

Full Length Research Paper

Functional foods in Mauritius: A consumer survey

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Over the last decade, functional foods have gradually entered markets in developing countries, but little is known about their status. The objective of this paper is to investigate the awareness and knowledge of consumers about functional foods, the factors influencing their purchase and their willingness to pay for these foods, in Mauritius. Structured questionnaires were administered to 200 consumers through personal interviews. 40% of the interviewees were found to be aware of functional foods, even though 89.5% of them were actually consuming them. Awareness of functional foods was found to be dependent on gender, education level and existence of children in the household and independent of region of residence. Respondents identified price and doubtful health claims as the two major factors hindering consumption of functional foods and 67.5% of them were unwilling to pay more for functional foods. This paper presents the findings of the first piece of research to elicit the status of functional foods among Mauritian consumers and these findings could be used as baseline for other more in-depth studies in the same area.

Key words: Functional foods, consumers, Mauritius.

INTRODUCTION

Economic growth, demographic patterns and changing lifestyles have triggered changes in food consumption globally. There is now a greater understanding that good health can be maintained through appropriate diets (Traill et al., 2008), thus prompting consumers to look for foods which reduce the risk of disease and promote well-being in addition to basic nutrition. This shift towards healthier food has driven changes in the way foods are processed and has given rise to the concept of functional foods.

The term 'functional food' was first coined in Japan in 1984 (Goldberg, 1994; Bradbury et al., 1996; Arshad, 2005). There is no universally accepted definition of functional foods (Doyon and Labrecque, 2008), but the term 'functional food' is generally used to describe foods having the ability to deliver some health benefit beyond nutrition (Frewer et al., 2003; World Health Organisation, 2003; British Nutrition Foundation, 2004; Like American Dietetic Association, 2004). This general concept of functional foods was adopted as the working definition for this paper.

There are different ways of classifying functional foods. Hasler (1998) broadly categorized functional foods into

two groups, namely that coming from plants and that from animal sources. Verschuren (2002) classified functional foods as foods which enhance physiological functions such as gastrointestinal physiology, physical performance and psychological functions. Alternatively functional foods were also classified as foods from which a deleterious component has been removed, reduced or replaced with another substance with beneficial effects, for example low salt foods which reduce the risk of hypertension and chewing gum sweetened with xylitol instead of sugar, which prevents dental caries (Kotilainen et al., 2006). Doyon and Labrecque (2008) identified the concepts that should be included in a broadly accepted definition for functional foods, namely the nature of the food consumption, the health benefits, functions and regular consumption.

Heasman and Melletin (2001) argued that functional foods represent an essentially new direction in food marketing which is based on people's fear about their health and possible future disease risk. Important drivers of the functional foods market are: 1) The developed world's obsession with the absence of disease, longevity and added performance (Lawrence and Germov, 2004); 2) The developing world's desire to curb diseases caused by micro-nutrient deficiencies (Asia Development Bank, 2000), and 3) Food companies' drive for competitive

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advantage (Nestle, 2002). Given the increasing global popularity of functional foods, several studies have been undertaken to investigate the consumption and sale patterns of these foods in regions like Europe, United States (US), South Africa and Japan (ACNielsen, 2005; Goldberg, 1994; Stewart-Knox, 2006; Syble, 2007; Beer-Borst et al., 2008; Wadolowska et al., 2009). These studies have mainly been conducted in developed countries, but less so in developing countries. As noted by Kotilainen et al. (2006), this reflects the higher consumption of functional foods in developed country markets. However evolving demographic and health trends along with income growth are expected to result in increased market share of functional foods in developing countries' markets too.

Mauritius is also likely to witness such a trend. It is a middle-income country with a per capita Gross Domestic Product of US\$ 12,078 PPP in 2008 (World Bank, 2009). Mauritius has witnessed rapid economic growth since the 1980s, with an increase in disposable income and subsequent change in food consumption patterns (Neeliah and Shankar, 2008). This nutrition transition has been characterized by an increase in the consumption of meat, eggs, dairy products, oils and fats resulting in a rapid increase in the prevalence of overweight, obesity and associated non-communicable diseases (for example diabetes and cardiovascular problems). Some studies have been conducted on the Mauritian food behaviour [see for example Essoo and Chellum (1999)], but none has specifically looked into functional foods.

The level of awareness of functional foods and factors influencing their purchase are unknown in Mauritius. This paper attempts to throw some light on the level of awareness of consumers and the factors which explain the consumption of functional foods. The preliminary findings from this paper would be a benchmark against which other studies on functional foods in Mauritius and in countries with the same or different levels of economic development could be compared with.

The objectives of this paper are to: 1) Assess the awareness of Mauritian consumers about functional foods; 2) Investigate the factors influencing the purchase of functional foods in Mauritius, and 3) Assess the willingness of Mauritian consumers to pay for functional foods.

METHODOLOGY

This study was carried out using a survey-based approach with a questionnaire.

Questionnaires

The questionnaire administered to the respondents comprised mostly close-ended questions and was divided into four sections. Section A looked into the awareness of functional foods, section B delved into the consumption patterns, purchasing behaviour and motives of functional food buyers and non-buyers' while section C

assessed the willingness to pay for functional foods. Section D looked at the socio-demographic profiles of the respondents including age, gender, education level, health status, existence of children in the family and household income.

In order to assess the importance given to functionality, the respondents were asked to rank the following determinants of food choice in order of priority: price, taste, income, food safety, advertisement, ready to eat, ethnic beliefs and functionality. Knowledge about functional ingredients such as calcium, dietary fibre, omega-3 fatty acids and probiotics was tested using questions involving categorical alternatives. Respondents were asked to choose the statement which, based on their knowledge, best described the function of the above mentioned ingredients. Respondents were also provided with a list of daily functional food items and were asked to tick that they had bought during the 30 days preceding the survey. Furthermore, respondents were asked to rate the statements related to 'reasons for buying functional foods' on a 5-point Likert scale (strongly disagree, disagree, not sure, agree and agree strongly). Similarly, reasons for not buying functional foods were also rated.

The draft consumed questionnaire was pre-tested with 10 respondents who were representative of the definitive sample. Pre-testing was done in order to identify any unforeseen problem, weakness and areas of improvement. In the light of the feedback obtained from the pre-test, some of the questions in the draft questionnaire were re-edited, re-phrased and re-arranged.

Sampling and enumeration

As proposed by Baba (1998), region of residence was taken as the sampling criterion, since it is an important factor influencing food consumption patterns. The sample consisted of Mauritian consumers who shop for their household food. The total number of households in Mauritius, is estimated to be 296, 300 (CSO, 2006) out of which two hundred were sampled. This accounted for 0.07% of the target population. Given that 57.3% of Mauritian households are in rural regions (Central Statistics Office, 2006), 115 respondents (57.3% of 200) from rural areas and 85 (42.7% of 200) from urban areas were respectively selected from rural and urban areas to ensure representativeness of the sample. The 200 respondents were personally interviewed by one enumerator using a pre-designed questionnaire. The data collected was coded and analysed using SPSS 16.0. Cross-tabulations of relevant variables were carried out and Pearson Chi-square tests were used to test for subsequent statistical significance.

RESULTS AND DISCUSSION

Socio-demographic profile of respondents

Out of the 200 respondents, 55% were female and 51.5% were educated up to secondary level. As can be seen from Table 1, 59% of the respondents earned a monthly household income ranging from MRU 10000 and MRU 25000 (one US \$ is approximately equivalent to MRU 30). The majority of respondents were aged between 31 to 50 years old. Moreover, 19% of the respondents had no children in their family.

Consumer awareness of functional foods

Out of the 200 respondents, 80 had heard about the term "functional foods". Given the generally low consumer

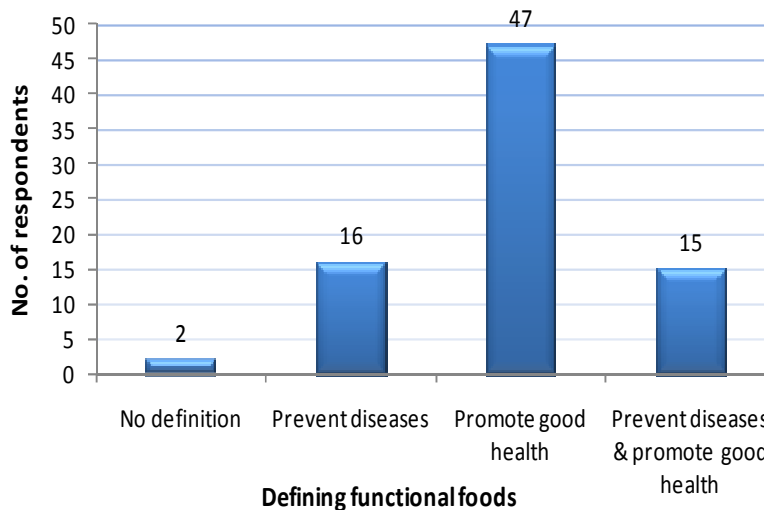


Figure 1. Definition of functional foods given by the 80 respondents who were aware of functional foods [Base: 80 respondents who heard the term functional foods].

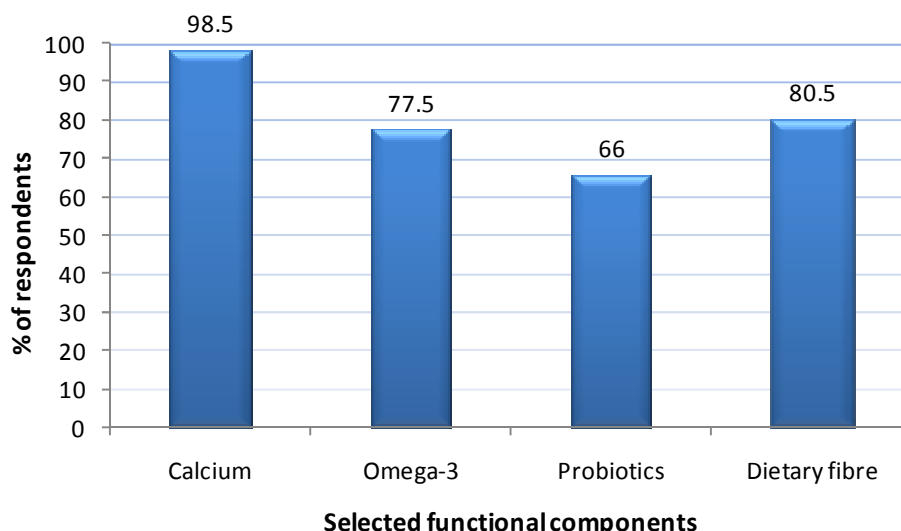


Figure 2. Percentage of respondents who were aware of the health effects of calcium, omega-3 fatty acids, probiotics and dietary fibre [Base: all 200 consumers].

awareness in Mauritius (Essoo and Chellum, 1999) and the higher awareness of functional foods in developed countries as compared to developing countries (Rooyen, 2006), this finding is not surprising. The 80 respondents were then asked to provide their definition of the term 'functional foods'. The findings are displayed in Figure 1.

The 47 respondents who defined functional foods as foods that promote good health in addition of basic nutrition, illustrated their answers by citing foods enriched with vitamins, minerals or fibre. Similarly, the 16 respondents who defined functional foods as foods that decrease the risk of disease in addition to providing nutrition, cited examples of low cholesterol foods. Based

on our working definition of 'functional foods', 15 out of 200 respondents correctly defined the term as food that combines both that beneficial effects.

We checked for a relationship between 'awareness of functional foods' with 'education' and 'gender' and found a statistically significant one based on the Pearson Chi square test ($p < 0.05$). Respondents having at least a secondary education were more aware of functional foods (p value = 0.022). This can be explained by the fact that they are more inquisitive and have a relatively better understanding of the impact of functional foods.

Our finding is supported by Childs and Poryzees (1997), Stewart-Knox (2006) and Wahba et al. (2006)

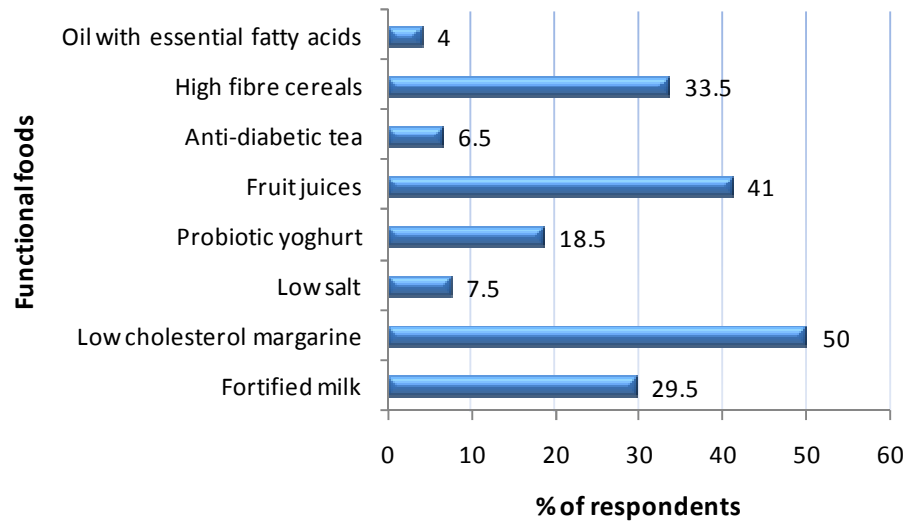


Figure 3. Consumption of selected functional foods during the previous 30 days preceding the interview [Base: 179 respondents who consumed functional foods].

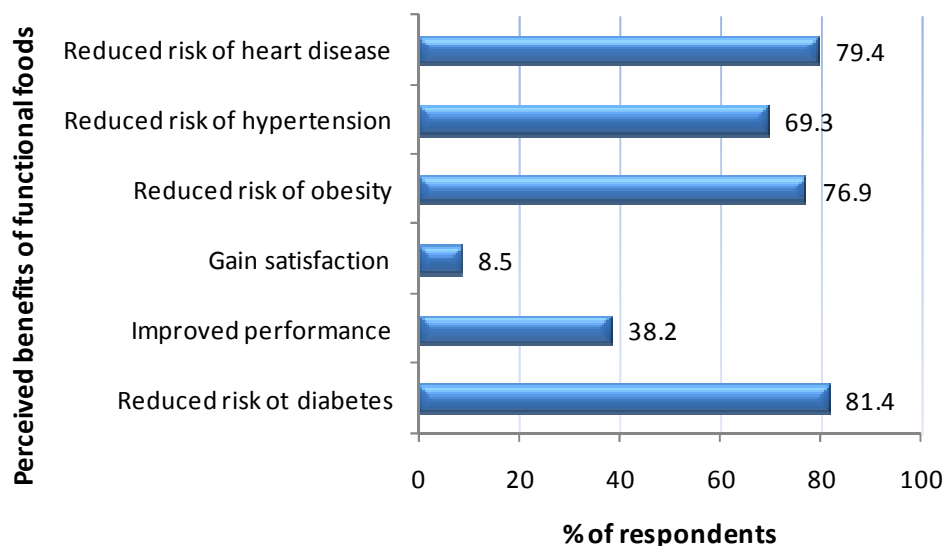


Figure 4. Desired benefits of functional foods [Base: all 200 respondents].

who all found that people with higher level of education were more aware of functional foods.

Females were found to be more aware of functional foods than males because out of the 80 respondents who were aware of functional foods, 54 were females. This relationship was statistically significant at 5% level (p value= 0.013). This may be due to the fact that women are typically responsible for most family food purchases and preparation, thus they have a greater interaction with food as compared to men. This finding is backed by Childs and Poryzees (1997) and Urala and Lahteenmaki (2003) who both mention that females have a greater concern about health conditions and are subsequently

more interested in functional foods. Another reason specific to the Mauritian context is that 'Home Economics' is a compulsory subject for girls from Form I to Form III in secondary schools and it covers areas such as health and diet. This may also explain why women are more aware of functional foods.

No statistically significant relationship was found between awareness of functional foods and region of residence ($p = 0.693$). This finding contradicts that from large countries in like America, where consumers in urban areas were more aware of functional foods (Lajolo, 2002). Mauritius is a small island and there is little variation in the standard of living or in the lifestyle of

Mauritians living in urban or rural regions. People in rural regions are more or less exposed to the same economic, educational, social and cultural realities as that living in urban regions, explaining the lack of significant difference between awareness of respondents coming from the two areas.

Understanding of functionality

After being provided with a definition of 'functional foods' by the interviewer, 89.5% of the respondents acknowledged that they consumed functional foods, implying that they were consuming these foods without being aware that they were termed functional foods. The respondents seemed to be more familiar with categories of functional foods like 'enriched', 'low calorie', 'low fat', 'low sugar' or 'unsalted foods'. They were then asked to identify the health impacts of selected functional components to assess their understanding of functionality. Figure 2 presents the results.

98.5, 77.5, 66.0 and 80.5% of respondents respectively gave the correct answer concerning the health effect of the four different functional components, namely calcium, omega-3 fatty acids, probiotics and dietary fibre. The high percentage of respondents knowing about the positive impact of calcium on bone health concurs with findings of Menrad and Sparke (2006) for four European countries. This is mainly because the benefits of the functional component 'calcium' on bone health have been marketed for a long time. 51.5% of the respondents gave the correct answers to all four questions showing satisfactory knowledge about the respective functional components. This mean percentage of correct answers is lower than what has been reported by Menrad and Sparke (2006) for Germany (65%), United Kingdom (66%) and Spain (53%) and higher than that for Poland (47%). Our findings indicate that although the respondents could not generally define functional foods, they were aware of their functionality.

Purchasing behaviour and motives of buyers of functional foods

Of the 179 respondents who consumed functional foods, 65% claimed to have purchased functional foods during the fortnight preceding the interview, whereas all claimed to have done so in the previous 30 days. Respondents were also asked to indicate the functional foods they had bought over the previous 30 days. Figure 3 presents the results.

Low cholesterol margarine was the most popular category of functional food, with 50% of the respondents having purchased it during the 30 days preceding the interview. This popularity may be attributed to the fact that it was introduced in the Mauritian market almost two

decades ago, and since then it has been aggressively marketed and adopted. The Mauritian government has also been sensitising the Mauritian population about the risks of unhealthy diets laying particular emphasis on low-cholesterol diets (Ministry of Health and Quality of life, 2006). Over time this has been engrained into the Mauritian purchasing behaviour. Our finding concurs with that of Stewart-Knox (2006) for Europe where low cholesterol foods were the most consumed functional foods.

There are several factors affecting consumer food choice, including price, taste, income, and attitudes towards different food issues (Buttriss et al., 2004; Chambers et al., 2006; Clarke, 1998; Rozin, 2007). 40.5% of the 200 respondents ranked price as the most important determinant of food choice. This finding tallies with the statement that a significant purchase driver for food in Mauritius, is 'value for money' with price being the key determinant (Austrade, 2007). Moreover, only 2 respondents out of 200, ranked functionality as the most important determinant of food choice. Respondents were also asked to rank several preconditions that would make them buy more functional foods. A reduction in the price of functional foods (for 25% of respondents) and an increase in income (for 17.5% of respondents), were ranked as the two major preconditions. This finding shows that consumers participating in the survey are price-sensitive.

Respondents were presented with different health benefits associated with functional foods and they were asked to select that which are more appealing to them. Figure 4 presents the results. 81.4, 79.4, 76.9 and 69.3% of them respectively reported that perceived reduced risk of diabetes, heart disease, obesity and hypertension would be the main reasons behind purchasing functional foods. The rising number of Mauritians suffering from diabetes and cardiovascular diseases (Central Statistics Office, 2006) and the increasing prevalence of obesity and its associated health risks, could explain the desired health benefits mentioned by the majority of respondents. Our result also tallies with that of Menrad and Sparke (2006), who found that 'staying healthy' was the most important reason to buy functional foods in four European countries. The potential of functional foods in combating diet-related non-communicable diseases is well referenced [for e.g. Henson et al. (2008)], and it explains why respondents perceive functional foods as a means to combating these diseases.

102 respondents (51%) were in favour of the statement that functional foods could repair the damage caused by an unhealthy diet. The respondents thought that functional foods could counteract the adverse effects of unhealthy eating. This finding concurs with that of Jong et al. (2003) and Chambers et al. (2006) who also reported that individuals used functional foods as a means to compensate for an unhealthy lifestyle. This perception about the impact of functional foods could actually

promote unhealthy eating, as they do not necessarily have the ability to repair or undo the damage caused by unhealthy eating, especially in the case of chronic diseases (Adams, 2004; Hasler, 1998).

No statistically significant link was found between health status of the respondents or their family members and their consumption of functional foods. Furthermore, 96 respondents (48% of respondents) thought that functional foods were important even for healthy people. These findings demonstrate that even respondents who did not suffer from any diet-related diseases consumed functional foods. They perceived functional foods as disease preventive and health promoting foods rather than 'treating' foods. Similar findings were reported by the International Food Information Council (2000), revealing that 72% of like Americans who characterise their health as "excellent", consumed functional foods for their health benefits.

Consumption of functional foods was found to be dependent on the presence of children in the household (p value = 0.019). 145 respondents (72.5%) considered functional foods to be beneficial for children. 93% of families with children consumed functional foods as compared to 87% for families without children. This may be due to the fact that parents are protective of their children and they may buy functional foods in an attempt to keep their children healthy. In fact, Sloan (2002) found that functional foods targeting children were first among the top ten functional foods trends.

Consumption of functional foods was found to be independent of region of residence. This can be explained by the fact that functional foods were available both in urban and rural retail outlets in Mauritius. 89.5% of buyers of functional foods shopped for conventional and functional foods simultaneously. 52% of them stated that they sometimes compared different brands of similar functional foods and even switched brands based on price and to a lesser extent, health claims.

On the other hand, the two main reasons for not consuming functional foods were price and doubtful health claims. 116 out of 200 respondents agreed that functional foods were more expensive as compared to their conventional counterparts. Once more, price is seen to be a key factor influencing the consumption of functional foods. In Poland the price of functional foods is also reported to be the main deterrent in the consumption of functional foods (Menrad and Sparke, 2006).

Moreover, 103 respondents stated that health claims related to functional foods were doubtful. These respondents had doubts about the validity of health claims on functional foods and did not consume them because of lack of evidence to support their efficacy. As reported by Chambers et al. (2006), consumers believe that health claims are often exaggerated by producers to increase their sales. Our findings are also supported by Hollingsworth (2001), who found that consumers are slow to embrace the new concepts of functional foods because

of the lack of credibility in the manufacturers of functional foods.

Willingness to pay for functional foods and household income

When asked whether they were willing to pay a higher price for functional foods as compared to conventional ones, 135 respondents answered negatively. This is not surprising given that price was the most important determinant of food choice. This unwillingness may further be attributed to low consumed awareness and to the little importance given to functionality (1.0%) as a major determinant of food choice. This finding concurs with that of Frewer et al. (2003) who reported that even a functional food with desirable and proven health benefits may not be attractive to consumers if it is simply too expensive to warrant purchase. A concrete example of a functional food which was rejected because consumers considered its price to be unacceptably high is Benecol margarine (Porter, 2002), reported to be approximately six times more expensive than ordinary margarine (Young, 1998).

Only 65 respondents were willing to pay a higher price for functional foods. These respondents knew that higher costs were involved in manufacturing and marketing of functional foods and were willing to pay for functionality of foods provided the price of functional foods was less 10% higher as compared to their conventional counterparts. Chambers et al. (2006) and Urala and Lahteenmaki (2007) confirmed that consumers were willing to pay a little extra for functional foods if they believed in their benefits. Other determinants that would make consumers pay more for functional foods are the nature of the product, the character of the functional ingredient, the information provided to the consumers, the food consumption pattern of the country, belief in associated health benefits and taste (Menrad and Sparke, 2006; Verbeke, 2005).

No link was found between household income and the monthly budget allocated to the purchase of functional foods ($p > 0.05$), concurring with the findings of Poulsen (1999). Thus, it can be concluded that an increase in household income would not necessarily lead to an increase in the consumption of functional foods. On the other hand, money spent monthly on functional foods was dependent on monthly household food expenditure ($p < 0.05$). Functional foods were purchased more frequently when they fitted within the existing household food budgets, as reported by Unnevehr (2006).

Although no link was found between consumption of functional foods and monthly household income, 109 respondents indicated that they might increase their demand for functional foods if their household income increased by 10%. The same relationship was reported for Bulgaria where actual purchase of functional foods

was independent of household income, but income could become a significant variable if disposable income increased (Florkowski et al., 1998). This may be attributed to the fact that increase in household income implies an increase in the ability to spend more on luxury foods and therefore more functional foods. Both the changes in the price of functional foods and an increase in income of respondents have the potential to increase demand for functional foods. However, it is difficult to predict the income elasticity of demand for functional foods with the present dataset.

Conclusion

This study throws light on the level of awareness and knowledge of consumers and the factors which affect their purchase and consumption of functional foods. The majority of the respondents were unaware of the term 'functional food' and among those who were aware, only 15 were able to properly define it. The majority of respondents knew about the health effects of selected functional components; this could explain the high percentage of respondents who actually purchased and consumed functional foods. Consumption of functional foods was found to be related to gender, education and the presence of children in the family, but independent of region of residence. However, the results cannot be generalised since purchasing and consumption patterns of functional foods are product-specific. Furthermore, this study revealed that price and confidence in health claims associated with functional foods were the two main barriers to their consumption. Most respondents were unwilling to pay a higher price for functional foods and barely gave any importance to functionality in food choice.

This is the first study that gives an 'aperçu' of the consumption of functional foods in Mauritius. Given that there was no prior information about buyers and non-buyers of functional foods in Mauritius, the findings of this study can be taken as a starting point upon which other studies to investigate the attitudes and the purchasing behaviour of buyers of functional foods can build.

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