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CONSUMERS' WILLINGNESS TO PAY (WTP) FOR PROCESSED FLUTED PUMPKIN BASED ON SENSORY ATTRIBUTES IN NORTH-CENTRAL, NIGERIA

Amolegbe KB[1], Danilola S[2]* and IK Biodun[1++]

Samuel Danilola

*Corresponding author email: samueldanilola@yahoo.com

[1]Department of Agricultural Economics and Farm Management, University of Ilorin, Kwara, Nigeria

[++]KB Iliasu [correction on the name - 24th January 2023]

[2]Department of Economics and Finance, Lagos Business School, Pan-Atlantic University, Lagos, Nigeria

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ABSTRACT

Although there are diverse kinds of leafy vegetables in Nigeria, fluted pumpkin is one of the most consumed. However, the high perishability of its leaves has been a source of concern, of which mild processing has been suggested in the literature as a way out. Several studies have been done on the production and profitability of fluted pumpkins. However, none exist on consumers' willingness to pay (WTP) for processed fluted pumpkins based on sensory/organoleptic attributes in Nigeria. This study, therefore, fills this gap by investigating consumers' perception of processed fluted pumpkin leaves, their WTP for processed fluted pumpkin leaves and the amount they are willing to pay, and the factors affecting their WTP. Data used in the study were obtained using a set of pretested structured questionnaires in an interview schedule, and it was administered to 120 consumers in Ilorin, North-central Nigeria. Descriptive statistics and logistic regression analysis were used to analyse the data. The logistics regression checked the factors affecting the WTP for the processed leaves. The study found evidence that consumers have a high perception of the sensory/organoleptic attributes – general acceptability, texture, colour, general appearance, and aroma - of the processed fluted pumpkin leaves; with 92.3% of them willing to pay for the processed fluted pumpkin leaves while 34.2% of the consumers were willing to pay a premium which was more than the conventional price of fresh fluted pumpkin leaves. The study also revealed that the perception of consumers about the sensory attributes of the processed pumpkins and their preferences for the processed leaves positively influence their willingness to pay. This shows that there could be a market for this product. Based on the study's findings, it is therefore recommended that further studies be carried out on processed fluted pumpkins to ascertain their suitability for scaling their production for the market.

Key words: Willingness to pay, Perception, Sensory Attributes, Vegetables, Logistics Regression

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INTRODUCTION

Background

The roles that fruits and vegetables consumption play in promoting the health of humans have been documented in the literature. Several epidemiological studies have shown the inverse relationship between this class of food consumption and the onset of cardiovascular, cancer, and other related diseases [1, 2, 3, 4]. For example, leafy and other fruity vegetables have been recognised historically as rich sources of essential dietary micronutrients and fibres and phytochemicals that aid healthy body cells. The World Health Organisation (WHO) recommends a daily intake of at least 400g of fruit and vegetables per person [4].

Although there is diverse kinds of leafy vegetables in Nigeria, fluted pumpkin is one of the most consumed as it is an essential source of nutrient in the diet; and is equally helpful to produce gourd, which is used in the preservation of food and traditional medicine in rural Nigeria [5, 6, 7]. Despite the rate at which fruits and vegetables are grown in Nigeria, evidence is scarce on the dietary intake and the dietary patterns and the role of vegetables in Nigeria. The data available (Nigeria Food Consumption and Nutrition Survey, NFCNS, conducted between 2001 and 2003) focused primarily on the consumption of staples and non-staples [7]. The NFCNS and other regional panel studies following the NFCNS revealed that vegetables are not consumed daily [8, 9].

The existing literature has focused on the economic efficiency and the profitability and determinants of profitability of fluted pumpkin production in various regions of Nigeria [10, 11, 12, 13, 14]. Another piece of literature provides a gender perspective on the production of fluted pumpkins by analysing its production by women to the household's income [15]. In addition, the literature has also expounded on the rate of postharvest losses of leafy vegetables [16] and how minor processing can help reduce these losses and improve the shelf-life [17]. However, these studies on the fluted pumpkin and other leafy vegetables give credence to gaps in research on consumers' willingness to pay (WTP) for processed fluted pumpkin based on sensory/organoleptic attributes in Nigeria.

There are pieces of evidence of the general acceptability of processed fluted pumpkins. For example, Mepba *et al. [17]* studied the effect of processing on the nutritional composition and consumer acceptance of some edible Nigerian leafy vegetables. Other studies on WTP for vegetables by Phillip and Dipeolu [18] focused on consumers' awareness and WTP for organic vegetables in South-West Nigeria. However, there is no empirical study on consumers' willingness to pay (WTP) for processed fluted pumpkin leaves and its factors, thereby leaving a gap in knowledge that this study seeks to fill.

In this study, therefore, consumers' perception of processed fluted pumpkin leaves, their WTP for processed fluted pumpkin leaves and the amount they are willing to pay was investigated. Then, we identify the factors affecting their WTP. Data used in the study were obtained using a pretested structured questionnaire in an interview schedule, and it was administered to 120 consumers in Ilorin LGA, Kwara State, Nigeria. In

collecting data, contingent valuation (after consumers had been shown a packaged sample of processed fluted pumpkin leaves) was used to obtain the consumers' preference and how much they were willing to pay for the processed leaves. The Likert scale was used to measure consumers' perception of the sensory/organoleptic attribute of the processed leaves. Logistic regression analysis was used to identify the factors influencing the consumers' WTP for the processed pumpkin leaves.

MATERIALS AND METHODS

Study Area

This study was conducted in the Ilorin metropolis. Ilorin is the capital of Kwara State in Nigeria and is made of three local government areas: Ilorin West, Ilorin East, and Ilorin south, with 777,667 as of the 2006 census. The target population of this study are the consumers of leafy vegetables, particularly pumpkin leaves.

Source of Data

Primary data was obtained using a structured questionnaire in an interview schedule. The respondents were selected using a two-stage random sampling. The first stage involved the random selection of four markets in the Ilorin metropolis, and the second stage involved the random sample of 30 respondents from each selected market. A total of 120 respondents were used for this study.

Data Collection

The questionnaire used in the study comprised three sections: the first section was aimed at obtaining the socio-economic data of the respondents; the second section elicits information on respondent's awareness and attitude towards the purchase of processed fluted pumpkin leaves, and the third section contains the respondent's responses from the choice experiment and how much consumers were willing to pay for the product.

In collecting data, consumers' willingness to pay (WTP) was obtained using the contingent valuation (CV) method. The method consisted of two questions: the first was the dichotomous choice (DC) question, and the second was a maximum WTP question. In the DC question, the consumers were asked whether they were willing to pay for the processed fluted pumpkin leaves they were given. Consumers' responses were recorded as YES if they were willing to pay or NO otherwise. Consumers were then asked for the exact amount they were willing to pay.

Data Analysis - Descriptive statistics and Logistic Regression Analysis

Descriptive statistics were used to describe the socio-economic characteristics of the respondents, the percentage of consumers willing to pay, and how much they are willing to pay. Logistics regression analysis was used to determine the factors affecting consumers' WTP.

The analytical tools used included a frequency distribution table, mean, and standard deviation. Likert scale was used to elicit the consumers' perception of the sensory attributes of the processed fluted pumpkins shown to them. They were asked to respond

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to a question: how much do you like or dislike the processed pumpkin leaves samples presented to you based on the following attributes? They were asked to respond on a scale ranging from 'dislike most (1)' to 'like most (5).' The characteristics used as the items for scale include colour, texture, aroma, general appearance, and general acceptability. The scores were then aggregated to obtain the mean.

Logistic Regression Analysis was used to determine the factors influencing consumers' WTP for the processed fluted pumpkins. Respondents are asked, 'are you willing to pay for the processed fluted pumpkin leaves?' Their responses were categorised into 1, for yes, and 0, for no. Their response is then used as the dependent variable in the model. The logit model is used since it is the best tool for modelling the probability of respondents falling into either two categories, yes or no.

The model specification is given in equation 1:

$Y^* = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, e)$ 1

Where,

Y = Willingness to pay (y* is 1, if Yes; 0, if No)
X_1 = Sex of the respondents (1, if Female; 0, if Male)
X_2 = Age of the respondents in years (Quantitative)
X_3 = Household size (Quantitative)
X_4 = income per month of the respondent in Naira (Quantitative)
X_5 = Ate pumpkin last week (1, if Yes; 0, if No)
X_6 = Perception of Sensory attribute (Mean score of everyone on a 5-item 5-point Likert scale
X_7 = Preference (1, if Yes; 0, if No)
X_8 = amount willing to pay in Naira
X_9 = Marital status (1, if single; 0, if otherwise)
e = Random error term

RESULTS AND DISCUSSION

This section presents the finding of the research. It describes the socio-economic characteristics of the respondents, their perception of the processed fluted pumpkin leaves, consumers' WTP for processed fluted pumpkins and the amount they are willing to pay, and the factors affecting their WTP.

Socio-economic Characteristics of respondents

Table 1 reveals the socio-economic characteristics of the respondents. A total of 120 respondents took part in the study, 80% of whom were females. The age distribution of the respondents has most respondents below 40 years, cumulatively 75.9%. However, the average of the respondents is 33 years. Most of the respondents were also married, 59.2%. The mean household size of the respondents is five persons. The study also revealed that about 70% of the respondents had a tertiary level of education, while the average income of the respondents was found to be N89, 356.67.

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Consumers' perception of processed fluted pumpkin leaves

Since consumers can readily assess the sensory attributes of the food they hope to consume, the perception of consumers about processed fluted pumpkin leaves will be instrumental in deciding its acceptability. As a result, consumers' perception of these attributes was measured on a 5-point Likert scale, as explained in section three. Table 2 reveals the result of the analysis.

With mean scores greater than 3.0, each attribute is considered acceptable for the processed fluted pumpkin shown to the respondents. From the table, it is revealed that the consumer finds the processed leaves generally good. The level of acceptability conforms to Mepba *et al.* [17] findings where dried fluted pumpkin leaves had higher acceptability than other processed vegetable leaves. Following the relationship between the physical attributes of fruits and vegetables and their consumption [19, 20, 21], there is a market potential for processed fluted pumpkin leaves owing to the satisfactory perception of consumers about its physical characteristics. It is, therefore, expected to influence the consumption of these processed fluted pumpkin leaves positively.

This finding, therefore, opens opportunities for an improvement in the leafy vegetable value chain, as it will promote post farm activities beyond sales and marketing via increased value addition. However, the level by which adding value via mild processing to fluted pumpkin leaves would impact the value chain, especially in terms of the profitability of its marketing, presents an exciting area for further research.

Consumers' WTP for processed fluted pumpkins and the amount they are willing to pay

The study, following consumers' satisfaction with the attributes of the processed pumpkin leaves, went further to assess their WTP for those processed pumpkin leaves and how much they were willing to pay. Table 3 presents the result of the analysis.

The result revealed that 41.0% of the respondents were willing to pay between 0.33 – 0.55 USD per 40g pack of the processed leaves, which is about 17.80 – 96.40% more than the average price of fresh fluted pumpkin leaves displayed in the market – 0.28 USD which was used as the starting bid price. About 25% were willing to pay a premium of 100% over the average price. The result also shows that about 92% of the consumers are willing to pay for the product. Further, only approximately 34.2% were ready to pay a premium over the average price for fresh vegetable leaves. This percentage also buttresses the market potential of the processed fluted pumpkin leaves.

The study finds that the consumers must perceive a high quality in the processed leaves, as proven by the positive perception of its organoleptic properties, hence the willingness to pay a premium just as was revealed by Loureiro and McCluskey [22]. In addition, to put the willingness to pay for the product in perspective required that the study asked the respondents why they were willing to pay for the commodity. It was revealed that most of the consumers, including some of those not willing to pay, believed the processed fluted pumpkins would also significantly reduce the problem of perishability and ultimately solve the challenge of scarcity, as shown in table 4. The perceived relevance of processing leaves in forestalling the perishability of leaves has

to be established empirically, which calls for further research. Although Mepba *et al.* [17] explained the likely relevance of minor processing in improving the shelf-life of processed leaves, the study did not state how much; neither did it focus on the effect of processing on the perishability of fluted pumpkin leaves.

Factors influencing consumers' willingness to pay (WTP) for the processed fluted pumpkins

The logistic regression model was used to obtain the determinants of consumers' WTP for the processed fluted pumpkin presented to them. The dependent variable is consumers' WTP which is a dichotomous variable – 'yes' denoted by 1, and 'no' represented by 0. The result of the analysis is presented in Table 5. Only the variables necessary to the model are presented.

From the table, three variables were found to significantly affect WTP – Secondary education, sensory attributes of the processed fluted pumpkins, and consumers' preference for processed vegetables. Consumers with secondary education will be 1.794 units more willing to pay for processed fluted pumpkins than consumers with tertiary schooling.

Consumers' perception of the sensory attributes of the processed fluted pumpkin leaves significantly affects their willingness to pay for the produce. The coefficient of the variable is 1.496, and this implies, holding other variables constant, consumers' likelihood to pay for the processed leaves will increase by a factor of 1.496 units when there is a unit increase in the measure of consumers' perception of the sensory attributes of the processed pumpkin leaves. This finding conforms to Haghjou *et al.* [23] results that revealed consumers' willingness to pay for organic foods is greatly influenced by their knowledge of the food's freshness, taste, the convenience of packaging, and other sensory attributes.

Consumers who prefer the processed fluted pumpkins displayed to fresh ones are 1.701 times more willing to pay for it than consumers who prefer the fresh fluted pumpkin leaves. This result is consistent with the findings of Yiridoe *et al.* [24] and Bower *et al.* [25]. These studies revealed that the willingness to pay a premium on food products increases with the combination of the consumers' preferred attributes of the food or likeness to the food. This time it is the preference for processing.

Following the data analysis, this study can establish a high preference for processed fluted pumpkins. This preference is matched by consumers' willingness to pay a premium for the purchase of the product. This high preference, coupled with the acceptability of the product based on the sensory or organoleptic attributes, reveals the product does not lag its new variant in meeting the sensory needs of the consumers. Although the assumption for the high preference of consumers for processed leaves relative to fresh leaves is that it would reduce the perishability, thereby increasing the product's shelf life; however, there is the need for empirical studies to check this assumption. The study also established the importance, preference, and sensory attributes of processed fluted pumpkins in affecting consumers' WTP for the product.

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CONCLUSION

Consumers have a high perception of the organoleptic attributes – general acceptability, texture, colour, general appearance, and aroma - of the processed leaves. The study also reveals that 92.3% of the respondents were willing to pay for the processed fluted pumpkin leaves, and only 34.2% of the consumers were willing to pay a premium on the bid price of the fluted pumpkin vegetable leaves. The consumers believed the processed leaves would help increase the shelf-life of the produce.

Analysis using the logistic regression model shows that consumers' perception of the sensory attributes of the processed pumpkin leaves positively influence the willingness to pay for the processed leaves.

It can be concluded that a large percentage (92.3%) of the consumers are willing to pay for processed fluted pumpkin leaves in North-central Nigeria, and about 34.2% will back that willingness by paying a premium for the produce. Therefore, it is recommended that further studies be carried out on processed fluted pumpkins to ascertain their suitability for scaling their production for the market.

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Table 1: Socio-economic characteristics of the respondents (N=120)

Variables	Category	Frequency	Percentage	Mean
Gender	Male	24	20	
	Female	96	80	
Marital status	Single	39	32.5	
	Married	71	59.2	
	Divorced	7	5.8	
	Widow	3	2.5	
Age	<= 30	65	54.2	33.64
	31-40	26	21.7	
	41-50	17	14.2	
	51-60	8	6.6	
	>60	4	3.3	
Household size	One to six	93	77.5	5.48
	seven to twelve	27	22.5	
Education level	No formal education	8	6.7	
	Primary education	6	5	
	Secondary education	22	18.3	
	Tertiary education	84	70	
Occupation	Student	18	15	
	Civil servant	43	35.8	
	Others	59	49.2	
Income	<10,000	15	12.5	N89,356.67
	10,001-30,000	34	28.3	
	30,001-50,000	23	19.2	
	50,001-80,000	16	13.3	
	>80,000	32	26.7	

Source: Authors' computation from a field survey, 2017

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Table 2: Attributes considered by consumers when purchasing processed pumpkin leaves

Constraints	Mean score	Rank
General acceptability	4.10	1st
Texture	4.06	2nd
Colour	3.99	3rd
General appearance	3.98	4th
Aroma	3.90	5th

Source: Authors' computation from a field survey, 2017

Table 3: Actual amount consumers were willing to pay

	Not Willing to pay		Willing to pay less than 0.28USD		Willing to pay 0.28 USD		Willing to pay a premium (more than 0.28 USD)	
No of consumers	Frequency	%	Frequency	%	Frequency	%	Frequency	%
	9	7.5	40.0	33.3	30.0	25.0	41.0	34.2
Amount willing to pay in USD[1]			0.11 - 0.25		0.28		0.33 - 0.55	

Source: Authors' computation from a field survey, 2017

Table 4: Consumers' Opinions on the benefit of the processed fluted pumpkin leaves

Opinion of Processed Pumpkin	Category	Frequency	Percentage
Reduce the problem of perishability	Yes	116	96.7
	No	4	3.3
Solve scarcity problem	Yes	115	95.8
	No	5	4.2

Source: Authors' computation from a field survey, 2017

[1] United State Dollar (USD) = 360.5 Nigerian Naira (NGN) as July, 2018 Source: Central Bank of Nigeria Parallel rate

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Table 5: Logistic regression analysis for the determinants of Willingness to Pay for Processed Fluted Pumpkin Leaves

Variables[2]	Coefficient	Std. Error
Sex	1.035	0.647
Single	-0.766	1.586
Married	-0.746	1.38
Age	-0.011	0.036
Household Size	0.023	0.112
Primary Education	-0.875	1.352
Secondary Education	1.794**	0.775
Average Monthly Income	2.65E-06	2.50 e-06
Sensory Attributes	1.496**	0.423
Preference for Processed Vegetables	1.701**	0.646
Constant	-6.733**	2.725
Number of observations	111	
LR chi2(13)	45.51	
Prob > chi2	0	
Log likelihood	-53.16976	
Pseudo R2	0.2997	

Source: Authors' computation from a field survey, 2017

[2] The reference variables for primary and secondary education is tertiary education, while for single and married is widowed

REFERENCES

1. **Dauchet L, Amouyel P, Hercberg S and J Dallongeville** Fruit and vegetable consumption and risk of coronary heart disease: a meta-analysis of cohort studies. *The Journal of nutrition*. 2006; **136:**2588-2593. https://doi.org/10.1093/jn/136.10.2588

2. **Devalaraja S, Jain S and H Yadav** Exotic fruits as therapeutic complements for diabetes, obesity and metabolic syndrome. *Food Research International*. 2011; **44**:1856-1865. https://doi.org/10.1016/j.foodres.2011.04.008

3. **Yahia EM** The contribution of fruit and vegetable consumption to human health. Fruit and Vegetable Phytochemicals; De La Rosa, LA, Alvarez-Parrilla, E., González-Aguilar, GA, Eds. 2017. 3-51. [Online]. Available: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.545.2365&rep=rep1&type=pdf *Accessed 15 July 2018.*

4. **Mirmiran P, Hosseini-Esfahani F and F Azizi** Fruit and vegetable consumption and risk of non-communicable diseases. *In Bioactive Food as Dietary Interventions for Cardiovascular Disease*. 2013; 121-152. https://doi.org/10.1016/B978-0-12-396485-4.00006-2

5. **Akoroda MO** Ethnobotany of Telfairia occidentalis (curcubitaceae) among Igbos of Nigeria. *Economic Botany*. 1990; **44:**29-39.

6. **Okoli BE and CM Mgbeogu** Fluted pumpkin, *Telfairia occidentalis*, West African vegetable crop. *Economic Botany.* 1983; **37:**145-149.

7. **Oboh G** Hepatoprotective property of Ethanolic and aqueous extracts of fluted pumpkin (*Telfaira occidentalis*) leaves against garlic-induced oxidative stress. *Journal of Medicinal Food*. 2005; **8:**560-563. https://doi.org/10.1089/jmf.2005.8.560

8. **Hart A, Azubuike C, Barimalaa I and S Achinewhu** Vegetable consumption pattern of households in selected areas of the old Rivers State in Nigeria. *African Journal of Food Agriculture and Nutritional Development*, 2005.

9. **Maziya-Dixon B** *Nigeria Food Consumption and Nutrition Survey, 2001-2003: Summary*: IITA. 2004.

10. **Chubike NE, Okaka J and EC Okoli** Evaluation of vegetable consumption in South Eastern Nigeria. *International Journal of Nutrition and Metabolism*. 2013; **5**:57-60.

11. **Edet BN, Jim AA, Uwemedimo EO and NE Edet** Determinants of fluted pumpkin (*Telferia occidentalis*) production and profitability in Akwa Ibom state, Nigeria. *American Journal of Experimental Agriculture*. 2015; **5**:109 - 117. https://doi.org/10.9734/AJEA/2015/10738

12. **Ayinde IA, Akerele D and OT Ojeniyi** Resource Use Efficiency and Profitability of Fluted Pumpkin Production Under Tropical Conditions. *International Journal of Vegetable Science*. 2010; **17**:75–82. https://doi.org/10.1080/19315260.2010.514979

13. **Omonona BT and DA Babalola** Determinants of the Production of Fluted Pumpkin (*Telfaria occidentalis*) Among Farmers in Nigeria: Evidence from Lagos State. *Journal of Agricultural & Food Information*. 2007; **8**:95–105. https://doi.org/10.1300/J108v08n01_07

14. **Idowu EO, Alimi T, Tijani AA and CN Okobi** Profitability and Resource Use Efficiency in Fluted Pumpkin. *International Journal of Vegetable Science*. 2007; 13:73–84. https://doi.org/10.1300/J512v13n01_06

15. **Ashagidigbi WM, Amos TT and F Azeez** Contribution of Fluted Pumpkin Leaf Production by Women to Household Income in the Tropics. *International Journal of Vegetable Science*. 2018; **24:**205–211. https://doi.org/10.1080/19315260.2017.1408735

16. **Adugna GT** Analysis of fruit and vegetable market chains in Alamata, Southern zone of Tigray: The case of onion, tomato and papaya (Doctoral dissertation, International Livestock Research Institute). 2009.

17. **Mepba HD, Eboh L and DEB Banigo** Effects of processing treatments on the nutritive composition and consumer acceptance of some Nigerian edible leafy vegetables. *African Journal of Food Agriculture, Nutrition and Development*. 2007; **7**. ISSN 1684-5378.

18. **Phillip B and AO Dipeolu** Willingness to pay for organic vegetables in Abeokuta, South West Nigeria. *African Journal of Food Agriculture and Nutritional Development.* 2010; **10**: 11. ISSN 1684 5374.

19. **Sorensen LB, Moller P, Flint A, Martens M and A Raben** Effect of sensory perception of foods on appetite and food intake: a review of studies on humans. *International Journal of Obesity*. 2003; **27**:1152-1166. https://doi.org/10.1038/sj.ijo.0802391

20. **Krolner R, Rasmussen M, Brug J, Klepp K, Wind M and P Due** Determinants of fruit and vegetable consumption among children and adolescents: a review of the literature. Part II: qualitative studies. *International Journal of Behavioral Nutrition and Physical Activity*. 2011; **8:**112.

21. **Bhuiyan FR and ATM Rahim** Consumer's sensory perception of food attributes: a survey on flavour. *Journal of Food and Nutrition Sciences.* Special Issue: Food Processing and Food Quality. 2015; **3:**157-160. https://doi.org/10.11648/j.jfns. s.2015030102.40

22. **Loureiro ML and JJ McCluskey** Consumer preferences and willingness to pay for food labelling: A discussion of empirical studies. *Journal of Food Distribution Research*. 2000; **34:**95-102. [Online] Available: https://core.ac.uk/download/pdf/6988619.pdf *Accessed: 14 August 2018*.

23. **Haghjou M, Hayati B, Pishbahar E, Mohammadrezaei R and Gh Dashti** Factors Affecting Consumers' Potential Willingness to Pay for Organic Food Products in Iran:Case Study of Tabriz. *J. Agr. Sci. Tech.* 2013; **15**:191-202. [Online] Available: http://jast-old.modares.ac.ir/index.php/ejb/article/viewfile/56560/journal/data/coversheet/images/icon/article4944_97372e7035c207d004c8fe5f96ba3df7.pdf *Accessed: 13 July 2018*.

24. **Yiridoe E, Bonti-Ankomah S and R Martin** Comparison of consumer perceptions and preference toward organic versus conventionally produced foods: A review and update of the literature. *Renewable Agriculture and Food Systems*. 2005; **20:**193-205. https://doi.org/10.1079/RAF2005113

25. **Bower JA, Saadat MA and C Whitten** Effect of liking, information and consumer characteristics on purchase intention and willingness to pay more for a fat spread with a proven health benefit. *Food Quality and Preference*. 2003; 14:65-74. https://doi.org/10.1016/S0950-3293(02)00019-8