

**Consumer's product quality perception and management:
Developing a “*queijo de coalho*” quality chain in Ceará state, Brazil**

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Introduction

The North-Eastern region of Brazil, is among the poorest and least developed of the country. Considerable rural development efforts have been targeting this region. In the non-irrigated (semi-arid) agriculture areas important crops are cassava, beans, cowpea and corn. Besides, beef, milk cattle and goat raising represent important economic activities. Among the various agriculture-related rural development objects, Ceará's milk (product) supply chain is of special interest, since it can have a major impact on rural employment and household incomes. According to IBGE (1999), 71% of the regions milk production is produced by small-holders. However, since the beginning 90's, with the termination of state price controls on milk, the end of hyper-inflation from the Plan Real, and with the strong expansion of large scale milk processing plants in the Northern states, the milk supply chain has undergone considerable structural changes, and consequently, it has been practically excluding small-holders from supplying the principal milk processing plants (Cerdan, 1999). To offer viable long-term solutions for this socio-economic problem, the development of economically and technically viable small-scale family processing units has been proposed as one of several attractive alternatives. Regarding this strategy, one of the development aims is providing technical, organizational and economic interventions to these processing units. Currently, they are producing traditional (variable quality) products and looking for economic survival faced by low-price industrial cheeses and “informal channel” low quality artesian cheeses (Martins & Gomes, 1998; Cerdan, 1999).

The research presented in this paper, forms part of an on-going cooperation between CIRAD (*Centre de Coopération Internationale en Recherche Agronomique pour le Développement*) and Embrapa-CNPAT (*Centro Nacional de Pesquisa Agroindústria Tropical*) to help develop a quality milk product supply chain around these small processing units, and subsequently, generate (broadened product demand) improved returns to milk producers and processors and better quality to final consumers. These R&D interventions include product and processing assessments, product development, consumer and market assessments, quality management systems, etc.

As such, an earlier technical product quality study (Andri, 2001) analysed microbial counts in traditional cheeses at different points of the chain i.e. milk producers, transporters and processors. The study showed alarmingly high contamination levels (Andri, 2001), implying

considerable needs for technical, organizational and socio-economic interventions at the raw material production and processor stages of the chain.

The current study aims to supply quantitative information about how local consumers think and act regarding this “questionable” cheese quality. The research focuses on the product quality perception and management of *queijo de coalho*, a very traditional product, by the consumers in Ceará’s state capital, Fortaleza. The results are based on the thesis research by MSc student Masseurin (2002). Additional results from the thesis on the characterization of the milk chain around Fortaleza city, will not be discussed here.

Procedures & methods

The theoretical underpinnings of the methodology are based on the economics of conventions. Most important is the work on the different definitions of the notion of quality and quality relations by Nicolas & Valeschini (1993) and Sylvander (1992). This emphasizes the complexity of this notion, that can have different meanings to different actors of the supply chain. In the eye of the consumer, quality can be considered as hybrid of different qualities: sanitary, nutritional, organoleptic, of use and reglementary quality (Lagrange, 1995). This approach, of dividing quality in different aspects is used in our research for consumers’ quality perceptions.

The additional questions related to quality identification can be applied to all actors of the supply chain. Two different ways of quality identification can be distinguished: direct and indirect (Cheyns, 1998). Indirect qualification implies the existence of third party experts capable of identifying in place of the user. In case of uncertainty, the economics of conventions dictates that users base their different quality conventions on the nature of the third party to which they accord their trust. Sylvander (1992) and Thévenot (1995) distinguish the following conventions: industrial, domestic, salesman, reputation and inspired.

This study, besides aiming to analyze quality perceptions, also looks at quality management practices of consumers regarding *queijo de coalho*. Primary information is needed for analysis, and this data is collected through semi-structured questionnaires, applied to consumers at different sales points. In the city of Fortaleza, a total of 140 consumers were interviewed, according to the following distribution:

- 45 consumers in the public marketplace (fairs), at the exit point of the establishments,
- 60 consumers inside supermarkets (medium and large), in the cheeses sales areas,

- 35 consumers in neighborhood shops (after exiting these shops). These were stratified in (a) low income level, and (b) medium level income neighborhoods, according to IBGE (1991).

The semi structured questionnaire that was used, included questions on 7 key themes : (1) general purchase habits, (2) expected product quality, (3) sanitary risk, (4) specific perceptions of the product, (5) relation with sales point, (6) user habits for product inclusion in the diet, (7) socio-economic characterization of interviewee.

Results

The product of interest – *queijo de coalho*

The North-eastern region of Brazil, including Ceará, produces a large variety of traditional and artisan cheeses, among which, *queijo de coalho* and *queijo de manteiga*, are best known. The first is basically a salty, fresh or slightly matured cheese processed from cow's milk, weighing between 1 and 10 KG. The principal differentiation is done on the basis of packaging and labelling. Hence, we distinguish (a) common *queijo de coalho* (41% of market share) which is mostly fresh, neither packaged nor labelled, and (b) the brand name labelled and packaged *queijo de coalho* (Massein, 2002).

The influence of sanitary risk on consumer behaviour

Consumer risk management practices were anticipated at three different levels: (1) cheese choice, (2) choice of sales point, and (3) consumption characteristics. Table 1 summarizes the results of the perception of sanitary risk on consumption habits. 70% of consumers take into account the sanitary risk. This level varies according to type of sales point: less than 50% for supermarkets, up to almost 95% for neighbourhood shops. For consumers in the former, it's the sales point choice being the principal base for risk management. For the other two sales point types, risk management is based on the choice of sales point and cheese.

Purchase behaviour

Consumers were asked where they placed their confidence to be assured about product quality, and about the different criteria important for choosing a sales point. Table 2 summarizes the principal results on the confidence question, while Table 3 relates to sales point choice. The results indicate a division of consumers in three different groups, as follows:

(i) *Neighbourhood shop consumers : trusting their own judgement*

These consumers distinguish themselves by predominantly using direct qualification¹ to reduce their uncertainty on sanitary quality. 62% of them mention that they only trust their own judgement. The predominance of direct qualification for consumers in neighbourhood shops, can also be interpreted as a necessary phase (of the decision process), given the large variability of the common *queijo de coalho* cheeses i.e. regarding texture, colour, taste, and saltiness. In addition, the common *queijo de coalho* are sold without any label (especially regarding origin). Under these conditions, direct qualifications is the only way to perceive expected quality.

Neighbourhood shop consumers are relatively less loyal to specific sales points than the other consumers. More than 35% responds not always to buy at the same place, which offers some explanation regarding the “search for good cheese” (Table 4). Furthermore, these consumers also state, that the choice of sales point is first of all based on, hygienic conditions (77%), and cheese characteristics – price and “quality” (62%).

For those neighbourhood shop consumers that do not abide by direct qualification, the majority of these (>30%), base their sanitary quality assessment on domestic convention. Most of these consumers are loyal to a specific (favourite) sales point.

(ii) *Supermarket consumers: confidence in the chain*

For sanitary quality, supermarket consumers principally base their decision on industrial convention. Nonetheless, some differences can be observed between consumers in large and those in small supermarkets.

In the former, 68% of consumers base their decision on the fact that the purchased cheese is brand labelled and has a sanitary control sticker, and on the fact that large supermarkets cannot afford to risk their good name by selling low (or questionable) quality products. Consequently, they can be considered to have confidence in the entire chain of labelled cheese, and hence abide by industrial convention.

The 30+% consumers remaining, respond to have confidence in brand labelled cheese, and hence base their decision on convention of reputation. However, it needs to be noted that their exist a high correlation between cheeses that are brand labelled, with sanitation control sticker and sold in supermarkets. Hence, one could argue that industrial convention plays a large role with these consumers as well.

¹ Direct qualification relates to two evaluation levels (according to consumer perceptions): (a) at the product level, it relates to the freshness of the cheese. A fresh cheese contains less bacteria, because bacteria have had little time to develop...., (b) at the level of the sales point, based on a combination of factors: cleanliness of shop and sales persons and the manner of handling the cheeses (with or without gloves).

For consumers in small supermarkets, 55% responds to base their decision on industrial convention, while only 10% refers to convention of reputation. However, more than 20% of consumers mention indirectly that the supermarkets chooses the “right” products (indication of an industrial convention).

The large majority (70%) of clients of the two sizes of supermarkets are loyal to a specific sales point, mostly because of habit.

The reasons why these consumers buy in supermarkets, are mostly practical reasons: 70% because they shop the majority of all purchases there, 45% because of proximity, and 40% also because the large variety of different cheeses on offer in supermarkets. These results to a certain extent hide the fact that brand name labelled cheese are almost only on sale in supermarkets.

Consumption behaviour

As has been indicated previously, most quality risk management practices by consumers are targeting the product purchase, and much less the post-purchase handling and consumption. Nonetheless, two consumption related risk management practices related to consumption were identified: by type of preparation (and consumption) of the cheese (fresh or fried), and the quantity consumed.

(i) type of preparation: fresh or fried

While it was already shown that more than 90% of consumers mentioned to pay attention to the type of sales point, only 33% indirectly declare that risk management also includes the way cheese is consumed, hence by frying it (Table 5). The same table, also shows the correlation between type of sales point and type of preparation. A Chi-square test on these variables showed a 96% probability. Consumers in public markets and even more those in neighbourhood shops are characterized by a lesser marked tendency to eat fresh *queijo de coalho*. Combining the various results of consumption behaviour may indicate that risk perception is different between consumers of labelled cheeses and of common cheeses.

(ii) Quantity consumed

Only 31% of interviewed consumers respond that the quantity of *queijo de coalho* is limited because of sanitary risk possibilities. This is substantially lower than the results related to

purchase behaviour. Concerning quantity consumed, consumers are also characterized by the differences related to the type of sales point where they buy *queijo de coalho*. A Chi-square test on the key related variables demonstrates a 98% probability of correlation. Table 6 shows that consumers of neighbourhood shops and small supermarkets are relatively more limited than those of other type of sales points. These results are difficult to interpret, since basic economics rules that consumer's purchasing power has an important explanatory power on quantities consumed!

Sanitary quality versus other quality dimensions

This part serves to put into perspective the relative importance of sanitary quality, as we have shown evidence that sanitary quality has explicitly been mentioned by only 10% of interviewed consumers, regarding important factors of *queijo de coalho* quality, as shown in Figure 1. This indicates that the principal quality attribute expectations spontaneously mentioned by consumers, regard taste (26%), low saltiness (43%) and freshness (58%).

These responses can be analysed from a different perspective. If taste would represent, without ambiguity, the full organoleptic dimension of quality, then, freshness and low saltiness could represent additional dimensions, such as:

- “Freshness” could be linked to the sanitary dimension of quality in the sense that the bacteriological count of a fresh cheese is instinctively lower than that of a less fresh cheese... At the same time, it could be also referenced to the organoleptic dimension, since that parameter is linked to texture and colour, that can have an influence on the capacity of a cheese to please the consumer.
- “Low saltiness” could also be interpreted in two ways. It could be linked to the organoleptic dimension as a manifestation as a taste preference. Or it could be linked to the nutritional dimension, seeing low saltiness as a result of a maturity process over time. Supposedly, the *queijo de coalho*, sold in Fortaleza city, is relatively more salty, than others.

Conclusions

The conclusions of this study will be discussed at different levels or angels. Firstly, the specific detailed conclusions regarding the results of the study related to its research questions. Secondly, the authors will propose several conclusions that relate this study's results to the wider development objectives of the project.

1. At the cheese purchase level, sanitary quality risk management by consumers is heavily linked to the type of sales point. Three types of practices, associated with three types of sales points can be differentiated : (1) In neighbourhood shops, consumers rely on direct qualification, (2) in supermarkets, they rely especially on industrial convention, and (3) in public market places, it's principally a domestic convention, that rules the client-salesman relation on quality risk prevention.
2. Explicit quality risk management practices are much less evident through consumer behaviour than through purchase behaviour. The data nonetheless indicates that post-purchase quality management is relatively more practiced with common cheeses than with packaged and branded cheeses.
3. The analysis of consumer quality perceptions shows proof that sanitary quality is not a very important attribute to *queijo de coalho* consumers in Fortaleza. The taste and nutritional attributes seem to be more important.
4. A major shortcoming of the study is the reduced number of consumers that were interviewed. This obviously increases the error ranges on the results. However, while from a scientific point of view this may be a drawback, from a development perspective this issue is not that decisive.

Regarding the utility and implications of these results for development purposes, the following can be concluded:

5. It is alarming to note that the majority of consumers put such relatively low importance to the hygiene or sanitary quality aspect. This will make it difficult to introduce and promote higher quality artesanal cheeses (emphasizing the higher sanitary standards).
6. This and other data has shown some evidence for a preference to consume packaged and branded *queijo de coalho*, if relative prices (with common cheeses) permit.
7. To product consumers health, this and other data also show evidence of the dire need for imposing quality norms and standards and the government control of these, to the entire chain of artesanal cheeses, including *queijo de coalho*.
8. In the same line of government interventions, it should be contemplated, together with the private sector cheese manufacturing associations, to formulate and implement a consumer education program regarding sanitary quality (best) practices.

Bibliography

Cerdan C. Qualité territoriale et dynamique d'entreprises : les fromageries artisanales dans le Nordeste brésilien. *Performances humaines et techniques* 1999 ; 101.

Martins P do C, Gomes AT. O agronegócio do leite e a necessidade de programas de desenvolvimento regional – Uma proposta para discussão. In EMPARN / FIERN / SENAI. *O agronegócio do leite no Nordeste*. Natal, 1998.

Massein G. *Perception et gestion des risques sanitaires du queijo de coalho sur le marché de Fortaleza (Brésil)*. Montpellier : CNEARC Thèse MSc, 2002 ; 87 p.

Nicolas F, Valeschini E. Agro-alimentaire et qualité. *Economie rurale* 1993 ; 217.

Sylvander B. Les conventions de qualité dans le secteur agro-alimentaire : aspects théoriques et méthodologiques. In AFGR. *La qualité dans l'agro-alimentaire : questions économiques et objets scientifiques*. Paris, 1992.

Lagrange L. *La commercialisation des produits agricoles et agro-alimentaires*. Paris : Lavoisier – Tec & Doc, 1995 ; 448 p.

Cheyns E. *Identification et construction sociale de la qualité des produits agro-alimentaires. Le cas de l'alimentation urbaine au Burkina Faso*. Montpellier : ENSA Thèse de Doctorat en Économie du Développement Agricole, Agro-Alimentaire et Rural, 1998.

Thévenot L. Des marchés aux normes. In Allaire G, Boyer R. *La grande transformation de l'agriculture*. Paris : INRA Ed-Oeconomica, 1995.

IBGE, Instituto brasileiro de Geografia e Estatísticas, 2001. <http://www.ibge.gov.br>.

Table 1 : Influence levels of sanitary risk on consumers behavior at different sales points.

	Shop choice	Cheese choice	Manner of consumption	Quantity consumed
Large supermarket	96,8%	48,4%	25,8%	16,1%
Smaller supermarket	90,9%	63,6%	27,3%	31,8%
Public fair	87,9%	84,9%	30,3%	21,21%
Neighborhood shop	88,6%	94,3%	37,1%	37,14%
Total	90,7%	72,9%	32,9%	30,7%

Source : Massein, 2002.

NOTE : The percentages shown in the table are from positive responses, by type of consumer. Example: 96,8 % of consumers in large supermarkets perceive that sanitary risk influences their choice of sales point to purchase cheese.

Table 2 : Manner of specific identification of the sanitary quality by consumers of the different sales points.

	Qualification: direct	Convention: domestic	Convention: industriel	Convention: reputation
Big supermarket	0,0%	0,0%	67,7%	32,3%
Small supermarket	13,6%	22,7%	54,6%	9,1%
Public fair	39,4%	54,6%	0,0%	6,06%
Neighborhood shop	62,9%	31,4%	0,0%	5,71%
Total	32,1%	29,3%	24,3%	14,3%

Source : Massein, 2002

Table 3 : Choice criteria for different sales points to purchase *queijo de coalho*

	Variety	Reception	Product characteristics	Proximity	Other purchases	Cleanliness of shop
Big supermarket	38,7%	9,7%	29,0%	45,2%	61,3%	77,4%
Small supermarket	18,2%	9,1%	45,5%	45,4%	77,3%	63,6%
Public fair	18,2%	66,7%	39,4%	15,2%	15,2%	81,8%
Neighborhood shop	14,3%	40,0%	62,9%	14,3%	22,9%	77,1%
Total	19,3%	31,4%	48,6%	25,7%	37,1%	72,9%

Source : Massein, 2002

Table 4 - Characteristics of 3 principle consumer types of *queijo de coalho*

	Consumers in supermarkets	Consumers in public fairs	Consumers in neighborhood shops
Income level	high (>8MS)	All	low (<3 MS)
Sales point choice criteria	Other purchases in the same place, Cheese varieties	Reception	Characteristics of the product
Sales point loyalty	Loyal by habit	Loyal by confidence to salesman	Not loyal, they look for the good cheese
Way to guarantee Sanitary quality	Industrial convention (reputation convention)	Domestic convention	Direct qualification

Source : Massein, 2002.

Table 5 - Different ways of consuming *queijo de coalho* (fresh or fried) by consumers in different sales points

	Always fresh	Sometimes fresh Sometimes fried	Always fried
Big supermarket	53,3%	13,3%	33,3%
Small supermarket	63,6%	13,6%	22,7%
Public fair	30,3%	33,3%	36,7%
Neighborhood shop	35,3%	32,4%	32,4%
Total	45,7%	21,0%	33,3%

Source : Massein, 2002

Table 6 - Sanitary risk consequences on the quantity of *queijo de coalho* consumed, by different sales points

	Limited, caused by sanitary risk	Not limited
Big supermarket	16,1%	83,9%
Small supermarket	31,8%	68,2%
Public fair	21,2%	78,8%
Neighborhood shop	37,1%	62,9%
Total	30,7%	69,3%

Source : Massein, 2002.

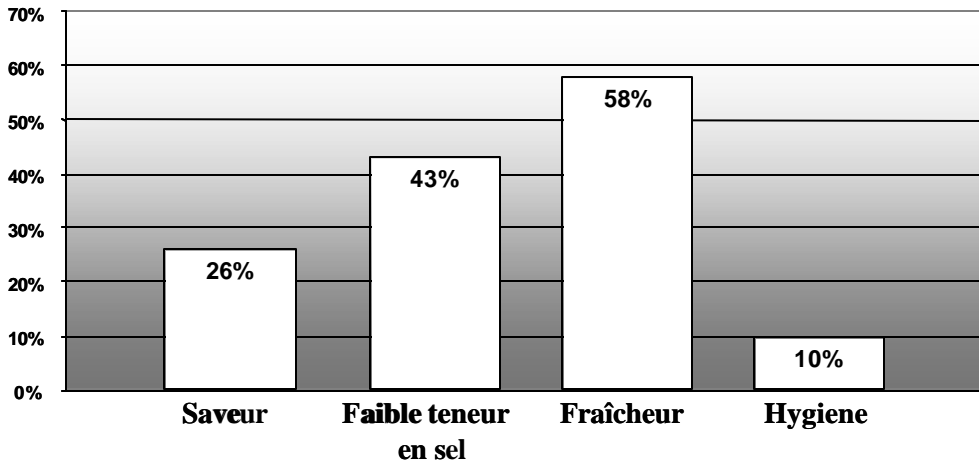


Figure 1 – Principal expectations of consumers regarding quality aspects of *queijo de coalho*
Source : Masseur, 2002