A study on consumers' awareness, perception, and willingness to pay for biofortified products

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Abstract

Malnutrition, which can perpetuate a cycle of poverty and ill health, would disproportionately impact the people. Biofortification is one such initiative to ensure improved nutritional outcomes in developing countries, where approaches to food supplements and commercially marketed fortified foods are limited. A primary survey was carried out in and around the National Capital Territory (NCT) of Delhi, India. In total, 134 respondents from the urban and 123 respondents from the rural were interviewed. The results revealed that the majority of respondents in urban areas (72 percent) presumed biofortified products were higher in micronutrients than those in rural areas (49 percent). Knowing the significance, all respondents agreed that biofortified products would help to address micronutrient deficiency. Regarding tastes and preferences, about half of them agreed that the products would be tasty, and only about a quarter of those opined that it would be harmful to human health and the environment. The findings reveal that age and gender exerted a negative and significant impact on consumers' awareness of biofortification, while education, food habits, and income exerted a positive and significant impact. The consumers' willingness to pay (WTP) for biofortified mustard oil was estimated using the double-bound Contingent Valuation Method (CVM), and it was found that urban and rural consumers' WTP were 36 and 26 percent higher than the existing price for the conventional oil, respectively, indicating that urban consumers were willing to pay more than rural consumers. Thus, the policy implications drawn should enable the development of consumer-based food products by creating a niche market and using an appropriate marketing channel to increase consumer acceptance and willingness to pay.

Keywords Malnutrition, biofortification, awareness, perception, contingent valuation method (CVM), willingness to pay (WTP)

Malnutrition is a condition that occurs when a person's body receives insufficient nutrients due to a lack of appropriate nutrition. This could be due to inadequate diet, an unbalanced diet, problems with absorption, or digestive issues[1]**.** As a result, an estimated 155 million children were stunted, 52 million were wasted, 41 million were obese, and undernutrition caused 45 percent of deaths among children under the age of five[2]. Malnutrition, according to the United Nations Children's Fund (UNICEF), is a broad term that is commonly used as an alternative to undernutrition. This global burden is highly skewed by age and region, with childhood malnutrition being one of the most serious health issues that confronting developing countries[3]**.** Out of total mortality burden, Vitamin A deficiency affects 93 percent of children, iron deficiency anemia affects 68 percent of children, and zinc deficiency affects all the children in this age group with the total disease burden (mortality and morbidity) accounting for 94 percent, 57 percent, and 100 percent, respectively[4]. Although the global burden of micronutrient deficiencies was reduced by more than half in many countries between 1990 and 2010, it continues to be a major public health issue and one of the leading causes of death and disability, particularly in Sub - Saharan Africa[5]. Malnutrition in all forms is most common in Asia and Africa. In 2016, Asia and Africa accounted for 56 and 38 percent of all stunted children, as well as 49 and 24 percent of all overweight and 69 and 29 percent of wasted children under the age of five, respectively[6] and in India 195 million people are malnourished[7]**.**

The following strategies were commonly used to address micronutrient malnutrition: (a) dietary diversification by having a wide variety of foods with different nutrients, based primarily on types of food already available to the population, with only minor modifications to a consumer's choice of foods, such as increasing the variety and quantity of micronutrient-rich foods, including animal-source foods[8], however, this is not always attainable in developing countries[9], because high-income consumers have access to improved nutrition[10], while poor people lack purchasing power[11] , (b) Fortification is the process of intentionally increasing the

number of essential micronutrients in food to improve the nutritional quality of the food supply and to provide a public health benefit with minimal risk to health[12]. Fortified foods are expensive due to the additional processing costs and must be consumed regularly[13], (c) Supplementation, defined as the provision of relatively large doses of micronutrients in the form of capsules, syrups, or pills[14], is generally reported to be the quickest way to control micronutrient deficiency in individuals or populations that have been identified as deficient[12], but have had little impact due to underfunding logistical issues, mismanagement, and lack of compliance[15], and (d) biofortification is the process of breeding staple food crops to be a rich source of many key micronutrients such as iron, zinc, vitamin A, and iodine. Biofortification differs from traditional fortification in that it aims to increase crop nutrient concentrations during plant growth rather than manually during crop processing[2] so that by disseminating these crops in rural areas where malnutrition is high and where staple foods account for a sizable portion of household calories[16]. In contrast to commercial fortification and supplementation, biofortification of staple food crops that are bred to be rich in micronutrients is likely to be a cost-effective public health intervention[11], and an effective technique for combating micronutrient malnutrition[17].

According to a substantial literature on consumer acceptance behaviour for quality attributes such as biofortified iron beans[18], better quality ripened pears[19], maize fortified with minerals and vitamins[20], and golden rice[21], consumers were willing to pay higher premium prices than for products with normal attributes. The study reveals that the increased intake of micronutrients by biofortified crops would improve the health status of deficient individuals[22]. However, the biofortification's success is determined by several factors, including how widely biofortified staples are adopted by farmers and accepted by consumers, as well as its cost-effectiveness[23], since it has almost no effect on the change in colour or appearance of the product, improved premium for biofortified products is achieved by international branding,

providing information on nutritional aspects and other sensory characteristics[24] and it was discovered that providing nutritional information increased consumer acceptance and willingness to pay for orange maize in Zambia and Ghana[11, 20].

Since consumers dietary patterns and choices are typically based on foods rather than nutrients, nutrient content alone is unlikely to be a reasonable justification for their acceptance, and in some cases, it may affect cooking, storage, or sensory qualities, which all have an impact on its acceptance[25]. As a result, the study attempted an in-depth evaluation to elicit information about consumer acceptance, perceptions, food purchasing behaviour, and willingness to pay (WTP) for biofortified products.

Materials and method

Study location

To gain a better understanding, primary data was collected from both urban and rural areas. Urban consumers from the National Capital Territory (NCT) area were chosen where the areas with the largest shopping complexes were listed out for the study areas in NCT, and four regions were selected, each with one shopping mall. The rural consumers were purposefully chosen from the Baghpat district, where ICAR-IARI has adopted some of the villages and had carried out many interventions aimed at raising awareness about nutrition and agriculture. The villages of Basi, Sunehra, and Lahchauda in the Kekra block were mainly chosen where many newly released varieties have been demonstrated, including PM-30 (Biofortified mustard variety which benefits health on account of low erucic acid), which is the focus of our study.

Sample

The data was collected over three months from January to March 2019. The survey in urban areas was carried out in such a way that at least 15 respondents who were aware of biofortified

varieties were reached in each region, for a total of at least 60 respondents who were aware from the four regions and the survey in rural areas has been carried out in each village until there are at least 20 respondents who are aware of the biofortification. In total, 134 respondents from the urban and 123 respondents from the rural areas were interviewed. The survey had a total sample size of 257 respondents.

Data analysis

A pre-tested schedule was used to perform face-to-face interviews. There were two sections of the schedule. Questions about perception, understanding, and other sociodemographic variables were asked in the first section, while questions related to biofortified products were asked in the second.

Knowledge index

The knowledge index was calculated for each respondent based on their awareness of biofortification. The awareness scores were assessed by assigning one point to the correct answer and zero otherwise[26]**.** A total of six questions were asked, with each respondent receiving a score ranging from 0 to 6. The scores were categorized into four: not aware (0), slightly aware (Index < Mean - 1/2 Standard deviation), moderately aware (Mean - 1/2 Standard deviation < Index < Mean + 1/2 Standard deviation), and completely aware (Index > Mean + 1/2 Standard deviation)

Information sources

The respondents were given a list of sources to specify, including radio, newspaper, television, internet, journals, articles, exhibitions, training, friends, relatives, and others, and asked to tick as many as they could so that the extent of sources from which they had received information about biofortification could be evaluated and compared for both urban and rural areas.

Perception of biofortified products

It is important to investigate because perceptions of health benefits, taste, convenience, and other attributes influence the decision to purchase goods, as well as the quantity consumed[27]. We used a Likert-scale (1 to 5) to analyze the responses and presented them in the form of percentages using a bar chart since the data on perception was qualitative and each statement's response spectrum is a linear scale that shows the degree to which respondents agree or disagree with each statement.

Conzsumers' food purchasing behavior

The study gathered three types of information about respondents' purchasing behaviour. Respondents were first questioned about their frequency of buying newly arrived food items in the market (always/ often/ sometimes/ rarely/ never), their purchasing behaviour of the biofortified product if it was made available in the supermarket (yes/no), and their opinion on the need for biofortified product promotion and advertising for wider acceptance (yes/no), after which the percentage of respondent accounts for each closed-ended class was tabulated.

To understand who is responsible for taking decisions on the purchase of food items, the respondents were asked to specify the decision-maker among five categories (husband/ wife/ children/ elders/ servants/ and others) and to know the major factors that influence food purchase, each respondent was asked to rate five product characteristics based on their significance in influencing their food purchase: price, taste, nutrition, brand, and additional healthy ingredients. For each characteristic, the percentage preference was computed using a five-point Likert scale: not at all important (1), slightly important (2), moderately important (3), important (4), and very important (5).

Statistical analysis

Determinants of consumers' awareness of biofortification

Consumer awareness regarding biofortification is influenced not only by perception but rather by a multitude of socioeconomic and demographic factors. Awareness of biofortification can be modeled as a choice between two alternatives: aware or not aware. Using the statistical package STATA, the binary logit estimates and marginal effects were calculated to quantify the instantaneous effects of changes in an independent variable on the predicted probability of being aware while keeping other independent variables constant. Logit model postulates that Pi is a function of an index variable Zi, which is equivalent to the logarithm of the odds ratio, i.e., the ratio of the probability that a consumer is aware of the probability that he is not aware, and it can be calculated as a linear function of explanatory variables (Xki). Mathematically,

$Pi=F(Zi)=F(Xi)$=1/(1+e-Zi)

$Zi=ln\{\frac{Pi}{1-Pi}\}=\alpha+\sum_{k=1}^{M}\beta k\ Xki$

Where, i = 1, 2... N and N is the total number of respondents,

X= explanatory variable (age in years, gender, number of years of education, occupation, monthly income, household size, location, food habits, decision maker in purchasing food items),

K = 1, 2... M, and M is the total number of explanatory variables,

ɑ = constant, and

B = an unknown parameter

Willingness to pay for the biofortified product

Initial bids were tested for randomness to see whether bids are represented equally in the data on average, and the price test checks whether, on average, as the bid value rises, the proportion of no responses rises or not. The contingent valuation method is used to estimate how much consumers are willing to pay for each product attribute where the respondent is confronted with

two bids, the first of which asked the respondent if he is willing to pay a specific amount for a product and a second bid is made based on his first response. A second bid with a higher amount is offered if the respondent answers yes, and a second bid with a lower amount is offered if the respondent answers no. Based on the responses, WTP is calculated using Double-Bound Contingent Valuation, which gives the value of WTP directly.

Determinants of WTP

WTP was calculated for each respondent and then regressed on the explanatory variables which include age, gender, years of education, occupation, monthly income, household size, location, and food habits in the study to see if they influenced WTP.

Results

Decision making and awareness level of respondents

In our study areas, 44.78 percent of urban respondents and 49.59 percent of rural respondents aware of biofortification. The salaried employees and non-agricultural enterprises make up the majority of the occupations of urban respondents and agriculture and wage employment were the two most common occupations found in rural areas. The findings revealed that 74 percent of wives in urban areas and 56 percent of husbands in rural areas were the key decision-makers in purchasing food items and when it comes to information sources in the urban setting, social media was found to be the most common, followed by newspapers and television. In a rural setting, it was training followed by relatives, exhibitions, and friends.

Those who were aware of biofortification were asked further in-depth to know their extent of awareness. Table 1 shows that 70 percent of respondents understood clearly that in biofortification, the nutritional quality of food crops improved during plant growth using any of the practices mentioned, including agronomic practices, modern biotechnology or genetic engineering, and conventional plant breeding methods. However, 64 percent of the respondents were having the misconception that biofortification entailed physically adding micronutrients to food products during processing, and 45 percent of them perceived that biofortification entailed providing nutrients by tablets, syrups, or pills.

The knowledge index also revealed that the majority of respondents in rural and urban were moderately aware, while about 11 percent of rural respondents and 18 percent of urban

respondents received a score of zero, suggesting that they were unaware of biofortification, despite believing they were.

Binary logit was used to analyse the factors that influence consumer awareness of biofortification (Table 2). Consumers' age had a negative and significant effect on their awareness which indicates that younger age groups were more likely to be aware of biofortification, and marginal effect results show that raising a respondent's age by one year reduces the probability of being aware of biofortification by 1.1 percent. Male respondents were found to be 31 percent less cognizant than female respondents on average, suggesting that gender had a negative and significant influence on awareness. Also, consumer awareness was significantly influenced by factors such as education and income. In both urban and rural areas, an increase in one unit of education (number of years of schooling) and income increased the probability of being aware by 4.7 percent and 0.8 percent, respectively, while household size, food habits, and the decision-maker (one who influences the food purchase) had no influence on awareness. In pooled data, however, food habit became a significant factor that influenced awareness, while the location was found to be an insignificant factor, implying that there is no significant difference in awareness levels between urban and rural consumers.

Consumers' perceptions of biofortified products

When given a Likert scale ranging from strongly disagree to strongly agree (Figure 1), nearly ¾ th of respondents in urban areas strongly agreed that biofortified products were rich in micronutrients while half of the rural consumers perceived the same. Similarly, almost all of the respondents agreed or strongly agreed with the statement that biofortified foods can aid in the fight against nutrient deficiency, especially in low-income communities and rural areas. As far as taste is concerned, more than half of the respondents agreed that the biofortified products

would be tasty and also disagreed that biofortified foods are risky for both human consumption and the environment.

Consumers' food purchasing behaviour

When it comes to purchasing new food products that have just arrived on the market, it was found that more urban respondents rated always and often to purchase newly-arrived food products than that of the rural respondents while in both regions, nearly equal percentages of respondents rated sometimes and rarely to the new products. More so, it was found that the rural respondents rated never to the newly arrived products more than the urban respondents. As a result, urban respondents were found to be more likely than rural respondents to purchase newly arrived goods.

Thereafter, respondents were asked about their purchase behaviour for biofortified products, and the outcome revealed that 83 percent of urban respondents and 59 percent of rural respondents would purchase a biofortified product once it becomes available on the market and when enquired about the need for product promotion and advertising, 86 percent of urban respondents and 90 percent of rural respondents' opined that the biofortified products should be advertised and promoted.

To identify the most important factors that influence food purchase, respondents were asked to rank product characteristics (Fig. 2) according to their level of importance before purchasing, ranging from not at all important to very important. The majority of respondents in both regions ranked taste/flavour as very important, while rural respondents ranked price as being more important than the urban respondents who were more conscious of nutritional information and ranked it as very important while purchasing food items. More than half of respondents in both study areas ranked the brand name of a product as very important to them

when purchasing it, whereas urban respondents ranked the availability of additional health information in the product as more important to them.

Willingness to pay, influencing factors and their determinants

The respondent's willingness to pay was analysed through a double-bound contingent valuation method. There were six randomly allocated initial bids for a litre of biofortified mustard oil, ranging from INR 100 to INR 150, based on a 10 percent difference in the average market price of normal mustard oil taken at 100 INR/litre. The randomness test for the initial bid revealed an equal representation ranging from 22 to 23 frequencies per bid, and the price test results verified that when a lower initial bid was quoted, a larger number of respondents were willing to pay, and as the price of the initial bid increased, a smaller number of respondents were willing to pay.

Table 3 shows the results of WTP analysis with control variables. In the urban study area, variables like income, education, and food habits, while in the rural study area, variables like gender and income were found to be significant. As in the case of pooled data, only income and food habits were found to be significant.

The consumers' responses were analyzed using STATA's Doubleb command, which gives directly the value of WTP for biofortified mustard oil (Table 3). The respondents in both the urban and rural areas were willing to pay INR 135.87 and INR 126.96, respectively, which is 35.87 percent and 27 percent more than the prevailing price of the normal mustard oil and in total, the pooled willingness to pay for the biofortified oil accounted for INR 131.91. The WTP estimates increased marginally after introducing the control variables to the model, with urban and rural respondents willing to pay INR 136.49 and INR 127.25, respectively, for a pooled respondents WTP of INR 132.58, which is 32.58 percent more than the price of normal mustard oil.

The WTP for each respondent was estimated by using STATA's predict command to which multiple linear regression was employed to identify determinants of predicted WTP. As WTP was predicted from the model, the regression model was highly significant and R-square value 1 indicates the variation in WTP was completely explained by the model (Table 3).

Discussion and conclusion

The study looked at respondents' awareness of biofortification and then the knowledge scores highlighted that the awareness on biofortification was slightly higher in rural respondents which may be owing to institutional training, health, and nutrition programs, which may have resulted in the high level of awareness. However, it is to be noted that the rural sample was purposively taken from the ICAR-IARI adopted villages, therefore it cannot be generalized. As consumers want products that have both traceability information and an assurance of good quality[28], the information sources place an important role. In our study, it was found that urban respondents' main source of information was found to be the internet, newspapers, and, television and for rural respondents, it was training, relatives, exhibitions, and friends. So, arranging training programs by government institutions and other non-profit organizations can be used to supplement media sources in rural areas, in disseminating information. In addition, mobile phones, the internet should be considered, since they are in wider use among urban consumers.

Although the explained variance of the binary logit model is rather low (Table 4), it does appear to be useful to explore the sign and impact of some of the important determinants of awareness. In our study, age and gender negatively affected awareness while education, food habit, and income affected awareness positively since the variability have significant implication in terms of developing programs aimed at improving consumer awareness[20] and found that awareness levels were indeed varied. Consumers can decide to consume or not to

consume a specific type of food depending on their perceptions, knowledge of health benefits, or other psychological factors[29, 27]. As in our findings, the majority of respondents strongly agreed that biofortified products were rich in micronutrients, and almost all the respondents agreed with the statement that biofortified foods can aid in the fight against nutrient deficiency which is in line with the study showed that consumers have a high interest in the nutrition attributes of food products, considering these attributes as very important for the choice of food.

The factors that influence food intake fall into the categories of food characteristics, individual characteristics, or economic and social environment characteristics when it comes to food purchasing behavior[31] while in our study taste/flavour was ranked as very important by the respondents, confirming previous findings that consumers value taste and other associated varietal attributes more than the nutritional quality of a product[19, 32, 33] and also the majority of rural respondents rated price as very significant as the economic and social environment reflects external influences on food acceptability, such as product price, ability to pay for it, availability, information, knowledge about it, and social, cultural, and ecological resources[34,35].

Furthermore, consumers expected enriched foods to be priced similarly to conventional foods[36] and people with low income, on the other hand, have a limited selection and must rely on low-cost foods, mostly cereals, to meet their nutritional needs[37]. Another study in South Africa looked at consumer acceptance of yellow, pro-vitamin A-biofortified maize and noticed that consumers would purchase yellow maize only if it was cheaper than the white majority maize[38], The study also revealed that the urban respondents were more conscious of nutritional information, showing a trend comparable to that observed in a study conducted in Zambia, where the provision of nutritional information on orange maize translated into a higher acceptance of the orange variety and a lower acceptance of white maize[11]. More than half of the respondents agreed that a product's brand name is very important to them when purchasing,

which is consistent with earlier studies[39]**,** who found that packaging and labeling are the most important marketing attributes for the majority of consumers.

Consumers' willingness to pay for biofortified mustard oil was found to be higher in both urban and rural areas than the current price of conventional mustard oil, which mirrored the findings of earlier studies[40], who examined the market potential of foliate biofortified rice (FBR) in China and found that consumers were willing to pay 33.7 percent more than for regular rice and that for the bio-fortified cassava, Brazilian consumers were willing to pay a premium of 160 percent[41].

Besides, regression analysis revealed that age, gender, income, household size, food habits, awareness, education, and location are all factors that influence willingness to pay for biofortified products. Furthermore, previous research has shown that age was found to be negatively correlated with willingness to pay for organic potatoes in earlier studies [42] and more educated consumers are willing to pay a premium for nutritionally improved products[20] and are willing to pay a premium for food safety and nutrition[43,44]. The study's findings provide insight on stakeholder knowledge and awareness of biofortification, which has the potential to impact policy formulation and guide strategies for promoting micronutrient-rich products. To better understand the link between consumer awareness and perception of biofortified foods, further research is needed. This would allow for the creation of consumer-based food products, potentially increasing consumer acceptance rates. The growing market for enriched foods, particularly biofortified foods, offers a potential opportunity to improve health while also allowing the development of new micronutrient-rich food products.

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Table 1. Respondents' level of awareness

Statements	Correct answers	Rightly aware (%) Urban (n=60)	Rural (n=61)	Pooled (n=121)
In biofortification, the nutritional quality of food crops is improved during plant growth through agronomic practices	Yes	38.33	83.61	61.16
In biofortification, the nutritional quality of food crops is improved during plant growth through conventional plant breeding	Yes	61.67	81.97	71.90
In biofortification, the nutritional quality of food crops is improved during plant growth through modern biotechnology or genetic engineering	Yes	81.67	63.93	72.73
In biofortification, any of the above or all of the above techniques are followed for improving the nutritional value of the crops	Yes	78.33	62.30	70.25
Biofortification is a commercial approach in which specific micronutrients are added to food products physically during processing	No	60.00	68.85	64.46
In biofortification, relatively large doses of micronutrients are supplied in the form of capsules, syrups, or pills	No	42.00	47.00	44.50

Table 2. Determinants of awareness (Marginal effects after logit)

Variable	Dy/dx (Urban)	Dy/dx (Rural)	Dy/dx (Total)
Age	-0.015*	-0.008*	-0.011***
	(0.009)	(0.005)	(0.004)
Gender	-0.224**	-0.413***	-0.312***
	(0.107)	(0.125)	(0.078)
Household size	0.005	0.006	0.005
	(0.066)	(0.022)	(0.020)
Education	0.057***	0.050***	0.047***
	(0.022)	(0.016)	(0.011)
Food habit	-0.002	-0.028	0.033***
	(0.107)	(0.258)	(0.010)
Income	0.007***	0.035***	0.008***
	(0.003)	(0.011)	(0.003)
Decision maker- Husband	-0.074	0.110	0.093
	(0.239)	(0.138)	(0.119)
Decision maker - Children	0.246	0.028	0.088
	(0.409)	(0.297)	(0.236)
Decision maker - Elders	-0.142	-0.175	-0.138
	(0.132)	(0.245)	(0.116)
Location	-	-	-0.213
			(0.215)
Log likelihood	-61.09	-56.01	-118.65
Pseudo R2	0.308	0.3430	0.3206
X2 (ρ- value)	54.39	58.49	111.99
	(0.000)	(0.000)	(0.000)
No. Of observations	129	123	253

Note: Standard errors in parentheses; statistical significance levels: ***1%; **5%; *10%

Table 3. Coefficient estimates for double-bound contingent valuation model and WTP for with and without control variables

	Urban	Rural	Pooled
Age	0.103	0.170	0.137
	(0.196)	(0.200)	(0.136)
Gender	3.887	-10.958*	-1.893
	(3.694)	(6.242)	(3.396)
Income	0.177***	0.802***	0.000***
	(0.072)	(0.331)	(0.000)
Household size	0.096	-0.330	0.179
	(1.943)	(0.889)	(0.695)
Food habits	15.000***	5.662	13.496***
	(3.662)	(8.219)	(3.843)
Awareness	-0.542	0.776	2.160
	(4.149)	(6.055)	(3.625)
Education	1.031**	0.548	0.528
	(0.485)	(0.582)	(0.366)
Location	-	-	6.967
			(5.312)
Constant	99.934***	104.299***	98.825***
	(13.492)	(13.008)	(8.532)
Log-likelihood	-120.587	-150.56263	-278.037
X2 (ρ- value)	36.81	12.97	43.16
	(0.000)	(0.073)	(0.000)
No. Of observations	134	123	257
WTP with no control variables	135.87***	126.96***	131.90***
	(2.029)	(2.559)	(1.658)
WTP with control variables	136.49***	127.25***	132.60***
	(1.773)	(2.425)	(1.532)

Note: Standard errors in parentheses; statistical significance levels: ***1%; **5%; *10%

Table 4. Determinants of WTP

	Urban	Rural	Total	Std. Err.	P>|z|
Age	0.103	0.170	0.137	0.000	0.000
Gender	3.887	-10.958	-1.893	0.000	0.000
Income	0.177	0.802	0.249	0.000	0.000
Household size	0.096	-0.330	0.179	0.000	0.000
Food habits	15.000	5.662	13.496	0.000	0.000
Awareness	-0.542	0.776	2.160	0.000	0.000
Education	1.031	0.548	0.528	0.000	0.000
Location	-	-	6.967	0.000	0.000
Constant	99.934	104.299	98.825	0.000	0.000
Number of observations	134	123	257		
Prob > F	0.000	0.000	0.000		
R-squared	1.00	1.000	1.000		
Adj. R-squared	1.000	1.000	1.000		

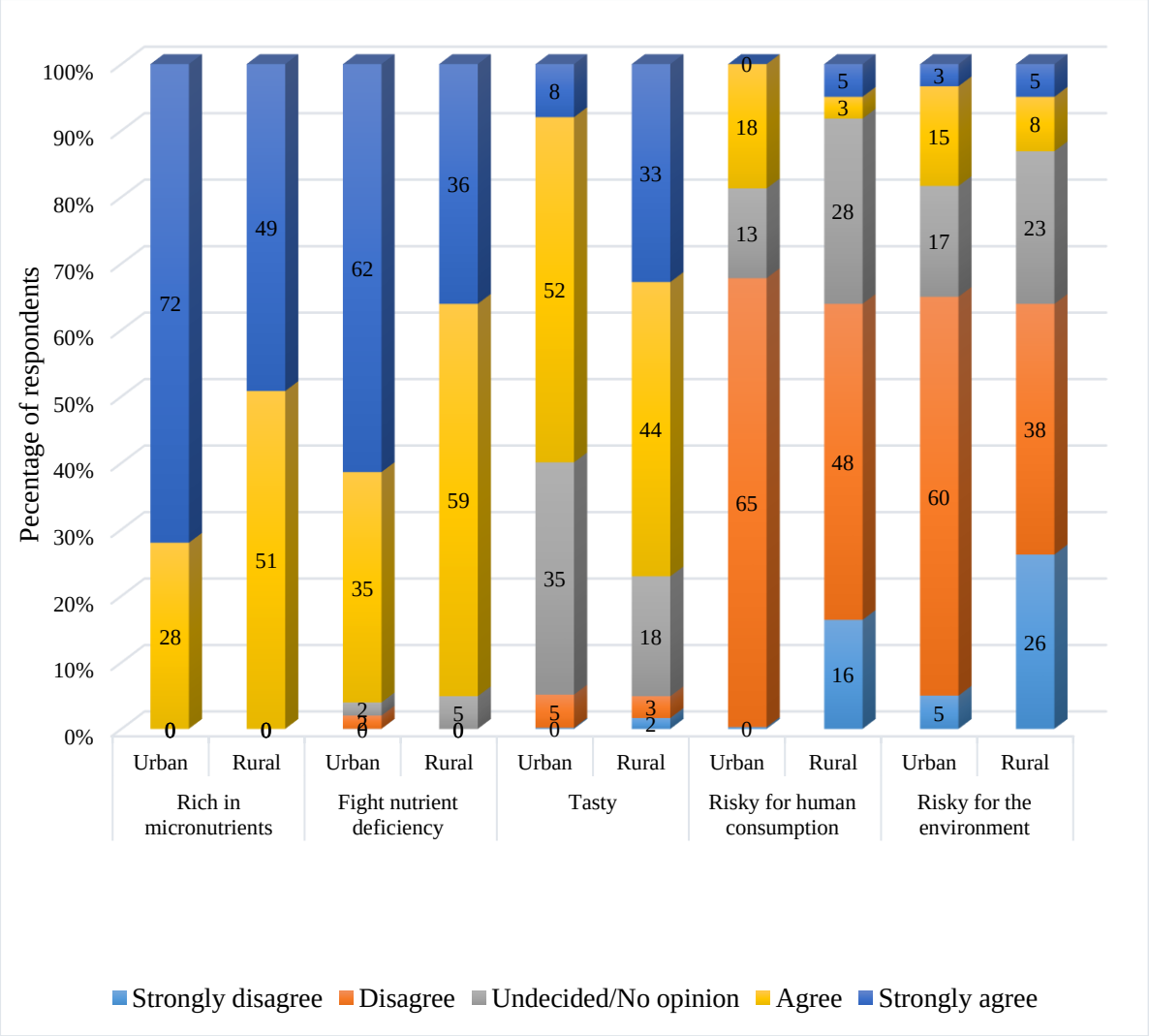

Figure 1. Perception scores

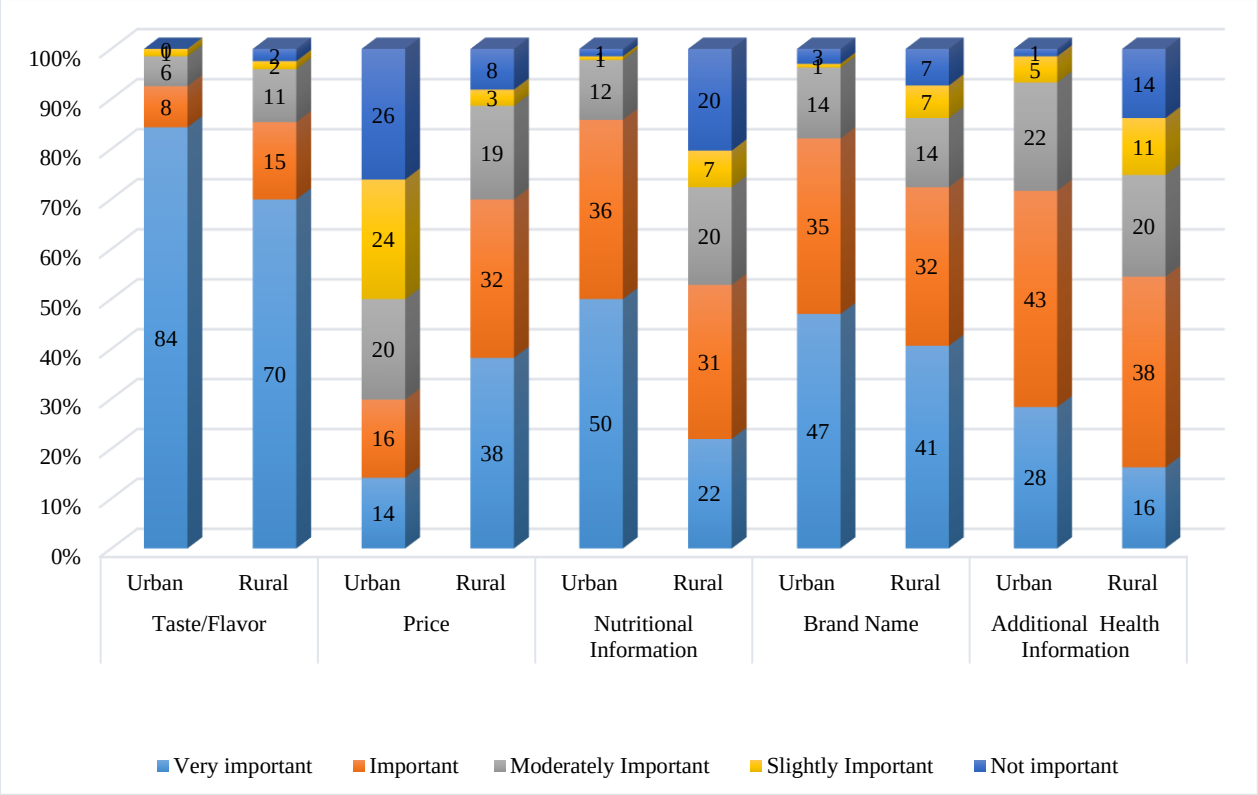

Figure 2. Factors influencing food purchase