

Consumer attitude towards information on non conventional technology

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The increasing demand for healthy and nutritious products as a consequence of consumers being better educated and more demanding, contributes to a continuous need for new products, and a more differentiated food product assortment. Many consumers are choosing foods closer to those 'in natura'. This scenario contributes to the development of emerging technologies which may lead to the availability of products with better sensory and nutritional quality. However, the concern about the acceptance of such products becomes an important factor during their developments. This study aimed at evaluating the consumer attitude towards the information presented on the label about the technology used for the fruit juice processing — high pressure — by Brazilian consumers. Focus group sessions were conducted with students and housewives to obtain information about consumers' awareness, attitudes, opinions, behaviours, and concerns toward processed foods and beverages, and to provide strategies that could aid in marketing products. A protocol delineating the sequence of question to be asked in each focus group was designed beforehand and applied to each group. Discussions were

conducted with two groups each of students and of housewives. Pineapple juice labels were created by varying the nutritional, sensory, and technological information about the product were used to motivate the discussion. Although the participants in this study were very different in terms of age and level of education, most of their perceptions about the pineapple juices were similar. The students and the housewives considered the information about the technology an important factor during the product evaluation, however, the employed ladies who worked at the administrative side of a food research institution asked for more explanation about the technology in order to show the benefits it could provide to consumers.

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Introduction

The increasing demand for healthy and nutritious products as a consequence of consumers being better educated and more demanding, contributes to a continuous need for new products, and a more differentiated food product assortment (Linneman, Meerdink, Meulenbergh, & Jongen, 1999). The development of healthy foods was rated as the most important area of research by a large majority of the interviewed companies, followed closely by developing natural foods (Katz, 2000). Even if a food meets its nutritional requirements, it is unlikely to be accepted by consumers if they do not like the flavour or any other product attribute. The method of production is also of increasing concern to many consumers. Several studies have demonstrated that some technological innovations are under debate about their merits and disadvantages in many countries in the world. To investigate consumer attitudes towards a specific technology is a key point, which has to be addressed before the *new* product is fully developed (Costa, Deliza, Rosenthal, Hedderley, & Frewer, 2000).

High pressure is a new food processing technology developed to achieve consumer demands for fresher products with reduced microbiological levels and improved flavour (Khamrui & Rajorhia, 2000; Ozen & Floros, 2001; Rosenthal & Silva, 1997; Swientek, 1999; Vardag, Dierkes, & Koener, 1995). The reason for being

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called *non-conventional*, *emerging*, or even *new* technology is because it does not use the classical way to preserve the food — the thermal processing (Cheftel, 1995; Williams, 1994), which causes negative effects on the functional food properties (Parés, Sagner, Toldrà, & Carretero, 2001). This non-thermal food preservation technique could have an enormous impact on the food industry.

Although the utilization of high pressure for the production of special materials is very well known in the metallurgical as well as in the chemical and ceramics industry, this technology has only been recently proposed to produce sterilised foodstuffs with a long shelf life (Donsi, Ferrari, & Di Matteo, 1996). It was in April 1990, that the first high-pressure product — a high-acid jam — was introduced to the Japanese retail market. In 1991 world-wide interest in high pressure food processing was stimulated and several programmes have been initiated in Europe and the USA (Williams, 1994). The main reasons for interest in high pressure processing are: high quality minimally processed food can be produced, a potential for microbiologically safe and additive-free food, besides other technological advantages.

Despite the mentioned importance of the sensory properties of the product, studies examining consumer attitudes towards new technologies used in food production have shown that consumers are also becoming increasingly interested in non-sensory food qualities. Aspects such as nutritional quality, microbiology safety, agrochemical residue and environmental pollution are all examples of consumer concern (Frewer, Howard, & Shepherd, 1998). Within this context, the use of technologies harmless to the environment may contribute to perceptions of increased consumer benefits and satisfaction. However, the negative impact of new technology and/or food processing may be a source of consumer concern (Deliza, Rosenthal, Hedderley, MacFie, & Frewer, 1999). A typical example of such concern is the controversial application of genetic engineering (GE) in food production. Although the two technologies (high pressure and GE) are different in their concepts and definitions, they may share the same novelty for consumers, and both may be considered non-conventional technologies. It is clear that the use of GE has provoked important debates among consumers all around the world, and various factors are likely to influence consumer reactions to novel products of genetic engineering. These include the extent to which the manipulation is controversial, the information available about the manufacturing process used in production, and the differential enhancement of both benefits and risks resulting from its application. There is an increasing body of evidence to suggest that consumer risk perceptions associated with any potential food hazard (and indeed risk — related beliefs and behaviours in general) are driven by psychological constructs

which are very different to the technical estimates provided by experts. Factors such as whether a hazard is perceived to be involuntary, and whether it is uncontrollable, are likely to be important in determining behavioural responses (Slovic, 1992).

It is important to address issues of consumer acceptance during product development rather than try to develop public relations campaigns to force consumer acceptance once novel products are brought into the marketplace (Deliza, Rosenthal *et al.*, 1999). After saying that, it becomes an important issue to investigate consumer's opinions, beliefs, and attitudes towards the use of non-conventional technologies in food production.

Qualitative research enables one to get detailed information about consumer attitudes, opinions, perceptions, behaviours, and habits (Hashim, Resurreccion, & McWatters, 1996). One of the most often used qualitative tool is focus group research. Focus group assembles a group of 8–12 respondents recruited to fit specific demographic, attitudinal, and usage characteristics. It is conducted by a skilled moderator which promotes a relaxed, comfortable, and often enjoyable discussion for participants (Casey & Krueger, 1994). This method allows participants to explain motivations and reasons for their attitudes, perceptions, and preferences. The discussion guide offers a course to follow from the warm-up to gathering the best information the panellists can offer bearing on the goals of the project (Templeton, 1994). It has been extensively used in different areas such as marketing research, nutrition, and health education (Auld, Kendall, Chipman, 1994; Brug, Debie, van Assema, & Weijts, 1995; Dixey, Sahota, Atwal, & Turner, 2001; Lewis & Yetley, 1992; Neumark-Sztainer, Story, Ackard, Moe, & Perry, 2000), which have considered the focus group as a reliable technique. It is referred to as a useful means of data collection in studies where rather little is known about the phenomenon of interest (Elsner, Resurreccion, & McWatters, 1997; McNeill, Sanders, & Civile, 2000; Stewart & Shamdasani, 1990).

Considering the nutrition science, Baranowski *et al.* (1993) reported a study aimed at exploring the factors affecting the fruit and vegetable practices among the American children, in order to identify strategies to increase their consumption of fruit and vegetables. A similar study was developed by Brug *et al.* (1995) focusing on Dutch adults and their relevant beliefs and barriers related to fruit and vegetable intake.

Focus group was used by Galvez and Resurreccion (1992) to determine the reliability of the technique in identifying the desirable and important sensory characteristics of dry and cooked mungbean noodles and to determine its quality characteristics. The authors have mentioned that the focus group was a valuable tool, when there was a need to determine consumers' definition of product quality at a stage when consumer testing would not be not desired.

As focus groups are most effective when exploring responses to well-formulated specific questions (Baranowski *et al.*, 1993), this study aimed at investigating the impact of the information about the used technology — high pressure, an emerging technology — in the fruit juice production on the consumer perception of pineapple juice using the referred methodology.

Material and methods

Subjects

Four consumer focus group interviews were conducted with a total of 41 participants, three men and 38 women. All respondents were recruited based on the criteria of being supermarket shoppers.

A focus group interview was held with housewives who were residents in the city of Rio de Janeiro, with a total of 10 participants. The reason for choosing housewives was because, in Brazil, the person responsible for food shopping in the majority of the dwellings are women, even when they work outside their homes. The mean age of this group was 46 years, and ranged from 32 to 71. All participants in this group were non-employed women.

According to Kirk and Gillespie (1990) women's working status is related to how they make family food choices. Besides, previous contact with the subject food technology in general may have an effect on consumer's product perception. Thus a purposive group of eight working housewives who worked for the administrative side of a food research institution was conducted. Their ages varied from 28 to 57 years.

The participants' level of education ranged from uncompleted high school to graduation in both groups of ladies.

Students of the Faculty of Nutrition from the State University of Rio de Janeiro (UERJ) were invited to participate in the study because we hypothesized that a nutritional background could have an effect on participants' opinions. Thus, two focus group sessions were conducted with them, assembling a total of 23 participants (three men and 20 women). The mean age of the participants was 25 years and range from 20 to 28. Respondents were also required to be supermarket shoppers.

The general subject for the discussion — industrialized food consumption — was mentioned during the recruitment, but the specific goals of the study were not mentioned.

Fruit juice labels

Three pineapple juice labels with different characteristics in terms of product information were used during the interviews. The use of labels mimicked the situation usually faced by consumers at the supermarket, which has to choose the product by looking at the package. Besides, the labels were useful in motivating the discus-

sion. The labels were created by varying the information on nutritional, sensory, and employed technology in the juice production. Table 1 describes the labels used in this study. The other features of the labels such as brand name and picture were kept identical for across all experimental conditions.

Figure. 1 presents one of the labels used in the study.

Conduct of the tests

The focus group sessions followed a protocol based on a semi-structured interview guide, which was developed in accordance with established guidelines (Brug *et al.*, 1995). In the construction of the interview guide for this study a theoretical perspective was used based on beliefs and attitudes held by a person during the food choice process. Food choice is influenced by many interrelating factors such as previous experience of these products, the situation, beliefs and information

Table 1. Labels' description used in the study

<i>Label</i>	<i>Amount of information</i>	<i>Description</i>
1	Low	Pineapple juice Ready to drink Pure pineapple juice
2	Medium	Pineapple juice Ready to drink Pure pineapple juice, no additives, and 100% of natural ingredients
3	Lots	Pineapple juice Ready to drink Healthy with more flavour Pure pineapple juice, no additives, 100% of natural ingredients, and processed by using high pressure technology



Fig. 1. One of the labels used in the study.

available, and by the personal traits of the consumer. There have been a number of models proposed which seek to delineate the effects of likely influences, which, in general, were not quantitative (Shepherd & Sparks, 1994). In general, beliefs concerning the taste and flavour of foods have been the most important in determining the selection of foods. In addition to sensory preferences, beliefs about the nutritional quality and health effects of a food may be more important than the actual nutritional quality and health consequences in determining a person's choice. Similarly, various marketing and economic variables may act through the attitudes and beliefs held by a person, as will social, cultural, religious or demographic factors.

The need for understanding the roles played by a number of different types of factors in food choice led to the generation of a number of structured attitude models during the 1970s. One example of such is the theory of reasoned action proposed by Fishbein and Ajzen (1975). It seeks to explain rational behaviour which is volitional. It will not apply to behaviours which are not under the individual's control. With volitional behaviours it is argued that intention to perform a behaviour is the best single predictor of behaviour. Intention, is predicted by two components: the person's own attitude and perceived social pressure to behave in this way. These determinants are supposed to have a direct influence on behavioural intention. A check list with topics related to these theoretical issues was made generating an interview guide.

The interview guide has been prepared by the moderator and used as a guide for conducting the sessions

Table 2. Interview guide for the focus group sessions
<p>1. Introduction and general questions: to warm up and relax the environment.</p> <ul style="list-style-type: none"> ●Do you like going to the supermarket? ●How often do you go? ●Do you take a shop list? ●Do you like browsing at the supermarket? <p>2. Regarding nutritional issues:</p> <ul style="list-style-type: none"> ●How concern you are about the food you eat? ●When you go shopping for food, what factors affect your choice? ●What do you think about the nutritional aspects of the food when you are doing shopping? <p>3. Looking at the each created labels (one at a time):</p> <ul style="list-style-type: none"> ●How do you perceive the product from this label? ●How do you expect the pineapple juice to be like in terms of its sensory properties (appearance, aroma, and flavour)? ●How do you notice about the labels? ●Are you concern about the technology used for food production? Why? ●How do you understand high pressure technology? ●Does this information help you on your decision making process? Why? ●Would you buy this product? Why or why not?

(Table 2). The questions presented to participants were asked to provoke a discussion about food labelling, important label aspects for consumers, product expectation through the label, factors affecting food choice, and information on food technology — pros and cons affecting consumer's choice. Table 2 does not present the exact questions as asked during the study, since the exact way in which the questions were formulated depended on the progress of the discussion.

The moderator and the participants introduced themselves and the objective of the task was explained. The interviews were led by the same moderator and two assistants. The moderator was responsible for facilitating the group discussions, and the assistants controlled the audio equipment and took notes during the discussions. Participants were advised that there were no right or wrong answers to the questions, to express their honest thoughts, opinions, and beliefs. The participants were seated around a table to allow interaction, eye contact, and free flow of discussion. Each session lasted approximately 60 min under similar conditions.

Coffee, tea, and biscuits were available to participants on arrival.

Data treatment

The data were analyzed qualitatively to identify topics that appeared and to assess the commonality of topics from one group to another. During each interview, two research assistants wrote down the participants' opinions and impressions. The transcripts were analysed using content analysis according to the guidelines given by Stewart and Shamdasani (1990) by the two researcher's assistants, and a summary of the results of each interview was made by comparing the results of each research's assistant. Issues were regarded as important enough for inclusion in the summary when were mentioned in at least two of the four interview sessions (Brug *et al.*, 1995).

Results and discussion

The responses made by participants were categorised in nine topics derived from the analysis. The focus group sessions revealed that people were interested in taking part in the study. The discussion groups were cheerful, showing that participants enjoyed the task. It has been revealed that similar beliefs on product perception may often occur even between different groups of consumers (with and without knowledge on nutrition). The results will be presented and discussed according to important themes that were identified from the analysis. The issues are presented in Table 3.

Participants showed concerns about the appearance and quality of labels in general, and revealed willingness to taste new products. They considered themselves loyal to brand, and some of them declared that brand would overcome price. Although price has not been manipu-

lated in this study, the majority of the participants in all four sessions have mentioned price as an important attribute during their decision making process. The following quotes are illustrative: “*I only buy it if I think it has a good price,*” “*I always like to try a new product before buying it. I don’t want to risk my money*”.

This result can be supported by several others in the literature, and, particularly by the study carried out by Pecher and Tregear (2000), where price was found to be the overwhelming factor dictating perception of quality, although country of origin had some impact on the intention to purchase of German cheese by British consumers.

Consumers pointed out that they very often read the label/package looking for information, when they are not very familiar with the brand name, to get a good

feeling about the product quality. It might show a very important fact to food producers, since it seemed that non familiar brand could be compensated for by providing consumer relevant information about the product. The point that was made by participants was that when the label contains information that could benefit consumer, it is considered a product advantage: “*This product must be good to the health of my children, and to me*”.

Results presented by Deliza, MacFie, and Hedderley (1999) have demonstrated that consumers inferred product taste from the package/label, revealing many packaging attributes which affected product expectation and perception. Product information (e.g. nutritional, sensory, safety, ingredients, and, from this study, about the technology) appeared to be an important package

Table 3. Summary of responses of the sessions

	<i>Label 1</i>	<i>Label 2</i>	<i>Label 3</i>
Information	Lack of information such as composition, price, product quantity, best before date was observed in this label	The increasing of the amount of information presented in the label improved the product perception by participants	It is much better like to be informed about the technology—high pressure I relate high pressure to a very hygienic food process
Brand	The absence of information may damage the product image, since the brand name is unknown	I don’t know this brand name. It means nothing for me	The information presented in the label compensated the unknown brand
Taste and quality	I would like to taste it	It seems nice	It must be yummy, refreshing, natural, and high quality
Attractiveness	It was considered appealing	Nicer label than the previous one	More attractive due to the statement <i>health with more flavour</i>
Health	Fruit juice is good for my family health and for myself	It is better than the previous one to my health It strengthened the absence of additives, which is an advantage to my children and myself	The technology used for the juice production must have improved the product quality, which will benefit my health I would give this juice to my kids
Price	I would buy it if it were a good value for money	The chances of buying it are greater than the previous one	I hope it has a good price because I am very tempted to buy it
Convenience	If I have time, I prefer to offer home-made fruit juice to my family Ready-to-drink juices are practical, but not nice	I like to buy ready-to-drink fruit juice to be taken to school by my children because they are practical	This juice seems to be nutritious, and, at the same time, it is practical I don’t have to peel the pineapple and everything else to get a good juice
Trustiness	I don’t trust this product because it has no information on the label	I don’t trust label information, but I like to read it	I trust this product The information on the used technology was valuable for me
Intention to purchase	I wouldn’t buy the product	I still need to know more about the product I would buy it if I could try and I liked it	I definitely would go for it

attribute (“*I think the process is more hygienic, and I feel a higher food producer preoccupation with the consumer*”).

Effective communication between the product and the consumer about food and nutrition relies on delivering messages that consumers find believable and that also convinces them that making healthy food choices is achievable (Borra & Earl, 2000). The issue of consumer benefit appears to be an important factor in determining acceptance, and reflects earlier research findings. Adolescents (aged 12–19 years) have mentioned the perceived benefits (e.g. health) as a factor influencing food choice (Neumark-Sztainer, Story, Perry, & Casey, 1999). By providing adequate and true information to consumers may help them to decide about their food choices.

The positive effect of providing technology information on the label has been reported in the literature. There was a positive reaction to HACCP with American consumers with participants feeling that it would convey a higher level of assurance of safety in meat products. Eighty percent were willing to pay more for HACCP processed beef mince. However, in the follow-up discussion, participants expressed mixed reactions, with some feeling that they should not have to pay more for safety which should already be part of the processing procedure (Ford, Penner, & Grunewald, 1998).

In the present study, three out of four consumer groups perceived the product as having higher quality when the information about the technology was presented. For those people, it demonstrated a greater concern about them by the food producer, favouring the product to be chosen. Besides, the information *Saudável com mais sabor* — Healthy with more flavour — contributed to a more positive fruit juice perception in all interview sessions.

A peculiar reaction could be observed in the fourth group of consumers, comprised by housewives who worked for the administrative side of a food research institution. Despite the fact of mentioning the technology — *high pressure* — has caught consumer attention, it was not clear enough for participants. They considered that as presented, it negatively affected product acceptance, and, consequently, they declared low intention to purchase for the pineapple juice “*I have no idea what high pressure is. They should given more explanation about its meaning*”). On the other hand, citation such as “*I don’t know what high pressure is, but it should provide a good juice to me*”, was said by the non-working ladies.

Although three out of four consumer groups considered the referred information as a positive effect on their product evaluation, it has to be considered by the food producers during the product label development. Certainly, an extra couple of words explaining the meaning and advantages of high pressure technology would have pleased the great majority of consumers

leading to a higher product satisfaction, and contributing to make available a juice that may really offer higher nutritional and sensory qualities.

Despite the nutrition background of the students, they valued the information about the technology. It is worthwhile presenting their comments: “*The information about the technology made me trust that the juice had no additives at all*”, “*I think this technology is associated with the juice being more healthy with more flavour*”.

Conclusions

The focus group interviews were an useful tool in evaluating the factors that affected consumer food choice and product intention to purchase, revealing the importance of information about technology on the consumer pineapple juice perception. This finding agrees with other results (Aldag & Tinsley, 1994; Brug *et al.*, 1995) which stressed the advantages of focus group in determining food choice influences. Compared to personal in-depth interviews, focus group sessions require less time and money, and yield more factors than personal interviews. Compared to quantitative research, focus groups produce a richer amount of data, because they allow the researcher to ask follow-up questions for clarification, and non-verbal communications can be observed for interpretation of the responses (Stewart & Shamandasani, 1990).

The results of this study suggest that giving consumers information about the used technology for food production — *high pressure* — had a positive impact on the perception of the product, with participants feeling that it would convey to a higher quality pineapple juice. Given the large literature that has been devoted to consumer perception of labels, it is rather surprising that the role of the package attributes in determining product expectations, beliefs, and attitudes does not appear in a large number of investigations. Until now, few studies has been focused on the expected sensory attributes, product quality, and consumer intention to purchase using specially made labels to investigate consumer product perception (Deliza & MacFie, 2001).

External cues such as label and its content (brand, price, information, etc.) may generate expectation and alter product perception. As consumer’s repurchase of a product is on the basis of what they perceived in previous trials, the effect of expectation is likely to be an important variable in determining satisfaction with the product. A common hypothesis is that satisfaction with a product is achieved when it matches a consumer’s expectation (Kopalle & Lehman, 1995). The ability to determine such expectation about a particular product becomes a vital strategy in promoting consumer’s sensory satisfaction.

This study has demonstrated that factors influencing pineapple juice intention to purchase included convenience, taste, cost (price of product, personal finances), but mainly information presented in the product

label which inferred perceived benefits (e.g. health, nutrition, safety) to consumers. It is concluded that the presentation of information about the used technology — high pressure — may be useful in the promotion of more positive attitude towards the product, leading to a high fruit juice consumption.

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