the oxidation states II, III, IV, V or VI. In one aspect, suitable metal salts and/or metal complexes may be chosen from the group consisting of Mn(II) sulphate, Mn(II) citrate, Mn(II) stearate, Mn(II) acetylacetonate, K⁺TiF₆ (e.g., K₂TiF₆), K⁺ZrF₆ (e.g., K₂ZrF₆), CoSO₄, Co(NO₃)₂ and Ce(NO₃)₃, zinc salts, for example zinc sulphate, hydrozincite or zinc acetate.;
- 15 (c) silicates, including sodium or potassium silicate, sodium disilicate, sodium metasilicate, crystalline phyllosilicate and mixtures thereof.

Further suitable organic and inorganic redox-active substances that act as silver/copper corrosion inhibitors are disclosed in WO 94/26860 and WO 94/26859. Preferably the composition
20 of the invention comprises from 0.1 to 5% by weight of the composition of a metal care agent, preferably the metal care agent is a zinc salt.

Hydrotropes

The cleaning composition may contain 0-10% by weight, for example 0-5% by weight, such as
25 about 0.5 to about 5%, or about 3% to about 5%, of a hydrotrope. Any hydrotrope known in the art for use in detergents may be utilized. Non-limiting examples of hydrotropes include sodium benzenesulfonate, sodium p-toluene sulfonate (STS), sodium xylene sulfonate (SXS), sodium cumene sulfonate (SCS), sodium cymene sulfonate, amine oxides, alcohols and polyglycoethers, sodium hydroxynaphthoate, sodium hydroxynaphthalene sulfonate, sodium ethylhexyl sulfate, and
30 combinations thereof.

Polymers

The cleaning composition may contain 0-10% by weight, such as 0.5-5%, 2-5%, 0.5-2% or 0.2-
35 1% of a polymer. Any polymer known in the art for use in detergents may be utilized. The polymer may function as a co-builder as mentioned above, or may provide antiredeposition, fiber protection, soil release, dye transfer inhibition, grease cleaning and/or anti-foaming properties. Some polymers may have more than one of the above-mentioned properties and/or more than one of the below-mentioned motifs. Exemplary polymers include (carboxymethyl)cellulose (CMC), poly(vinyl alcohol)

(PVA), poly(vinylpyrrolidone) (PVP), poly(ethyleneglycol) or poly(ethylene oxide) (PEG), ethoxylated poly(ethyleneimine), carboxymethyl inulin (CMI), and polycarboxylates such as PAA, PAA/PMA, poly-aspartic acid, and lauryl methacrylate/acrylic acid copolymers, hydrophobically modified CMC (HM-CMC) and silicones, copolymers of terephthalic acid and oligomeric glycols, copolymers of poly(ethylene terephthalate) and poly(oxyethene terephthalate) (PET-POET), PVP, poly(vinylimidazole) (PVI), poly(vinylpyridine-N-oxide) (PVPO or PVPNO) and polyvinylpyrrolidone-vinylimidazole (PVPVI). Suitable examples include PVP-K15, PVP-K30, ChromaBond S-400, ChromaBond S-403E and Chromabond S-100 from Ashland Aqualon, and Sokalan® HP 165, Sokalan® HP 50 (Dispersing agent), Sokalan® HP 53 (Dispersing agent), Sokalan® HP 59 (Dispersing agent), Sokalan® HP 56 (dye transfer inhibitor), Sokalan® HP 66 K (dye transfer inhibitor) from BASF. Further exemplary polymers include sulfonated polycarboxylates, polyethylene oxide and polypropylene oxide (PEO-PPO) and diquatonium ethoxy sulfate. Other exemplary polymers are disclosed in, e.g., WO 2006/130575. Salts of the above-mentioned polymers are also contemplated. Particularly preferred polymer is ethoxylated homopolymer Sokalan® HP 20 from BASF, which helps to prevent redeposition of soil in the wash liquor.

Fabric hueing agents

The cleaning composition of the present invention may also include fabric hueing agents such as dyes or pigments, which when formulated in detergent compositions can deposit onto a fabric when said fabric is contacted with a wash liquor comprising said detergent compositions and thus altering the tint of said fabric through absorption/reflection of visible light. Fluorescent whitening agents emit at least some visible light. In contrast, fabric hueing agents alter the tint of a surface as they absorb at least a portion of the visible light spectrum. Suitable fabric hueing agents include dyes and dye-clay conjugates, and may also include pigments. Suitable dyes include small molecule dyes and polymeric dyes. Suitable small molecule dyes include small molecule dyes selected from the group consisting of dyes falling into the Colour Index (C.I.) classifications of Direct Blue, Direct Red, Direct Violet, Acid Blue, Acid Red, Acid Violet, Basic Blue, Basic Violet and Basic Red, or mixtures thereof, for example as described in WO2005/03274, WO2005/03275, WO2005/03276 and EP1876226 (hereby incorporated by reference). The detergent composition preferably comprises from about 0.00003 wt% to about 0.2 wt%, from about 0.00008 wt% to about 0.05 wt%, or even from about 0.0001 wt% to about 0.04 wt% fabric hueing agent. The composition may comprise from 0.0001 wt% to 0.2 wt% fabric hueing agent, this may be especially preferred when the composition is in the form of a unit dose pouch. Suitable hueing agents are also disclosed in, e.g. WO 2007/087257 and WO2007/087243.

35

Enzymes

The cleaning composition may comprise one or more additional enzymes such as one or more lipase, cutinase, an amylase, carbohydrase, cellulase, pectinase, mannanase, arabinase, galactanase, xylanase, oxidase, e.g., a laccase, and/or peroxidase.

- 5 In general, the properties of the selected enzyme(s) should be compatible with the selected detergent, (i.e., pH-optimum, compatibility with other enzymatic and non-enzymatic ingredients, etc.), and the enzyme(s) should be present in effective amounts.

Proteases

- 10 Suitable proteases for the compositions of the invention include those of bacterial, fungal, plant, viral or animal origin e.g. vegetable or microbial origin. Microbial origin is preferred. Chemically modified or protein engineered mutants are included. It may be an alkaline protease, such as a serine protease or a metalloprotease. A serine protease may for example be of the S1 family, such as trypsin, or the S8 family such as subtilisin. A metalloproteases
15 protease may for example be a thermolysin from e.g. family M4 or other metalloprotease such as those from M5, M7 or M8 families.

- Examples of subtilases are those derived from *Bacillus* such as *Bacillus lentus*, *Bacillus alkalophilus*, *Bacillus subtilis*, *Bacillus amyloliquefaciens*, *Bacillus pumilus* and *Bacillus gibsonii* described in; US7262042 and WO09/021867. *Subtilisin lentus*, *Subtilisin Novo*, *subtilisin*
20 *Carlsberg*, *Bacillus licheniformis*, *subtilisin BPN'*, *subtilisin 309*, *subtilisin 147* and *subtilisin 168* and e.g. protease PD138 described in (WO93/18140). Other useful proteases may be those described in WO01/016285 and WO02/016547. Examples of trypsin-like proteases are trypsin (e.g. of porcine or bovine origin) and the *Fusarium* protease described in WO94/25583 and WO05/040372, and the chymotrypsin proteases derived from *Cellulomonas* described in
25 WO05/052161 and WO05/052146.

A further preferred protease is the alkaline protease from *Bacillus lentus* DSM 5483, as described for example in WO95/23221, and variants thereof which are described in WO92/21760, WO95/23221, EP1921147 and EP1921148.

- Examples of metalloproteases are the neutral metalloprotease as described in
30 WO07/044993 (Proctor & Gamble/Genencor Int.) such as those derived from *Bacillus amyloliquefaciens*.

- Examples of useful proteases are the variants described in: WO89/06279, WO92/19729, WO96/034946, WO98/20115, WO98/20116, WO99/011768, WO01/44452, WO03/006602, WO04/03186, WO04/041979, WO07/006305, WO11/036263, WO11/036264, especially the
35 variants with substitutions in one or more of the following positions: 3, 4, 9, 15, 24, 27, 42, 55, 59, 60, 66, 74, 85, 96, 97, 98, 99, 100, 101, 102, 104, 116, 118, 121, 126, 127, 128, 154, 156, 157, 158, 161, 164, 176, 179, 182, 185, 188, 189, 193, 198, 199, 200, 203, 206, 211, 212, 216, 218, 226, 229, 230, 239, 246, 255, 256, 268 and 269 wherein the positions correspond to the

positions of the *Bacillus lentus* protease shown in SEQ ID NO 79. More preferred the protease variants may comprise one or more of the mutations selected from the group consisting of: S3T, V4I, S9R, S9E, A15T, S24G, S24R, K27R, N42R, S55P, G59E, G59D, N60D, N60E, V66A, N74D, S85R, A96S, S97G, S97D, S97A, S97SD, S99E, S99D, S99G, S99M, S99N, S99R, S99H, S101A, V102I, V102Y, V102N, S104A, G116V, G116R, H118D, H118N, A120S, S126L, P127Q, S128A, S154D, A156E, G157D, G157P, S158E, Y161A, R164S, Q176E, N179E, S182E, Q185N, A188P, G189E, V193M, N198D, V199I, Y203W, S206G, L211Q, L211D, N212D, N212S, M216S, A226V, K229L, Q230H, Q239R, N246K, N255W, N255D, N255E, L256E, L256D T268A and R269H. The protease variants are preferably variants of the *Bacillus* 5 *lentus* protease (Savinase®) shown in SEQ ID NO 79, the *Bacillus amylolichenifaciens* protease (BPN') shown in SEQ ID NO 80. The protease variants preferably have at least 80 % sequence identity to SEQ ID NO 79 or SEQ ID NO 80 of WO 2016/001449.

A protease variant comprising a substitution at one or more positions corresponding to positions 171, 173, 175, 179, or 180 of SEQ ID NO: 81, wherein said protease variant has a 15 sequence identity of at least 75% but less than 100% to SEQ ID NO: 81.

Suitable commercially available protease enzymes include those sold under the trade names Alcalase®, Duralase™, Durazym™, Relase®, Relase® Ultra, Savinase®, Savinase® Ultra, Primase®, Polarzyme®, Kannase®, Liquanase®, Liquanase® Ultra, Ovozyme®, Coronase®, Coronase® Ultra, Blaze®, Blaze Evity® 100T, Blaze Evity® 125T, Blaze Evity® 20 150T, Neutrase®, Everlase® and Esperase® (Novozymes A/S), those sold under the tradename Maxatase®, Maxacal®, Maxapem®, Purafect Ox®, Purafect OxP®, Puramax®, FN2®, FN3®, FN4®, Excellase®, Excellenz P1000™, Excellenz P1250™, Eraser®, Preferenz P100™, Purafect Prime®, Preferenz P110™, Effectenz P1000™, Purafect®™, Effectenz P1050™, Purafect Ox®™, Effectenz P2000™, Purafast®, Properase®, Opticlean® and Optimase® 25 (Danisco/DuPont), Axapem™ (Gist-Brocases N.V.), BLAP (sequence shown in Figure 29 of US5352604) and variants hereof (Henkel AG) and KAP (*Bacillus alkalophilus* subtilisin) from Kao.

Cellulases

Suitable cellulases include those of bacterial or fungal origin. Chemically modified or protein 30 engineered mutants are included. Suitable cellulases include cellulases from the genera *Bacillus*, *Pseudomonas*, *Humicola*, *Fusarium*, *Thielavia*, *Acremonium*, e.g., the fungal cellulases produced from *Humicola insolens*, *Myceliophthora thermophila* and *Fusarium oxysporum* disclosed in US 4,435,307, US 5,648,263, US 5,691,178, US 5,776,757 and WO 89/09259.

Especially suitable cellulases are the alkaline or neutral cellulases having colour care benefits. 35 Examples of such cellulases are cellulases described in EP 0 495 257, EP 0 531 372, WO 96/11262, WO 96/29397, WO 98/08940. Other examples are cellulase variants such as those described in WO 94/07998, EP 0 531 315, US 5,457,046, US 5,686,593, US 5,763,254, WO 95/24471, WO 98/12307 and WO99/001544.

Other cellulases are endo-beta-1,4-glucanase enzyme having a sequence of at least 97% identity to the amino acid sequence of position 1 to position 773 of SEQ ID NO:2 of WO 2002/099091 or a family 44 xyloglucanase, which a xyloglucanase enzyme having a sequence of at least 60% identity to positions 40-559 of SEQ ID NO: 2 of WO 2001/062903.

5 Commercially available cellulases include Celluzyme™, and Carezyme™ (Novozymes A/S) Carezyme Premium™ (Novozymes A/S), Celluclean™ (Novozymes A/S), Celluclean Classic™ (Novozymes A/S), Cellusoft™ (Novozymes A/S), Whitezyme™ (Novozymes A/S), Clazinase™, and Puradax HA™ (Genencor International Inc.), and KAC-500(B)™ (Kao Corporation).

Mannanases

10 Suitable mannanases include those of bacterial or fungal origin. Chemically or genetically modified mutants are included. The mannanase may be an alkaline mannanase of Family 5 or 26. It may be a wild-type from *Bacillus* or *Humicola*, particularly *B. agaradhaerens*, *B. licheniformis*, *B. halodurans*, *B. clausii*, or *H. insolens*. Suitable mannanases are described in WO 1999/064619. A commercially available mannanase is Mannaway (Novozymes A/S).

Peroxidases/Oxidases

15 Suitable peroxidases/oxidases include those of plant, bacterial or fungal origin. Chemically modified or protein engineered mutants are included. Examples of useful peroxidases include peroxidases from *Coprinus*, e.g., from *C. cinereus*, and variants thereof as those described in WO 93/24618, WO 95/10602, and WO 98/15257. Commercially available peroxidases include
20 Guardzyme™ (Novozymes A/S).

Lipases and Cutinases:

Suitable lipases and cutinases include those of bacterial or fungal origin. Chemically modified or protein engineered mutant enzymes are included. Examples include lipase from *Thermomyces*, e.g. from *T. lanuginosus* (previously named *Humicola lanuginosa*) as described in EP258068 and
25 EP305216, cutinase from *Humicola*, e.g. *H. insolens* (WO96/13580), lipase from strains of *Pseudomonas* (some of these now renamed to *Burkholderia*), e.g. *P. alcaligenes* or *P. pseudoalcaligenes* (EP218272), *P. cepacia* (EP331376), *P. sp.* strain SD705 (WO95/06720 & WO96/27002), *P. wisconsinensis* (WO96/12012), GDSL-type *Streptomyces* lipases (WO10/065455), cutinase from *Magnaporthe grisea* (WO10/107560), cutinase from *Pseudomonas mendocina* (US5,389,536), lipase from *Thermobifida fusca* (WO11/084412), *Geobacillus stearothermophilus* lipase (WO11/084417), lipase from *Bacillus subtilis* (WO11/084599), and lipase from *Streptomyces griseus* (WO11/150157) and *S. pristinaespiralis* (WO12/137147).

30 Other examples are lipase variants such as those described in EP407225, WO92/05249, WO94/01541, WO94/25578, WO95/14783, WO95/30744, WO95/35381, WO95/22615, WO96/00292, WO97/04079, WO97/07202, WO00/34450, WO00/60063, WO01/92502, WO07/87508 and WO09/109500.

Preferred commercial lipase products include Lipolase™, Lipex™; Lipolex™ and Lipoclean™ (Novozymes A/S), Lumafast (originally from Genencor) and Lipomax (originally from Gist-Brocades).

Still other examples are lipases sometimes referred to as acyltransferases or perhydrolases, e.g. acyltransferases with homology to *Candida antarctica* lipase A (WO10/111143), acyltransferase from *Mycobacterium smegmatis* (WO05/56782), perhydrolases from the CE 7 family (WO09/67279), and variants of the *M. smegmatis* perhydrolase in particular the S54V variant used in the commercial product Gentle Power Bleach from Huntsman Textile Effects Pte Ltd (WO10/100028).

Amylases:

Suitable amylases include alpha-amylases and/or a glucoamylases and may be of bacterial or fungal origin. Chemically modified or protein engineered mutants are included. Amylases include, for example, alpha-amylases obtained from *Bacillus*, e.g., a special strain of *Bacillus licheniformis*, described in more detail in GB 1,296,839.

Suitable amylases include amylases having SEQ ID NO: 2 in WO 95/10603 or variants having 90% sequence identity to SEQ ID NO: 3 thereof. Preferred variants are described in WO 94/02597, WO 94/18314, WO 97/43424 and SEQ ID NO: 4 of WO 99/019467, such as variants with substitutions in one or more of the following positions: 15, 23, 105, 106, 124, 128, 133, 154, 156, 178, 179, 181, 188, 190, 197, 201, 202, 207, 208, 209, 211, 243, 264, 304, 305, 391, 408, and 444.

Different suitable amylases include amylases having SEQ ID NO: 6 in WO 02/010355 or variants thereof having 90% sequence identity to SEQ ID NO: 6. Preferred variants of SEQ ID NO: 6 are those having a deletion in positions 181 and 182 and a substitution in position 193.

Other amylases which are suitable are hybrid alpha-amylase comprising residues 1-33 of the alpha-amylase derived from *B. amyloliquefaciens* shown in SEQ ID NO: 6 of WO 2006/066594 and residues 36-483 of the *B. licheniformis* alpha-amylase shown in SEQ ID NO: 4 of WO 2006/066594 or variants having 90% sequence identity thereof. Preferred variants of this hybrid alpha-amylase are those having a substitution, a deletion or an insertion in one of more of the following positions: G48, T49, G107, H156, A181, N190, M197, I201, A209 and Q264. Most preferred variants of the hybrid alpha-amylase comprising residues 1-33 of the alpha-amylase derived from *B. amyloliquefaciens* shown in SEQ ID NO: 6 of WO 2006/066594 and residues 36-483 of SEQ ID NO: 4 are those having the substitutions:

M197T;

H156Y+A181T+N190F+A209V+Q264S; or

G48A+T49I+G107A+H156Y+A181T+N190F+I201F+A209V+Q264S.

Further amylases which are suitable are amylases having SEQ ID NO: 6 in WO 99/019467 or variants thereof having 90% sequence identity to SEQ ID NO: 6. Preferred variants of SEQ ID NO: 6 are those having a substitution, a deletion or an insertion in one or more of the following positions:

R181, G182, H183, G184, N195, I206, E212, E216 and K269. Particularly preferred amylases are those having deletion in positions R181 and G182, or positions H183 and G184.

Additional amylases which can be used are those having SEQ ID NO: 1, SEQ ID NO: 3, SEQ ID NO: 2 or SEQ ID NO: 7 of WO 96/023873 or variants thereof having 90% sequence identity to SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3 or SEQ ID NO: 7. Preferred variants of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3 or SEQ ID NO: 7 are those having a substitution, a deletion or an insertion in one or more of the following positions: 140, 181, 182, 183, 184, 195, 206, 212, 243, 260, 269, 304 and 476, using SEQ ID 2 of WO 96/023873 for numbering. More preferred variants are those having a deletion in two positions selected from 181, 182, 183 and 184, such as 181 and 182, 182 and 183, or positions 183 and 184. Most preferred amylase variants of SEQ ID NO: 1, SEQ ID NO: 2 or SEQ ID NO: 7 are those having a deletion in positions 183 and 184 and a substitution in one or more of positions 140, 195, 206, 243, 260, 304 and 476.

Other amylases which can be used are amylases having SEQ ID NO: 2 of WO 08/153815, SEQ ID NO: 10 in WO 01/66712 or variants thereof having 90% sequence identity to SEQ ID NO: 2 of WO 08/153815 or 90% sequence identity to SEQ ID NO: 10 in WO 01/66712. Preferred variants of SEQ ID NO: 10 in WO 01/66712 are those having a substitution, a deletion or an insertion in one or more of the following positions: 176, 177, 178, 179, 190, 201, 207, 211 and 264.

Further suitable amylases are amylases having SEQ ID NO: 2 of WO 09/061380 or variants having 90% sequence identity to SEQ ID NO: 2 thereof. Preferred variants of SEQ ID NO: 2 are those having a truncation of the C-terminus and/or a substitution, a deletion or an insertion in one or more of the following positions: Q87, Q98, S125, N128, T131, T165, K178, R180, S181, T182, G183, M201, F202, N225, S243, N272, N282, Y305, R309, D319, Q320, Q359, K444 and G475. More preferred variants of SEQ ID NO: 2 are those having the substitution in one or more of the following positions: Q87E,R, Q98R, S125A, N128C, T131I, T165I, K178L, T182G, M201L, F202Y, N225E,R, N272E,R, S243Q,A,E,D, Y305R, R309A, Q320R, Q359E, K444E and G475K and/or deletion in position R180 and/or S181 or of T182 and/or G183. Most preferred amylase variants of SEQ ID NO: 2 are those having the substitutions:

N128C+K178L+T182G+Y305R+G475K;

N128C+K178L+T182G+F202Y+Y305R+D319T+G475K;

S125A+N128C+K178L+T182G+Y305R+G475K; or

S125A+N128C+T131I+T165I+K178L+T182G+Y305R+G475K wherein the variants are C-terminally truncated and optionally further comprises a substitution at position 243 and/or a deletion at position 180 and/or position 181.

Further suitable amylases are amylases having SEQ ID NO: 1 of WO13184577 or variants having 90% sequence identity to SEQ ID NO: 1 thereof. Preferred variants of SEQ ID NO: 1 are those having a substitution, a deletion or an insertion in one or more of the following positions: K176, R178, G179, T180, G181, E187, N192, M199, I203, S241, R458, T459, D460, G476 and G477. More preferred variants of SEQ ID NO: 1 are those having the substitution in one or more of the

following positions: K176L, E187P, N192FYH, M199L, I203YF, S241QADN, R458N, T459S, D460T, G476K and G477K and/or deletion in position R178 and/or S179 or of T180 and/or G181.

Most preferred amylase variants of SEQ ID NO: 1 are those having the substitutions:

E187P+I203Y+G476K

5 E187P+I203Y+R458N+T459S+D460T+G476K

wherein the variants optionally further comprise a substitution at position 241 and/or a deletion at position 178 and/or position 179.

Further suitable amylases are amylases having SEQ ID NO: 1 of WO10104675 or variants having 90% sequence identity to SEQ ID NO: 1 thereof. Preferred variants of SEQ ID NO: 1 are those having a substitution, a deletion or an insertion in one of more of the following positions: N21, D97, V128 K177, R179, S180, I181, G182, M200, L204, E242, G477 and G478. More preferred variants of SEQ ID NO: 1 are those having the substitution in one of more of the following positions: N21D, D97N, V128I K177L, M200L, L204YF, E242QA, G477K and G478K and/or deletion in position R179 and/or S180 or of I181 and/or G182. Most preferred amylase variants of SEQ ID NO: 1 are those having the substitutions:

N21D+D97N+V128I

wherein the variants optionally further comprise a substitution at position 200 and/or a deletion at position 180 and/or position 181.

Other suitable amylases are the alpha-amylase having SEQ ID NO: 12 in WO01/66712 or a variant having at least 90% sequence identity to SEQ ID NO: 12. Preferred amylase variants are those having a substitution, a deletion or an insertion in one of more of the following positions of SEQ ID NO: 12 in WO01/66712: R28, R118, N174; R181, G182, D183, G184, G186, W189, N195, M202, Y298, N299, K302, S303, N306, R310, N314; R320, H324, E345, Y396, R400, W439, R444, N445, K446, Q449, R458, N471, N484. Particular preferred amylases include variants having a deletion of D183 and G184 and having the substitutions R118K, N195F, R320K and R458K, and a variant additionally having substitutions in one or more position selected from the group: M9, G149, G182, G186, M202, T257, Y295, N299, M323, E345 and A339, most preferred a variant that additionally has substitutions in all these positions.

Other examples are amylase variants such as those described in WO2011/098531, WO2013/001078 and WO2013/001087.

Commercially available amylases are DuramyITM, TermamyITM, FungamyITM, Stainzyme TM, Stainzyme PlusTM, NatalaseTM, Liquozyme X and BANTM (from Novozymes A/S), and RapidaseTM, PurastarTM/EffectenzTM, Powerase, Preferenz S1000, Preferenz S100 and Preferenz S110 (from Genencor International Inc./DuPont).

35 Peroxidases/Oxidases

A peroxidase according to the invention is a peroxidase enzyme comprised by the enzyme classification EC 1.11.1.7, as set out by the Nomenclature Committee of the International Union of

Biochemistry and Molecular Biology (IUBMB), or any fragment derived therefrom, exhibiting peroxidase activity.

Suitable peroxidases include those of plant, bacterial or fungal origin. Chemically modified or protein engineered mutants are included. Examples of useful peroxidases include peroxidases from *Coprinopsis*, e.g., from *C. cinerea* (EP 179,486), and variants thereof as those described in WO 93/24618, WO 95/10602, and WO 98/15257.

A suitable peroxidase includes a haloperoxidase enzyme, such as chloroperoxidase, bromoperoxidase and compounds exhibiting chloroperoxidase or bromoperoxidase activity. Haloperoxidases are classified according to their specificity for halide ions. Chloroperoxidases (E.C. 1.11.1.10) catalyze formation of hypochlorite from chloride ions. Preferably, the haloperoxidase is a vanadium haloperoxidase, i.e., a vanadate-containing haloperoxidase. Haloperoxidases have been isolated from many different fungi, in particular from the fungus group dematiaceous hyphomycetes, such as *Caldariomyces*, e.g., *C. fumago*, *Alternaria*, *Curvularia*, e.g., *C. verruculosa* and *C. inaequalis*, *Drechslera*, *Ulocladium* and *Botrytis*.

Haloperoxidases have also been isolated from bacteria such as *Pseudomonas*, e.g., *P. pyrrocinia* and *Streptomyces*, e.g., *S. aureofaciens*.

A suitable oxidase includes in particular, any laccase enzyme comprised by the enzyme classification EC 1.10.3.2, or any fragment derived therefrom exhibiting laccase activity, or a compound exhibiting a similar activity, such as a catechol oxidase (EC 1.10.3.1), an o-aminophenol oxidase (EC 1.10.3.4), or a bilirubin oxidase (EC 1.3.3.5). Preferred laccase enzymes are enzymes of microbial origin. The enzymes may be derived from plants, bacteria or fungi (including filamentous fungi and yeasts). Suitable examples from fungi include a laccase derivable from a strain of *Aspergillus*, *Neurospora*, e.g., *N. crassa*, *Podospora*, *Botrytis*, *Collybia*, *Fomes*, *Lentinus*, *Pleurotus*, *Trametes*, e.g., *T. villosa* and *T. versicolor*, *Rhizoctonia*, e.g., *R. solani*, *Coprinopsis*, e.g., *C. cinerea*, *C. comatus*, *C. friesii*, and *C. plicatilis*, *Psathyrella*, e.g., *P. condelleana*, *Panaeolus*, e.g., *P. papilionaceus*, *Myceliophthora*, e.g., *M. thermophila*, *Schytalidium*, e.g., *S. thermophilum*, *Polyporus*, e.g., *P. pinsitus*, *Phlebia*, e.g., *P. radiata* (WO 92/01046), or *Coriolus*, e.g., *C. hirsutus* (JP 2238885). Suitable examples from bacteria include a laccase derivable from a strain of *Bacillus*. A laccase derived from *Coprinopsis* or *Myceliophthora* is preferred; in particular, a laccase derived from *Coprinopsis cinerea*, as disclosed in WO 97/08325; or from *Myceliophthora thermophila*, as disclosed in WO 95/33836.

Dispersants

The cleaning composition of the present invention can also contain dispersants. In particular, powdered detergents may comprise dispersants. Suitable water-soluble organic materials include the homo- or co-polymeric acids or their salts, in which the polycarboxylic acid comprises at least two carboxyl radicals separated from each other by not more than two carbon atoms. Suitable

dispersants are for example described in Powdered Detergents, Surfactant science series volume 71, Marcel Dekker, Inc.

Dye Transfer Inhibiting Agents

5 The cleaning composition of the present invention may also include one or more dye transfer inhibiting agents. Suitable polymeric dye transfer inhibiting agents include, but are not limited to, polyvinylpyrrolidone polymers, polyamine N-oxide polymers, copolymers of N-vinylpyrrolidone and N-vinylimidazole, polyvinylloxazolidones and polyvinylimidazoles or mixtures thereof. When present in a subject composition, the dye transfer inhibiting agents may be present at levels from about 10 0.0001 % to about 10%, from about 0.01% to about 5% or even from about 0.1% to about 3% by weight of the composition.

Fluorescent whitening agent

15 The cleaning composition of the present invention will preferably also contain additional components that may tint articles being cleaned, such as fluorescent whitening agent or optical brighteners. Where present the brightener is preferably at a level of about 0.01% to about 0.5%. Any fluorescent whitening agent suitable for use in a laundry detergent composition may be used in the composition of the present invention. The most commonly used fluorescent whitening agents are those belonging to the classes of diaminostilbene-sulfonic acid derivatives, diarylpyrazoline 20 derivatives and bisphenyl-distyryl derivatives. Examples of the diaminostilbene-sulfonic acid derivative type of fluorescent whitening agents include the sodium salts of: 4,4'-bis-(2-diethanolamino-4-anilino-s-triazin-6-ylamino) stilbene-2,2'-disulfonate, 4,4'-bis-(2,4-dianilino-s-triazin-6-ylamino) stilbene-2,2'-disulfonate, 4,4'-bis-(2-anilino-4-(N-methyl-N-2-hydroxyethylamino)-s-triazin-6-ylamino) stilbene-2,2'-disulfonate, 4,4'-bis-(4-phenyl-1,2,3-triazol-2-yl)stilbene-2,2'-disulfonate and sodium 5-(2H-naphtho[1,2-d][1,2,3]triazol-2-yl)-2-[(E)-2-phenylvinyl]benzenesulfonate. Preferred fluorescent whitening agents are Tinopal DMS and Tinopal CBS available from Ciba-Geigy AG, Basel, Switzerland. Tinopal DMS is the disodium salt of 4,4'-bis-(2-morpholino-4-anilino-s-triazin-6-ylamino) stilbene-2,2'-disulfonate. Tinopal CBS is the disodium salt of 2,2'-bis-(phenyl-styryl)-disulfonate. Also preferred are fluorescent whitening agents 30 is the commercially available Parawhite KX, supplied by Paramount Minerals and Chemicals, Mumbai, India. Other fluorescers suitable for use in the invention include the 1-3-diaryl pyrazolines and the 7-alkylaminocoumarins. Suitable fluorescent brightener levels include lower levels of from about 0.01, from 0.05, from about 0.1 or even from about 0.2 wt % to upper levels of 0.5 or even 0.75 wt%.

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Soil release polymers

The cleaning composition of the present invention may also include one or more soil release polymers which aid the removal of soils from fabrics such as cotton and polyester based fabrics, in

particular the removal of hydrophobic soils from polyester based fabrics. The soil release polymers may for example be nonionic or anionic terephthalate based polymers, polyvinyl caprolactam and related copolymers, vinyl graft copolymers, polyester polyamides see for example Chapter 7 in Powdered Detergents, Surfactant science series volume 71, Marcel Dekker, Inc. Another type of soil release polymers is amphiphilic alkoxyated grease cleaning polymers comprising a core structure and a plurality of alkoxyate groups attached to that core structure. The core structure may comprise a polyalkylenimine structure or a polyalkanolamine structure as described in detail in WO 2009/087523 (hereby incorporated by reference). Furthermore, random graft co-polymers are suitable soil release polymers. Suitable graft co-polymers are described in more detail in WO 2007/138054, WO 2006/108856 and WO 2006/113314 (hereby incorporated by reference). Suitable polyethylene glycol polymers include random graft co-polymers comprising: (i) hydrophilic backbone comprising polyethylene glycol; and (ii) side chain(s) selected from the group consisting of: C4-C25 alkyl group, polypropylene, polybutylene, vinyl ester of a saturated C1-C6 monocarboxylic acid, C1-C 6 alkyl ester of acrylic or methacrylic acid, and mixtures thereof. Suitable polyethylene glycol polymers have a polyethylene glycol backbone with random grafted polyvinyl acetate side chains. The average molecular weight of the polyethylene glycol backbone can be in the range of from 2,000 Da to 20,000 Da, or from 4,000 Da to 8,000 Da. The molecular weight ratio of the polyethylene glycol backbone to the polyvinyl acetate side chains can be in the range of from 1: 1 to 1:5, or from 1: 1.2 to 1:2. The average number of graft sites per ethylene oxide units can be less than 1, or less than 0.8, the average number of graft sites per ethylene oxide units can be in the range of from 0.5 to 0.9, or the average number of graft sites per ethylene oxide units can be in the range of from 0.1 to 0.5, or from 0.2 to 0.4. A suitable polyethylene glycol polymer is Sokalan HP22. Other soil release polymers are substituted polysaccharide structures especially substituted cellulosic structures such as modified cellulose derivatives such as those described in EP 1867808 or WO 2003/040279 (both are hereby incorporated by reference). Suitable cellulosic polymers include cellulose, cellulose ethers, cellulose esters, cellulose amides and mixtures thereof. Suitable cellulosic polymers include anionically modified cellulose, nonionically modified cellulose, cationically modified cellulose, zwitterionically modified cellulose, and mixtures thereof. Suitable cellulosic polymers include methyl cellulose, carboxy methyl cellulose, ethyl cellulose, hydroxyl ethyl cellulose, hydroxyl propyl methyl cellulose, ester carboxy methyl cellulose, and mixtures thereof.

Anti-redeposition agents

The cleaning composition of the present invention may also include one or more anti-redeposition agents such as carboxymethylcellulose (CMC), polyvinyl alcohol (PVA), polyvinylpyrrolidone (PVP), polyoxyethylene and/or polyethyleneglycol (PEG), homopolymers of acrylic acid, copolymers of acrylic acid and maleic acid, and ethoxylated polyethyleneimines. The

cellulose based polymers described under soil release polymers above may also function as anti-redeposition agents.

Rheology Modifiers

The cleaning composition of the present invention may also include one or more rheology modifiers, structurants or thickeners, as distinct from viscosity reducing agents. The rheology modifiers are selected from the group consisting of non-polymeric crystalline, hydroxy-functional materials, polymeric rheology modifiers which impart shear thinning characteristics to the aqueous liquid matrix of a liquid detergent composition. The rheology and viscosity of the detergent can be modified and adjusted by methods known in the art, for example as shown in EP 2169040.

Other suitable cleaning composition components include, but are not limited to, anti-shrink agents, anti-wrinkling agents, bactericides, binders, carriers, dyes, enzyme stabilizers, fabric softeners, fillers, foam regulators, hydrotropes, perfumes, pigments, sod suppressors, solvents, and structurants for liquid detergents and/or structure elasticizing agents.

Formulation of cleaning compositions

The cleaning composition of the invention may be in any convenient form, e.g., a bar, a homogenous tablet, a tablet having two or more layers, a pouch having one or more compartments, a regular or compact powder, a granule, a paste, a gel, or a regular, compact or concentrated liquid.

Pouches can be configured as single or multicompartments. It can be of any form, shape and material which is suitable for hold the composition, e.g. without allowing the release of the composition to release of the composition from the pouch prior to water contact. The pouch is made from water soluble film which encloses an inner volume. Said inner volume can be divided into compartments of the pouch. Preferred films are polymeric materials preferably polymers which are formed into a film or sheet. Preferred polymers, copolymers or derivatives thereof are selected polyacrylates, and water soluble acrylate copolymers, methyl cellulose, carboxy methyl cellulose, sodium dextrin, ethyl cellulose, hydroxyethyl cellulose, hydroxypropyl methyl cellulose, malto dextrin, poly methacrylates, most preferably polyvinyl alcohol copolymers and, hydroxypropyl methyl cellulose (HPMC). Preferably the level of polymer in the film for example PVA is at least about 60%. Preferred average molecular weight will typically be about 20,000 to about 150,000. Films can also be of blended compositions comprising hydrolytically degradable and water soluble polymer blends such as polylactide and polyvinyl alcohol (known under the Trade reference M8630 as sold by MonoSol LLC, Indiana, USA) plus plasticisers like glycerol, ethylene glycerol, propylene glycol, sorbitol and mixtures thereof. The pouches can comprise a solid laundry cleaning composition or part components and/or a liquid cleaning composition or part components separated by the water soluble film. The compartment for liquid components can be different in composition than compartments containing solids: US2009/0011970 A1.

Detergent ingredients can be separated physically from each other by compartments in water dissolvable pouches or in different layers of tablets. Thereby negative storage interaction between

components can be avoided. Different dissolution profiles of each of the compartments can also give rise to delayed dissolution of selected components in the wash solution.

A liquid or gel detergent, which is not unit dosed, may be aqueous, typically containing at least 20% by weight and up to 95% water, such as up to about 70% water, up to about 65% water, up to about 55% water, up to about 45% water, up to about 35% water. Other types of liquids, including without limitation, alkanols, amines, diols, ethers and polyols may be included in an aqueous liquid or gel. An aqueous liquid or gel detergent may contain from 0-30% organic solvent. A liquid or gel detergent may be non-aqueous.

10 Granular detergent formulations

The composition(s) of the invention may be formulated as a granule for example as a co-granule that combines one or more enzymes. Each enzyme will then be present in more granules securing a more uniform distribution of enzymes in the detergent. This also reduces the physical segregation of different enzymes due to different particle sizes. Methods for producing multi-enzyme co-granulates for the detergent industry are disclosed in the IP.com disclosure IPCOM000200739D.

Another example of formulation of enzymes by the use of co-granulates are disclosed in WO 2013/188331, which relates to a detergent composition comprising (a) a multi-enzyme co-granule; (b) less than 10 wt zeolite (anhydrous basis); and (c) less than 10 wt phosphate salt (anhydrous basis), and the composition additionally comprises from 20 to 80 wt% detergent moisture sink component. The multi-enzyme co-granule may comprise an enzyme blend i.e. at least one DNase and at least one hexosaminidase and one or more enzymes selected from the group consisting of proteases, lipases, cellulases, xyloglucanases, perhydrolases, peroxidases, lipoxygenases, laccases, hemicellulases, proteases, cellulases, cellobiose dehydrogenases, xylanases, phospho lipases, esterases, cutinases, pectinases, mannanases, pectate lyases, keratinases, reductases, oxidases, phenoloxidases, ligninases, pullulanases, tannases, pentosanases, lichenases glucanases, arabinosidases, hyaluronidase, chondroitinase, amylases, and mixtures thereof.

WO 2013/188331 also relates to a method of treating and/or cleaning a surface, preferably a fabric surface comprising the steps of (i) contacting said surface with the detergent composition as claimed and described herein in aqueous wash liquor, (ii) rinsing and/or drying the surface.

An embodiment of the invention relates to an enzyme granule/particle comprising the DNase and hexosaminidase. The granule is composed of a core, and optionally one or more coatings (outer layers) surrounding the core. Typically, the granule/particle size, measured as equivalent spherical diameter (volume based average particle size), of the granule is 20-2000 μm , particularly 50-1500 μm , 100-1500 μm or 250-1200 μm . The core may include additional materials such as fillers, fibre materials (cellulose or synthetic fibres), stabilizing agents, solubilising agents, suspension agents, viscosity regulating agents, light spheres, plasticizers, salts, lubricants and fragrances. The core may include binders, such as synthetic polymer, wax, fat, or carbohydrate. The core may comprise a salt of a multivalent cation, a reducing agent, an antioxidant, a peroxide

decomposing catalyst and/or an acidic buffer component, typically as a homogenous blend. The core may consist of an inert particle with the enzyme absorbed into it, or applied onto the surface, *e.g.*, by fluid bed coating. The core may have a diameter of 20-2000 μm , particularly 50-1500 μm , 100-1500 μm or 250-1200 μm . The core can be prepared by granulating a blend of the ingredients, *e.g.*, by a method comprising granulation techniques such as crystallization, precipitation, pan-coating, fluid bed coating, fluid bed agglomeration, rotary atomization, extrusion, prilling, spheronization, size reduction methods, drum granulation, and/or high shear granulation.

Methods for preparing the core can be found in Handbook of Powder Technology; Particle size enlargement by C. E. Capes; Volume 1; 1980; Elsevier.

The core of the enzyme granule/particle may be surrounded by at least one coating, *e.g.*, to improve the storage stability, to reduce dust formation during handling, or for coloring the granule. The optional coating(s) may include a salt coating, or other suitable coating materials, such as polyethylene glycol (PEG), methyl hydroxy-propyl cellulose (MHPC) and polyvinyl alcohol (PVA). Examples of enzyme granules with multiple coatings are shown in WO 93/07263 and WO 97/23606. The coating may be applied in an amount of at least 0.1% by weight of the core, *e.g.*, at least 0.5%, 1% or 5%. The amount may be at most 100%, 70%, 50%, 40% or 30%. The coating is preferably at least 0.1 μm thick, particularly at least 0.5 μm , at least 1 μm or at least 5 μm . In a one embodiment, the thickness of the coating is below 100 μm . In another embodiment, the thickness of the coating is below 60 μm . In an even more particular embodiment the total thickness of the coating is below 40 μm . The coating should encapsulate the core unit by forming a substantially continuous layer. A substantially continuous layer is to be understood as a coating having few or no holes, so that the core unit it is encapsulating/enclosing has few or none uncoated areas. The layer or coating should be homogeneous in thickness. The coating can further contain other materials as known in the art, *e.g.*, fillers, antisticking agents, pigments, dyes, plasticizers and/or binders, such as titanium dioxide, kaolin, calcium carbonate or talc. A salt coating may comprise at least 60% by weight w/w of a salt, *e.g.*, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95% or at least 99% by weight w/w. The salt may be added from a salt solution where the salt is completely dissolved or from a salt suspension wherein the fine particles is less than 50 μm , such as less than 10 μm or less than 5 μm . The salt coating may comprise a single salt or a mixture of two or more salts. The salt may be water soluble, and may have a solubility at least 0.1 grams in 100 g of water at 20°C, preferably at least 0.5 g per 100 g water, *e.g.*, at least 1 g per 100 g water, *e.g.*, at least 5 g per 100 g water. The salt may be an inorganic salt, *e.g.*, salts of sulfate, sulfite, phosphate, phosphonate, nitrate, chloride or carbonate or salts of simple organic acids (less than 10 carbon atoms, *e.g.*, 6 or less carbon atoms) such as citrate, malonate or acetate. Examples of cations in these salts are alkali or earth alkali metal ions, the ammonium ion or metal ions of the first transition series, such as sodium, potassium, magnesium, calcium, zinc or aluminium. Examples of anions include chloride, bromide, iodide, sulfate, sulfite, bisulfite, thiosulfate, phosphate, monobasic phosphate, dibasic phosphate,

hypophosphite, dihydrogen pyrophosphate, tetraborate, borate, carbonate, bicarbonate, metasilicate, citrate, malate, maleate, malonate, succinate, lactate, formate, acetate, butyrate, propionate, benzoate, tartrate, ascorbate or gluconate. In particular alkali- or earth alkali metal salts of sulfate, sulfite, phosphate, phosphonate, nitrate, chloride or carbonate or salts of simple organic acids such as citrate, malonate or acetate may be used. The salt in the coating may have a constant humidity at 20°C above 60%, particularly above 70%, above 80% or above 85%, or it may be another hydrate form of such a salt (e.g., anhydrate). The salt coating may be as described in WO 00/01793 or WO 2006/034710. Specific examples of suitable salts are NaCl (CH_{20°C}=76%), Na₂CO₃ (CH_{20°C}=92%), NaNO₃ (CH_{20°C}=73%), Na₂HPO₄ (CH_{20°C}=95%), Na₃PO₄ (CH_{25°C}=92%), NH₄Cl (CH_{20°C} = 79.5%), (NH₄)₂HPO₄ (CH_{20°C} = 93,0%), NH₄H₂PO₄ (CH_{20°C} = 93.1%), (NH₄)₂SO₄ (CH_{20°C}=81.1%), KCl (CH_{20°C}=85%), K₂HPO₄ (CH_{20°C}=92%), KH₂PO₄ (CH_{20°C}=96.5%), KNO₃ (CH_{20°C}=93.5%), Na₂SO₄ (CH_{20°C}=93%), K₂SO₄ (CH_{20°C}=98%), KHSO₄ (CH_{20°C}=86%), MgSO₄ (CH_{20°C}=90%), ZnSO₄ (CH_{20°C}=90%) and sodium citrate (CH_{25°C}=86%). Other examples include NaH₂PO₄, (NH₄)H₂PO₄, CuSO₄, Mg(NO₃)₂ and magnesium acetate. The salt may be in anhydrous form, or it may be a hydrated salt, i.e. a crystalline salt hydrate with bound water(s) of crystallization, such as described in WO 99/32595. Specific examples include anhydrous sodium sulfate (Na₂SO₄), anhydrous magnesium sulfate (MgSO₄), magnesium sulfate heptahydrate (MgSO₄·7H₂O), zinc sulfate heptahydrate (ZnSO₄·7H₂O), sodium phosphate dibasic heptahydrate (Na₂HPO₄·7H₂O), magnesium nitrate hexahydrate (Mg(NO₃)₂·(6H₂O)), sodium citrate dihydrate and magnesium acetate tetrahydrate. Preferably the salt is applied as a solution of the salt, e.g., using a fluid bed. One embodiment of the present invention provides a granule, which comprises:

(a) a core comprising a DNase and a hexosaminidase, preferably a β-N-acetylglucosaminidase e.g. a dispersin, and

(b) optionally a coating consisting of one or more layer(s) surrounding the core.

One embodiment of the invention relates to a granule, which comprises:

(a) a core comprising a DNase and a hexosaminidase, preferably a β-N-acetylglucosaminidase e.g. a dispersin, wherein the hexosaminidase is selected from the group consisting of polypeptides comprising an amino acid sequence with;

i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,

ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,

iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,

iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and

v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86,

and wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 13, and

(b) optionally a coating consisting of one or more layer(s) surrounding the core.

One embodiment of the invention relates to a granule, which comprises:

(a) a core comprising a DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin, wherein the hexosaminidase is selected from the group consisting of polypeptides comprising an amino acid sequence with;

i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,

ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,

iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,

iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and

v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86,

and wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 65, and

(b) optionally a coating consisting of one or more layer(s) surrounding the core.

One embodiment of the invention relates to a granule, which comprises:

(a) a core comprising a DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin, wherein the hexosaminidase is selected from the group consisting of polypeptides comprising an amino acid sequence with;

- i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,
- 5 ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,
- iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,
- 10 iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and
- v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86,
- 15

and wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 66, and

(b) optionally a coating consisting of one or more layer(s) surrounding the core.

20 One embodiment of the invention relates to a granule, which comprises:

- (a) a core comprising a DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin, wherein the hexosaminidase is selected from the group consisting of polypeptides comprising an amino acid sequence with;
- 25 i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,
- ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,
- 30 iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,
- iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and
- 35 v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86,

and wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 67, and

(b) optionally a coating consisting of one or more layer(s) surrounding the core.

5 One embodiment of the invention relates to a granule, which comprises:

(a) a core comprising a DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin, wherein the hexosaminidase is selected from the group consisting of polypeptides comprising an amino acid sequence with;

10 i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,

ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,

15 iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,

20 iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and

v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86,

25 and wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 68, and

(b) optionally a coating consisting of one or more layer(s) surrounding the core.

Uses

30 The present invention is also directed to methods for using the cleaning composition in laundry/textile/fabric (House hold laundry washing, Industrial laundry washing) or hard surface cleaning (ADW, car wash, Industrial surface)

Use of cleaning composition

35 The cleaning composition of the present invention may be formulated, for example, as a hand or machine laundry detergent composition including a laundry additive composition suitable for pre-treatment of stained fabrics and a rinse added fabric softener composition, or be formulated as a detergent composition for use in general household hard surface cleaning operations, or be

formulated for hand or machine dishwashing operations. In a specific aspect, the present invention provides a detergent additive comprising one or more enzymes as described herein.

The present invention is directed to methods for using the compositions thereof. Laundry/textile/fabric (House hold laundry washing, Industrial laundry washing). Hard surface
5 cleaning (ADW, car wash, Industrial surface). The compositions of the invention comprise a blend of DNase and a hexosaminidase, and effectively reduce or remove organic components, such as polysaccharide and DNA from surfaces such as textiles and hard surfaces e.g. dishes.

The compositions of the invention comprise a blend of DNase and hexosaminidase, preferably β -N-acetylglucosaminidase, and the composition effectively reduce or remove organic
10 components, such as polysaccharides and DNA from surfaces such as textiles and hard surfaces e.g. dishes. One embodiment of the invention relates to the use of a cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin, and at least one cleaning component for reduction or removal of components e.g. of biofilm, such as polysaccharides, e.g. N-acetyl-glucosaminide e.g. poly-N-acetylglucosamine (PNAG)
15 and DNA, of an item, wherein the item is a textile or a hard surface.

One embodiment of the invention relates to the use of a cleaning composition comprising a DNase, at least one hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin, and a cleaning component for deep cleaning of an item, wherein the item is a textile or a surface.

One embodiment of the invention relates to the use of a composition comprising a
20 DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin for reduction or removal of biofilm and/or compounds such as polysaccharide, e.g. N-acetyl-glucosaminide e.g. poly-N-acetylglucosamine (PNAG) and/or DNA of an item. One embodiment of the invention relates to the use of a cleaning composition comprising a DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin for reduction or
25 removal of biofilm and/or compounds such as polysaccharide, e.g. N-acetyl-glucosaminide e.g. poly-N-acetylglucosamine (PNAG) and/or DNA of an item such as textile. One embodiment of the invention relates to the use of a cleaning composition comprising a DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin for deep cleaning when the cleaning composition is applied in e.g. laundry process.

One embodiment of the invention relates to the use of a composition comprising a
30 DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin for reduction of redeposition or reduction of malodor. One embodiment of the invention relates to the use of a cleaning composition comprising a DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin for reduction of redeposition or reduction of malodor.

One embodiment of the invention relates to the use of a cleaning composition
35 comprising a DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin for reduction of redeposition or reduction of malodor when the cleaning composition is applied in e.g. laundry process. One embodiment of the invention relates to the use of a cleaning

composition comprising a DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin for reduction of redeposition or reduction of malodor on an item e.g. textile. In one embodiment, the composition is an anti-redeposition composition.

One embodiment of the invention relates to the use of a cleaning composition comprising
5 a DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin for deep cleaning of an item or reduction of redeposition or malodor, wherein the a hexosaminidase is selected from the group consisting of polypeptides comprising;

- 10 i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,
- ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,
- 15 iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,
- iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85,
- 20 v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86.

One embodiment of the invention relates to the use of a cleaning composition comprising
25 a DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin for deep cleaning of an item or reduction of redeposition or malodor, wherein the a hexosaminidase is selected from the group consisting of polypeptides comprising;

- 30 i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,
- ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,
- 35 iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,
- iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and

- v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86,

and wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 13.

One embodiment of the invention relates to the use of a cleaning composition comprising a DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin for deep cleaning of an item or reduction of redeposition or malodor, wherein the a hexosaminidase is selected from the group consisting of polypeptides comprising;

- i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,

ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,

- iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,

iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and

- v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86,

and wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 65.

One embodiment of the invention relates to the use of a cleaning composition comprising a DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin for deep cleaning of an item or reduction of redeposition or malodor, wherein the a hexosaminidase is selected from the group consisting of polypeptides comprising;

- i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,

ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,

- iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,
- 5 iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and
- v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86,
- 10 and wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 66.

One embodiment of the invention relates to the use of a cleaning composition comprising a DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin for deep
15 cleaning of an item or reduction of redeposition or malodor, wherein the hexosaminidase is selected from the group consisting of polypeptides comprising;

- i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,
- 20 ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,
- iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity
25 to the polypeptide shown in SEQ ID NO: 84,
- iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and
- v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%,
30 at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86,

and wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 67.

35 One embodiment of the invention relates to the use of a cleaning composition comprising a DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin for deep cleaning of an item or reduction of redeposition or malodor, wherein the a hexosaminidase is selected from the group consisting of polypeptides comprising;

- 1) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,
- 5 2) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,
- 3) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,
- 10 4) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and
- 15 5) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86,

and wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 68.

The invention further relates to a method of deep cleaning an item, comprising the steps of:

- 20 a) contacting the item with a cleaning composition comprises a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning component; and
- b) and optionally rinsing the item, wherein the item is preferably a textile.

The invention further relates to a method of deep cleaning an item, comprising the steps of:

- 25 a) contacting the item with a cleaning composition comprises a DNase, wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 13, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin, wherein the hexosaminidase is selected from the group consisting of the polypeptides;
- 30 1) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,
- 2) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,
- 35 3) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,

iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and

v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86,

and a cleaning component; and

b) and optionally rinsing the item, wherein the item is preferably a textile.

The invention further relates to a method of deep cleaning an item, comprising the steps of:

a) contacting the item with a cleaning composition comprises a DNase, wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 65, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin, wherein the hexosaminidase is selected from the group consisting of the polypeptides;

i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,

ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,

iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,

iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and

v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86,

and a cleaning component; and

b) and optionally rinsing the item, wherein the item is preferably a textile.

The invention further relates to a method of deep cleaning an item, comprising the steps of:

a) contacting the item with a cleaning composition comprises a DNase, wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 66, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin, wherein the hexosaminidase is selected from the group consisting of the polypeptides;

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- 15
- and a cleaning component; and
- i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,
 - ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,
 - iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,
 - iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and
 - v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86,

b) and optionally rinsing the item, wherein the item is preferably a textile.

The invention further relates to a method of deep cleaning an item, comprising the steps of:

- 20
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- 35
- a) contacting the item with a cleaning composition comprises a DNase, wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 66, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin, wherein the hexosaminidase is selected from the group consisting of the polypeptides;
 - i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,
 - ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,
 - iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,
 - iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and
 - v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86,

and a cleaning component; and

b) and optionally rinsing the item, wherein the item is preferably a textile.

The invention further relates to a method of deep cleaning an item, comprising the steps of:

- 5 a) contacting the item with a cleaning composition comprises a DNase, wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 67, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin, wherein the hexosaminidase is selected from the group consisting of the polypeptides;
- 10 i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,
- ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,
- 15 iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,
- iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and
- 20 v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86,
- 25 and a cleaning component; and
- b) and optionally rinsing the item, wherein the item is preferably a textile.

The invention further relates to a method of deep cleaning an item, comprising the steps of:

- 30 a) contacting the item with a cleaning composition comprises a DNase, wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 68, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin, wherein the hexosaminidase is selected from the group consisting of the polypeptides;
- 35 i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,

- ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,
- 5 iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,
- iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and
- 10 v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86,

and a cleaning component; and

b) and optionally rinsing the item, wherein the item is preferably a textile.

15 The invention further relates to a kit intended for deep cleaning, wherein the kit comprises a solution of an enzyme mixture comprising a DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin.

The DNase is preferably selected from polypeptides having at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 13, SEQ ID NO 65, SEQ ID
20 NO 66, SEQ ID NO 67 and SEQ ID NO 68, and the a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin is preferably selected from the group consisting of the polypeptides;

- i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%,
25 at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,
- ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,
- 30 iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,
- iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and
- 35 v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86.

Definitions

Biofilm is produced by any group of microorganisms in which cells stick to each other or stick
5 to a surface, such as a textile, dishware or hard surface or another kind of surface. These
adherent cells are frequently embedded within a self-produced matrix of extracellular polymeric
substance (EPS). Biofilm EPS is a polymeric conglomeration generally composed of
extracellular DNA, proteins, and polysaccharides. Biofilms may form on living or non-living
10 surfaces. The microbial cells growing in a biofilm are physiologically distinct from planktonic cells
of the same organism, which, by contrast, are single-cells that may float or swim in a liquid
medium. Bacteria living in a biofilm usually have significantly different properties from planktonic
bacteria of the same species, as the dense and protected environment of the film allows them
to cooperate and interact in various ways. One benefit of this environment for the
15 microorganisms is increased resistance to detergents and antibiotics, as the dense extracellular
matrix and the outer layer of cells protect the interior of the community. On laundry biofilm
producing bacteria can be found among the following species: *Acinetobacter sp.*, *Aeromicrobium
sp.*, *Brevundimonas sp.*, *Microbacterium sp.*, *Micrococcus luteus*, *Pseudomonas sp.*,
Staphylococcus epidermidis, and *Stenotrophomonas sp.*. On hard surfaces biofilm producing
20 bacteria can be found among the following species: *Acinetobacter sp.*, *Aeromicrobium sp.*,
Brevundimonas sp., *Microbacterium sp.*, *Micrococcus luteus*, *Pseudomonas sp.*,
Staphylococcus epidermidis, *Staphylococcus aureus* and *Stenotrophomonas sp.*. In one aspect,
the biofilm producing strain is *Brevundimonas sp.* In one aspect, the biofilm producing strain is
Pseudomonas alcaliphila or *Pseudomonas fluorescens*. In one aspect, the biofilm producing
strain is *Staphylococcus aureus*.

25 By the term “deep cleaning” is meant disruption, removal or reduction of components of
organic matter, e.g. biofilm, such as polysaccharides, proteins, DNA, soil or other components
present in the organic matter.

Cleaning component: The cleaning component is different from the DNase and
hexosaminidase. The precise nature of these cleaning component, and levels of incorporation
30 thereof, will depend on the physical form of the composition and the nature of the operation for
which it is to be used. Suitable cleaning components include, but are not limited to the
components described below such as surfactants, builders, flocculating aid, chelating agents,
dye transfer inhibitors, enzymes, enzyme stabilizers, enzyme inhibitors, catalytic materials,
bleach activators, hydrogen peroxide, sources of hydrogen peroxide, preformed peracids,
35 polymeric agents, clay soil removal/anti-redeposition agents, brighteners, suds suppressors,
dyes, perfumes, structure elasticizing agents, fabric softeners, carriers, hydrotropes, builders
and co-builders, fabric huing agents, anti-foaming agents, dispersants, processing aids, and/or
pigments.

Cleaning Composition: The term "cleaning composition" refers to compositions that find use in the removal of undesired compounds from items to be cleaned, such as textiles. The cleaning composition may be a detergent composition and may be used to e.g. clean textiles for both household cleaning and industrial cleaning. The terms encompass any materials/compounds selected for the particular type of cleaning composition desired and the form of the product (e.g., liquid, gel, powder, granulate, paste, or spray compositions) and includes, but is not limited to, detergent compositions (e.g., liquid and/or solid laundry detergents and fine fabric detergents; fabric fresheners; fabric softeners; and textile and laundry pre-spotters/pretreatment). In addition to containing the enzyme of the invention, the detergent formulation may contain one or more additional enzymes (such as proteases, amylases, lipases, cutinases, cellulases, endoglucanases, xyloglucanases, pectinases, pectin lyases, xanthanases, peroxidases, haloperoxygenases, catalases and mannanases, or any mixture thereof), and/or detergent adjunct ingredients such as surfactants, builders, chelators or chelating agents, bleach system or bleach components, polymers, fabric conditioners, foam boosters, suds suppressors, dyes, perfume, tannish inhibitors, optical brighteners, bactericides, fungicides, soil suspending agents, anti-corrosion agents, enzyme inhibitors or stabilizers, enzyme activators, transferase(s), hydrolytic enzymes, oxido reductases, bluing agents and fluorescent dyes, antioxidants, and solubilizers. The term "cleaning composition" is used interchangeably with "detergent composition". The cleaning composition of the present invention can be diluted with water to form a wash liquor solution upon application.

The term "enzyme detergency benefit" is defined herein as the advantageous effect an enzyme may add to a detergent compared to the same detergent without the enzyme. Important detergency benefits which can be provided by enzymes are stain removal with no or very little visible soils after washing and/or cleaning, prevention or reduction of redeposition of soils released in the washing process (an effect that also is termed anti-redeposition), restoring fully or partly the whiteness of textiles which originally were white but after repeated use and wash have obtained a greyish or yellowish appearance (an effect that also is termed whitening). Textile care benefits, which are not directly related to catalytic stain removal or prevention of redeposition of soils, are also important for enzyme detergency benefits. Examples of such textile care benefits are prevention or reduction of dye transfer from one fabric to another fabric or another part of the same fabric (an effect that is also termed dye transfer inhibition or anti-backstaining), removal of protruding or broken fibers from a fabric surface to decrease pilling tendencies or remove already existing pills or fuzz (an effect that also is termed anti-pilling), improvement of the fabric-softness, colour clarification of the fabric and removal of particulate soils which are trapped in the fibers of the fabric or garment. Enzymatic bleaching is a further enzyme detergency benefit where the catalytic activity generally is used to catalyze the formation of bleaching components such as hydrogen peroxide or other peroxides. Textile care benefits, which are not directly related to catalytic stain removal or prevention of redeposition of soils, are

also important for enzyme detergency benefits. Examples of such textile care benefits are prevention or reduction of dye transfer from one textile to another textile or another part of the same textile (an effect that is also termed dye transfer inhibition or anti-backstaining), removal of protruding or broken fibers from a textile surface to decrease pilling tendencies or remove already existing pills or fuzz (an effect that also is termed anti-pilling), improvement of the textile-softness, colour clarification of the textile and removal of particulate soils which are trapped in the fibers of the textile. Enzymatic bleaching is a further enzyme detergency benefit where the catalytic activity generally is used to catalyze the formation of bleaching component such as hydrogen peroxide or other peroxides or other bleaching species.”

The term “hard surface cleaning” is defined herein as cleaning of hard surfaces wherein hard surfaces may include floors, tables, walls, roofs etc. as well as surfaces of hard objects such as cars (car wash) and dishes (dish wash). Dish washing includes but are not limited to cleaning of plates, cups, glasses, bowls, cutlery such as spoons, knives, forks, serving utensils, ceramics, plastics, metals, china, glass and acrylics.

The term “wash performance” is used as an enzyme’s ability to remove stains present on the object to be cleaned during e.g. wash or hard surface cleaning.

The term “whiteness” is defined herein as a greying, yellowing of a textile. Loss of whiteness may be due to removal of optical brighteners/hueing agents. Greying and yellowing can be due to soil redeposition, body soils, colouring from e.g. iron and copper ions or dye transfer. Whiteness might include one or several issues from the list below: colourant or dye effects; incomplete stain removal (e.g. body soils, sebum etc.); redeposition (greying, yellowing or other discolourations of the object) (removed soils reassociate with other parts of textile, soiled or unsoiled); chemical changes in textile during application; and clarification or brightening of colours.

The term “laundering” relates to both household laundering and industrial laundering and means the process of treating textiles with a solution containing a cleaning or detergent composition of the present invention. The laundering process can for example be carried out using e.g. a household or an industrial washing machine or can be carried out by hand.

By the term “malodor” is meant an odor which is not desired on clean items. The cleaned item should smell fresh and clean without malodors adhered to the item. One example of malodor is compounds with an unpleasant smell, which may be produced by microorganisms. Another example is unpleasant smells can be sweat or body odor adhered to an item which has been in contact with human or animal. Another example of malodor can be the odor from spices, which sticks to items for example curry or other exotic spices which smells strongly.

The term “mature polypeptide” means a polypeptide in its final form following translation and any post-translational modifications, such as N-terminal processing, C-terminal truncation, glycosylation, phosphorylation, etc.

The term "textile" means any textile material including yarns, yarn intermediates, fibers, non-woven materials, natural materials, synthetic materials, and any other textile material, fabrics made of these materials and products made from fabrics (e.g., garments and other articles). The textile or fabric may be in the form of knits, wovens, denims, non-wovens, felts, yarns, and
5 towelling. The textile may be cellulose based such as natural cellulose, including cotton, flax/linen, jute, ramie, sisal or coir or manmade cellulose (e.g. originating from wood pulp) including viscose/rayon, cellulose acetate fibers (tricell), lyocell or blends thereof. The textile or fabric may also be non-cellulose based such as natural polyamides including wool, camel, cashmere, mohair, rabbit and silk or synthetic polymers such as nylon, aramid, polyester, acrylic,
10 polypropylene and spandex/elastane, or blends thereof as well as blends of cellulose based and non-cellulose based fibers. Examples of blends are blends of cotton and/or rayon/viscose with one or more companion material such as wool, synthetic fiber (e.g. polyamide fiber, acrylic fiber, polyester fiber, polyvinyl chloride fiber, polyurethane fiber, polyurea fiber, aramid fiber), and/or cellulose-containing fiber (e.g. rayon/viscose, ramie, flax/linen, jute, cellulose acetate fiber,
15 lyocell). Fabric may be conventional washable laundry, for example stained household laundry. When the term fabric or garment is used it is intended to include the broader term textiles as well.

The term "variant" means a polypeptide having the activity of the parent or precursor polypeptide and comprising an alteration, i.e., a substitution, insertion, and/or deletion, at one or
20 more (e.g., several) positions compared to the precursor or parent polypeptide. A substitution means replacement of the amino acid occupying a position with a different amino acid; a deletion means removal of the amino acid occupying a position; and an insertion means adding an amino acid adjacent to and immediately following the amino acid occupying a position.

Sequence identity: The relatedness between two amino acid sequences or between two
25 nucleotide sequences is described by the parameter "sequence identity". For purposes of the present invention, the sequence identity between two amino acid sequences is determined using the Needleman-Wunsch algorithm (Needleman and Wunsch, 1970, J. Mol. Biol. 48: 443-453) as implemented in the Needle program of the EMBOSS package (EMBOSS: The European
30 Molecular Biology Open Software Suite, Rice et al., 2000, Trends Genet. 16: 276-277), preferably version 6.6.0 or later. The parameters used are a gap open penalty of 10, a gap extension penalty of 0.5, and the EBLOSUM62 (EMBOSS version of BLOSUM62) substitution matrix. The output of Needle labeled "longest identity" (obtained using the -nobrief option) is used as the percent identity and is calculated as follows:

$$\frac{(\text{Identical Residues} \times 100)}{(\text{Length of Alignment} - \text{Total Number of Gaps in Alignment})}$$

35 NUC1, NUC1A DNase: The term includes DNases comprising a certain domain. The domain termed NUC1 and polypeptides of this domain are in addition to having DNase activity, characterized by comprising certain motifs e.g. one or more of the motifs [F/L/Y/I]A[N/R]D[L/I/P/V] (SEQ ID NO: 87) or C[D/N]T[A/R] (SEQ ID NO: 88); the letters indicate

amino acids in one letter code thus F is phenylalanine, L is leucine, A is alanine, N is asparagine, D is aspartic acid, I is isoleucine, V is valine, H is histidine, G is glycine, C cysteine, T is threonine, R is arginine and so forth. The brackets indicate that the amino acids within the bracket are alternatives. The NUC1_A domain share the common motif [D/Q][I/V]DH (SEQ ID NO 89).

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Examples

Composition of model detergent A (liquid)

Ingredients: 12% LAS, 11% AEO Biosoft N25-7 (NI), 5% AEOS (SLES), 6% MPG (monopropylene glycol), 3% ethanol, 3% TEA, 2.75% coco soap, 2.75% soya soap, 2% glycerol, 10 2% sodium hydroxide, 2% sodium citrate, 1% sodium formate, 0.2% DTMPA and 0.2% PCA (all percentages are w/w).

Assays

Assay I: testing of DNase activity

15 DNase activity was determined on DNase Test Agar with Methyl Green (BD, Franklin Lakes, NJ, USA), which was prepared according to the manual from supplier. Briefly, 21 g of agar was dissolved in 500 ml water and then autoclaved for 15 min at 121°C. Autoclaved agar was tempered to 48°C in water bath, and 20 ml of agar was poured into petridishes with and allowed to solidify by incubation o/n at room temperature. On solidified agar plates, 5 µl of 20 enzyme solutions are added and DNase activity is observed as colorless zones around the spotted enzyme solutions

Assay II: testing of DNase activity

DNase activity was determined by using the DNaseAlert™ Kit (11-02-01-04, IDT Intergrated DNA Technologies) according to the supplier's manual. Briefly, 95 µl DNase sample was mixed 25 with 5 µl substrate in a microtiter plate, and fluorescence was immediately measured using a Clariostar microtiter reader from BMG Labtech (536 nm excitation, 556 nm emission).

Assay III: testing of hexosaminidase activity

The hexosaminidase activity of the polypeptides was determined using 4-nitrophenyl N-acetyl-β-D-glucosaminide (Sigma-Aldrich) as substrate. The enzymatic reaction was performed 30 in triplicates in a 96 well flat bottom polystyrene microtiter plate (Thermo Scientific) with the following conditions: 50 mM 2-(N-morpholino)ethanesulfonic acid pH 6 buffer, 1.5 mg/ml 4-nitrophenyl N-acetyl-β-D-glucosaminide and 20 µg/ml purified enzyme sample in a total reaction volume of 100 µl. Blank samples without polypeptide were run in parallel. The reactions were carried out at 37°C in a Thermomixer comfort (Eppendorf). After 10 minutes of incubation, 5 µl 35 1 M NaOH was added to each reaction mixture to stop the enzymatic reaction. The absorbance was read at 405 nm using a POLARstar Omega plate reader (BMG LABTECH) to estimate the

formation of 4-nitrophenolate ion released because of enzymatic hydrolysis of the 4-nitrophenyl N-acetyl- β -D-glucosaminide substrate.

Assay IV: Mini wash assay

Wash performance may be assessed in laundry wash experiment using a Mini wash assay, which is a test method where soiled textile is continuously is lifted up and down into the test solution and subsequently rinsed.

The wash experiment is conducted under various experimental conditions one examples specified below:

Table 1: Experimental conditions:

Detergent	Model A detergent Model detergent A wash liquor (100%) is prepared by dissolving 3.33 g/l of model detergent A containing 12% LAS, 1.1% AEO Biosoft N25-7 (NI), 5% AEOS (SLES), 6% MPG, 3% ethanol, 3% TEA (triethanolamine), 2.75% coco soap, 2.75% soya soap, 2% glycerol, 2% sodium hydroxide, 2% sodium citrate, 1% sodium formate, 0.2% DTMPA and 0.2% PCA (all percentages are w/w (weight volume) in water with hardness 15 dH.
Detergent dose	3.33 g/l
pH	Example: "as is" in the current detergent solution and is not adjusted.
Water hardness	15°dH, adjusted by adding $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$, $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$ and NaHCO_3 (4:1:7.5) to milli-Q water.
Enzymes	Enzyme blend according to the invention
Enzyme conc.	Example 2.5 nM, 5 nM, 10 nM, 30 nM, 60 nM
Test material	Example: Biofilm or EPS swatches
Temperature	e.g. 15°C, 20°C, 30°C, 40°C or 60°C
Test system	Soiled textile continuously lifted up and down into the test solutions, 50 times per minute the test solutions are kept in 125 ml glass beakers. After wash of the textiles are continuously lifted up and down into tap water, aprox. 50 times per minute.

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Test materials may be obtained from EMPA Testmaterials AG Mövenstrasse 12, CH-9015 St. Gallen, Switzerland, from Center for Testmaterials BV, P.O. Box 120, 3133 KT Vlaardingen, the Netherlands, and WFK Testgewebe GmbH, Christenfeld 10, D-41379 Brüggen, Germany. The textiles are subsequently air-dried and the wash performance is measured as the brightness of the colour of these textiles. Brightness can also be expressed as the Remission (R), which is a measure for the light reflected or emitted from the test material when illuminated with white

15

light. The Remission (R) of the textiles is measured at 460 nm using a Zeiss MCS 521 VIS spectrophotometer. The measurements are done according to the manufacturer's protocol.

Example 1: Synergistic effect between hexosaminidase (dispersin) and DNase on cleaning in liquid model detergent on biofilm swatches

A *Pseudomonas fluorescens* isolate was restreaked on Tryptone Soya Agar (TSA) (pH 7.3) (CM0131; Oxoid Ltd, Basingstoke, UK) and incubated for 3 days at ambient temperature. A single colony was inoculated into 10 mL of TSB and the culture was incubated for 16 hours at 30°C, 200rpm. After propagation, the culture was diluted (1:100) in fresh TSB and 1.65 mL aliquots were added to the wells of 12-well polystyrene flat-bottom microplates (3512; Costar, Corning Incorporated, Corning, NY, USA), in which round swatches (diameter 2 cm) of sterile textile (WFK20A) had been placed. Sterile TSB was added to control wells. After incubation for 48h at ambient temperature (static incubation), the swatches were rinsed twice with 0.9% (w/v) NaCl before use. Five rinsed swatches (sterile or with *P.fluourescens*) were placed in 50 mL test tubes and 10 mL of wash liquor (15⁰dH water with 0.7 g/L WFK 09V pigment soil (Wfk-Testgewebe GmbH, #00500) and 3.33g/L liquid model A detergent) and 0.2ppm enzyme(s) was added to each tube. Washes without enzyme were included as controls. The test tubes were placed in a Stuart rotator and incubated for 1 hour at 30°C at 20rpm. The wash liquor was then removed, and the swatches were rinsed twice with 15⁰dH water and dried on filter paper over night. The tristimulus light intensity (Y) values were measured using a DigiEYE colour measurement and imaging system (VeriVide) equipped with a Nikon D90 digital camera, and are displayed in 1. Wash performance (WP, $\Delta Y = Y_{(\text{swatch washed with enzyme})} - Y_{(\text{swatch washed without enzyme})}$) and the wash performance synergies, $WP_{\text{syn}} (\Delta Y_{(\text{cocktail})} - \Delta Y_{(\text{sum of individual enzyme treatments})})$ are also indicated.

Table 2. Synergistic effect of hexosaminidase (Dispersin) and DNase on cleaning in model A detergent on biofilm swatches.

Swatch type	Enzyme	Enzyme concentration (µg/ml)	Y values	WP (ΔY)	WP _{syn}
wfk20A, sterile medium	no enzyme	0	83,8		
Wfk20A, Biofilm	no enzyme	0	56,3		
Wfk20A, Biofilm	SEQ ID NO 67	0,2	57,5	1,2	
Wfk20A, Biofilm	SEQ ID NO 13	0,2	56,9	0,6	
Wfk20A, Biofilm	SEQ ID NO 82	0,2	59,4	3,1	
Wfk20A, Biofilm	SEQ ID NO 86	0,2	59,3	3,0	

Wfk20A, Biofilm	SEQ ID NO 82 + SEQ ID NO 67	0,2+0,2	68,1	11,8	7,5
Wfk20A, Biofilm	SEQ ID NO 82 + SEQ ID NO 13	0,2+0,2	69,6	13,3	9,6
Wfk20A, Biofilm	SEQ ID NO 86+ SEQ ID NO 67	0,2+0,2	69,1	12,8	8,6
Wfk20A, Biofilm	SEQ ID NO SEQ ID NO 13	0,2+0,2	68,9	12,6	9,0

As seen in table 2, an enzyme blend comprising Dispersin and DNase provides superior deep-cleaning properties in model A detergent as compared to the individual enzymes, given that the wash performance of the enzyme cocktail (ΔY (cocktail)) clearly exceed the sum of the performances seen for of the individual enzymes (ΔY (sum of individual enzyme treatments)), i.e. $WP_{syn} > 0$. This clearly suggests that there is a synergetic effect between the two enzymes on the deep-cleaning properties in model A. This also suggests that the different EPS components targeted by these enzymes are localized in complex macromolecular structures, which shield each other from enzymatic hydrolysis.

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Claims

1. A cleaning composition comprising a DNase, a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin and a cleaning component, wherein the hexosaminidase
5 is selected among polypeptides which in addition to having hexosaminidase activity, comprises the motifs GXDE (SEQ ID NO 90), [EQ][NRS][A][YVFL][AGSTC][VLF][EAQYN][SN] (SEQ ID NO: 91), and [VLIM][LIV]G[GAV]DE[VI][PSA] (SEQ ID NO: 92); and one of the motifs D[IV]AR[TK] (SEQ ID NO: 93) and [GK]A[IL][IL][KSR][LQ]L (SEQ ID NO: 94).
- 10 2. The cleaning composition according to claim 1, wherein the DNase is microbial, preferably obtained from bacteria or fungi.
3. The cleaning composition according to claim 2, wherein the DNase is obtained from *Bacillus*, preferably *Bacillus cibi*, *Bacillus horikoshii*, *Bacillus licheniformis*, *Bacillus subtilis*, *Bacillus*
15 *horneckiae*, *Bacillus idriensis*, *Bacillus algicola*, *Bacillus vietnamensis*, *Bacillus hwajinpoensis*, *Bacillus indicus*, *Bacillus marisflavi* or *Bacillus luciferensis*.
4. The cleaning composition of claim 3, wherein the DNase comprises one or both of the motif(s) [D/M/L][S/T]GYSR[D/N] (SEQ ID NO: 73) or ASXNRSKG (SEQ ID NO: 74).
20
5. The cleaning composition according to any of claims 2 to 4, wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO 13.
- 25
6. The cleaning composition according to any of claims 2 to 4, wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO: 65.
- 30
7. The cleaning composition according to any of claims 2 to 4, wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO: 66.
- 35
8. The cleaning composition according to claim 2, wherein the DNase is fungal, preferably obtained from *Aspergillus* and even more preferably from *Aspergillus oryzae* and wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%,

at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO: 67.

9. The cleaning composition according to claim 2, wherein the DNase is fungal, preferably
5 obtained from *Trichoderma* and even more preferably from *Trichoderma harzianum* and wherein the DNase has at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 98% or 100% sequence identity to the amino acid sequence shown in SEQ ID NO: 68.
10. The cleaning composition according to any of the preceding claims, wherein the
10 hexosaminidase is selected from the group of hexosaminidases comprising an amino acid sequence with;
- i) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%,
15 at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 82,
 - ii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%,
at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 83,
 - 20 iii) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%,
at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 84,
 - iv) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%,
at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 85, and
 - 25 v) at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%,
at least 90%, at least 95%, at least 98%, at least 99% or 100% sequence identity to the polypeptide shown in SEQ ID NO: 86.
11. The cleaning composition according to any of the preceding claims wherein the amount of
30 DNase in the composition is from 0.01 to 1000 ppm and the amount of hexosaminidase is from 0.01 to 1000 ppm.
12. The cleaning composition according to any of the preceding claims, wherein the cleaning
35 component is selected from surfactants, preferably anionic and/or nonionic, builders and bleach components.
13. The cleaning composition according to any of the preceding claims, wherein the DNase and the hexosaminidase exhibit a synergistic effect.

14. The cleaning composition according to claim 13, wherein the wash performance synergy, measured as the difference between the wash performance of the combination of the DNase and the hexosaminidase and the sum of the wash performances of the DNase and the hexoaminidase alone, is at least 1.0, at least 2.0, at least 3.0, at least 4.0, at least 5.0, at least 6.0, at least 7.0, at least 8.0, at least 9.0 or at least 10.0.
15. Use of a cleaning composition according to any of claims 1 to 14 for deep cleaning of an item, wherein the item is a textile or a surface.
16. A method of formulating a cleaning composition according to any of claims 1 to 14 comprising adding a DNase, a hexosaminidase and at least one cleaning component.
17. A kit intended for deep cleaning, wherein the kit comprises a solution of an enzyme mixture comprising a DNase and a hexosaminidase, preferably a β -N-acetylglucosaminidase e.g. a dispersin, wherein the hexosaminidase is selected among polypeptides which in addition to having hexosaminidase activity, comprises the motifs GXDE (SEQ ID NO 90), [EQ][NRSHA][YVFL][AGSTC][IVLF][EAQYN][SN] (SEQ ID NO: 91), and [VLIM][LIV]G[GAV]DE[VI][PSA] (SEQ ID NO: 92); and one of the motifs D[IV]AR[TK] (SEQ ID NO: 93) and [GK]A[IL][IL][KSR][LQ]L (SEQ ID NO: 94).
18. A method of deep cleaning an item, comprising the steps of:
- a) contacting the item with a cleaning composition according to any of claims 1 to 14;
 - and
 - b) optionally rinsing the item, wherein the item is preferably a textile.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2019/067332

A. CLASSIFICATION OF SUBJECT MATTER
INV. C11D3/386
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
C11D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, Sequence Search

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2016/176280 A1 (PROCTER & GAMBLE [US]) 3 November 2016 (2016-11-03) the whole document	1-18
Y	----- DATABASE UniProt [Online] 27 September 2017 (2017-09-27), "SubName: Full=Uncharacterized protein {ECO:0000313 EMBL:ARM14795.1}";", XP002787090, retrieved from EBI accession no. UNIPROT:A0A219D8D5 Database accession no. A0A219D8D5 the whole document	1-18
Y	----- WO 2017/207770 A1 (NOVOZYMES AS [DK]) 7 December 2017 (2017-12-07) the whole document ----- -/--	1-18

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>
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Date of the actual completion of the international search 8 October 2019	Date of mailing of the international search report 11/12/2019
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Smalt, Rolf
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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2019/067332

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2018/011277 A1 (NOVOZYMES AS [DK]) 18 January 2018 (2018-01-18) the whole document	5
Y,P	----- WO 2018/184873 A1 (NOVOZYMES AS [DK]) 11 October 2018 (2018-10-11) the whole document	1-18
Y,P	----- WO 2019/086532 A1 (NOVOZYMES AS [DK]) 9 May 2019 (2019-05-09) sequences 20-24 -----	1-18

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2019/067332

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-18(partially)

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-18(partially)

Cleaning composition comprising a DNase, a cleaning component, and a hexosaminidase comprising the motifs with SEQ.ID.NO's 90-92 and one of motifs with SEQ.ID.NO's 93 or 94, wherein the hexosaminidase has at least 60% sequence identity to SEQ.ID.82; use, kit, method of formulating, method of deep cleaning.

2-5. claims: 1-18(partially)

Subject-matter, essentially as defined for invention 1 above, but limited to the respective hexosaminidases with at least 60% identity to the respective SEQ.ID.'s 83 to 86.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/EP2019/067332

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