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(54) IMPROVEMENTS IN OR RELATING TO THE DEGUMMING OF TRIGLYCERIDE OILS

(71) We, SIMON-ROSE DOWNS LIMITED, a British Company, of Canon Street, Hull, Humberside, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention concerns the degumming of triglyceride oils particularly, though not exclusively, edible oils of vegetable or animal origin. A large quantity of triglyceride oil is conveniently refined by alkali treatment but this has a considerable disadvantage in that the process produces a large quantity of soapstock for which there is a diminishing market (owing to the increasing use of synthetic detergents) and an effluent whose disposal presents difficulty and cost.

Understandably more processors are turning to the physical refining of oil involving the steam stripping of free fatty acids and deodorisation or treatment in a deodoriser which is modified by the incorporation of a fat eliminator. In either case the fatty acids are recovered in a reasonably pure form and the only waste water produced is deodoriser condensate which is substantially neutral and forms an effluent amenable to conventional effluent disposal techniques. However, the problem with such physical refining is that the oil will have a bad colour when compared with alkali refined oil and may even develop a slight fluorescence unless the oil is subjected to a very effective preliminary degumming process.

It is an object of the present invention to provide an effective degumming process for triglyceride oils suitable as a treatment prior to physical refining thereof.

According to the present invention, there is provided a method of degumming triglyceride oil to render it suitable for physical refining comprising the steps of adding a quantity of acid to the oil and allowing contact between the acid and the oil, neut-

ralising such acid by the addition of a base and water in such quantity that no substantial amount of soap is produced, allowing contact for the development of oil insoluble gum particles, and separating the gum layer in water which arises as a result of the aforesaid steps.

The invention will be further apparent from the following description which concerns, by way of example only, one method for the degumming of a triglyceride oil prior to the physical refining thereof in accordance with the method of the invention.

The degumming is achieved by the addition of a small amount of non-toxic acid as a concentrated solution in water. The amount of acid is preferably 0.5% or less by weight relative to the weight of the oil. Preferably the oil is warmed to a temperature of approximately 95°C before adding the acid as an approximately 50% solution in water. The acid is stirred into the oil and allowed to contact the oil for a period of approximately ten minutes for reaction. The oil containing the acid is next treated with a base to give the water soluble salts of the added acid and to bring the pH of the mixture towards neutrality. The base is selected to give a non-toxic salt and may be added either in dilute solution in water or water may be added to the oil and the base added as a solid or in concentrated solution.

The total volume of water used in the whole process is about 10% of the volume of the oil.

The resulting mixture is separated either by gravity or centrifuge and the gum layer in water removed. Normally the gum layer in water can be passed to the meal desolventiser in a solvent extraction plant. In press plant it may be added to the meal being pelleted.

Suitable acids are phosphoric acid or citric acid but other non-toxic acids may, of course, be used. The base is preferably an alkaline salt such as trisodium phosphate or

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sodium silicate. It will be appreciated that if either of these bases is added to citric acid or phosphoric acid or any other similar weak acid, a mixture of salts is produced which constitute a pH buffer system with the result that the pH of the solution can be selected accurately without the need for extreme care over the quantities of acid and base used.

If sodium silicate is used as the base and is added in the form of a solution in water to phosphoric or citric acid solutions, mixed sodium salts are produced which stay in solution whilst a precipitate of silica comes out of solution and acts as a coagulent and collector for certain types of gum. Such silica gum mixture separates readily from the oil in the water layer.

It will be understood that the pH of the degumming process can be controlled to bring the gum out of solution and to remove the added acid without removing free fatty acid as soap. In this way the gum is removed very effectively in a single separation and the oil after bleaching can be deodorised to give a good and lasting colour.

It will be appreciated that it is not intended to limit the invention to the above example only, many variations, such as might readily occur to one skilled in the art, being possible without departing from the scope thereof, as defined by the appended claims.

Thus, for example, in the interests of economy the base may be wholly or in part caustic soda but the use of this requires much greater precision in measurement of the acid and alkali added.

WHAT WE CLAIM IS:—

1. A method of degumming triglyceride oil to render it suitable for physical refining comprising the steps of adding a quantity of acid to the oil and allowing contact between the acid and the oil, neutralising such acid by the addition of a base and water in such quantity that no substantial amount of soap is produced, allowing contact for the development of oil insoluble gum particles, and separating the gum layer in water which arises as a result of the aforesaid steps.

2. A method according to claim 1

wherein the acid is added as a concentrated solution in water.

3. A method according to claim 2 wherein the acid is an approximately 50% solution in water.

4. A method according to any preceding claim wherein the quantity of acid added is not more than 0.5% by weight relative to the weight of the oil.

5. A method according to any preceding claim wherein the oil is warmed to a temperature of approximately 95°C before the addition of acid.

6. A method according to any preceding claim wherein the acid is stirred into the oil and allowed to contact the oil for a period of approximately ten minutes for reaction prior to the addition of the base.

7. A method according to any preceding claim wherein the base is added in the form of a dilute solution in water.

8. A method according to any one of claims 1 to 6 inclusive wherein the step of adding a base and water is carried out by first adding water to the oil and then adding the base as a salt or in concentrated solution.

9. A method according to any preceding claim wherein the total volume of water used during both the addition of acid and base is about 10% of the volume of the oil.

10. A method according to any preceding claim wherein the acid used is phosphoric acid.

11. A method according to any one of claims 1 to 9 inclusive wherein the acid used is citric acid.

12. A method according to any preceding claim wherein the base is trisodium phosphate.

13. A method according to any one of claims 1 to 11 inclusive wherein the base is sodium silicate.

14. A method according to any one of claims 1 to 11 inclusive wherein the base is caustic soda.

15. A method of degumming triglyceride oil according to claim 1 and substantially as described herein.

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