International Journal of Development and Sustainability
ISSN: 2186-8662 – www.isdsnet.com/ijds
Volume 7 Number 4 (2018): Pages 1376-1388
ISDS Article ID: IJDS18041701

Evaluation of honey consumption pattern in Ekiti State, Nigeria

Oluwayemisi Grace Ebunoluwa Arowosoge *

Department of Forest Resources and Wildlife Management, Ekiti State University, Ado Ekiti, Ekiti State, Nigeria

Abstract

The study evaluated the consumption pattern of honey in Ekiti State, Nigeria. Data were collected through the administration of semi-structured questionnaire and interview of 266 respondents who belonged to the working class in the three senatorial districts of the study area. The data collected were analyzed using descriptive statistics, ordinal ranking and multiple regression analysis. Majority (43.9 %) of the respondents were between 51-60 years of age. 53.5% of the respondents consumed honey occasionally, 36% consumed honey on daily basis while 52.6% had been consuming honey for over 20 years. Factors influencing the frequency of honey consumption in order of priority include health benefit (96.5%), availability of honey (88.6%), colour and texture (86%) and packaging/branding with 79.8%. Respondents' preference for imported honey was 27.2% while preference for honey collected from locally domesticated bees and wild was 30.7% and 42.1% respectively. The co-efficient of determinations (R^2) of honey consumption was 79%. The five regression variables, age of respondent (X_1), level of education of respondent (X_2), household income (X_3), household size (X_4) and price of honey (X_5) contributed positively to the quantity of honey consumed while X_1 and X_3 were statistically significant ($p<0.05$). The domestication of bees for increased honey production to make honey available should be vigorously pursued. Furthermore, The National Agency for Food and Drug Administration and Control (NAFDAC) should ensure the quality control of honey that is produced in order to increase its consumption and reduce importation.

Keywords: Honey, Consumption Frequency; Consumption Determinants; Consumption Pattern

Cite this article as: Arowosoge, O.G.E. (2018), "Evaluation of honey consumption pattern in Ekiti State, Nigeria", *International Journal of Development and Sustainability*, Vol. 7 No. 4, pp. 1376-1388.

* Corresponding author. *E-mail address:* oluwayemisi.arowosoge@eksu.edu.ng

1. Introduction

Honey, the most popular and important bee product has a long history of human consumption as a natural food source, preservative and medicine (Ismaiel et al., 2014) while it has also been used extensively in the cosmetic industry. Generally, honey is defined as a sweet substance from nectar or honeydew, which honeybees collect, transform with their enzymes and store in honeycomb (Veselý, 2013). The physical and chemical composition of honey varies depending on the types of plants from which the bee consumes nectar. However, all honey contains similar types of phenolic acids, flavonoids, and antioxidants and comes in a range of colours including gold, white, amber, red, brown and black (Vanyi and Caspo, 2009; Eleazu et al., 2013).

As a food, honey is a natural source of energy with the following major nutritional components fructose and glucose (80–85%); proteins and amino acids (0.1–0.4%) and trace amounts of enzymes, vitamins, minerals and about 200 other substances, such as phenolic compounds. Hence, it is used as ingredients in various food preparations, in both alcoholic and non-alcoholic beverages as sweeteners and in confectionaries as flavouring agents (Durrani et al., 2011; Eleazu et al., 2013). The antioxidant properties of honey prevent the oxidation of food during storage thus making it an ideal food preservation agent especially in bakery, confectionary and in some commercial beverages. The use of honey for medicinal purposes dated from 1900 to 1250 BC in Egypt (Stomfay-Stitz, 1960); while studies have confirmed its medicinal and therapeutic properties, such as anti-inflammatory, antibacterial, anti-viral, anti-ulcer, anti-hyperlipidemic, anti-diabetic and anti-cancer properties (Viuda-Martos et al., 2008; Erejuwa et al., 2010; Khalil et al., 2015). The low water content and high anti-microbiotical properties of honey which prevent the growth of microorganisms have recently been promoted to tremendous levels for healing processing in western medicine (Molan, 2006). Hence, in Nigeria in the last 10 – 15 years, honey has been used for dressing pressure sores, wounds and burns in hospitals (Adewumi and Ogunjinmi, 2011; Anyanechi and Saheed, 2015).

The consumption of honey worldwide has increased tremendously due to consumers' awareness of its nutritious values in maintaining good health and in treatment of various diseases (Ismaiel et al., 20141; Cosmina et al., 2016). As the consumption of honey continue to increase, the large gap in the supply – demand of honey has been reduced with increase in the production of honey collected from domesticated bees worldwide. The total world consumption of *honey* is estimated at 1,170,000 tonnes with China as the world's leading honey consuming country with 20% of global consumption. This is followed by United States and Turkey with a share of 10% and 6% respectively (Anonymous, 2017). In Nigeria however, the *consumption* of *honey* has been stated to be very low and d*espite the low quantity of honey consumed, Nigeria keeps importing honey* from China *for consumption, the quantity which is valued to be* ₦3 billion ($10 million) annually (Ogbeh, 2017).

The fact that *Nigeria keeps importing honey despite the low consumption justifies the need to evaluate* the consumption pattern of honey in order to increase consumers' satisfaction and consumption. This study therefore determined consumers' preference for local honey (wild and domesticated) and imported honey. The socio-economic factors determining the consumption of honey in the study area coupled with the

frequency of its consumption and factors influencing its consumption were also examined. Knowledge of these would help to develop an ideal honey profile for honey production and formulate marketing strategies to satisfy consumers' needs.

2. Methodology

2.1. The study area

The study was carried out in Ekiti State. The state, which was carved out from the old Ondo State, is made up of 16 Local Government Areas and covers an area of 6,353 km^2 (National Geograghic, 2016). It is located between longitude 4^0 5' and 5^0 45' East of the Greenwich meridian and latitude 7^0 5' and 8^0 5' North of the equator. There are two ecological zones in Ekiti State: tropical rainforest exists in the southern part of the state while the derived savannah exists in the northern peripheries of the state. Ekiti state has two distinct seasons: rainy season (March-October) and the dry season (November-February). The annual rainfall ranged from 900 mm in the northern part of the state to 1,500 mm in the southern part. Temperature ranges between 21^{0}C and 34^{0}C throughout the year with relative humidity that ranged from 60% - 85%. (National Geograghic, 2016).

2.2. Sampling technique

Ado-Ekiti, Ikole and Ikere the headquarters of Ekiti central, Ekiti North and Ekiti South Senatorial districts were purposively selected for the study. The selection process was guided by the relatively high population of income earners in the cities; since income plays a very important role in consumers' decisions of what to consume (Georgina et al., 2014). The study therefore targeted working class respondents in educational institutions, banks, civil service; and business people who buy honey for consumption. Snowball sampling technique whereby a respondent was asked if he or she has ever consumed honey before been sampled, or a sampled respondent introduced another consumer, was used. Based on this methodology, hundred respondents were sampled in each city, thus a total of 300 respondents were sampled in the three cities. However, due to incomplete information from thirty four respondents the study made use of data from 266 respondents.

2.3. Data collection

Semi-structured questionnaire and interview were used to collect primary data from respondents. Data were collected on respondents' socio economic characteristics such as age, gender, level of education, marital status and average household income per month; the frequency of honey consumption, factors influencing the rate of honey consumption; and on consumers' preference for local honey (wild and domesticated) and imported honey.

2.4. Data analysis

Frequency of honey consumption was determined using ordinal ranking. The number of respondent for a particular factor was multiplied by the weight given and this was expressed as a percentage of the maximum score possible. For the 6 options presented for factors influencing the frequency of consumption, the respondents were to score between 1 and 6 in increasing order of importance, and zero for non- applicable options. The analysis of the ranking involved the summation of the product of the number of respondent for a particular factor by the weight given and this was expressed as a percentage of the maximum score point. The maximum score point is the product of the number of respondent and the maximum point any option can have. The option with highest percentage score was considered to be the most preferred. This relationship as adapted by Tee and Verinumbe (2007) is as follows:

$$Option\ Ranking = \sum_{i=1}^{n} FS_i\ /nSMX100/1 \qquad \text{(Equation 1)}$$

where F = Frequency of respondents with same score for a factor, Si = Respondents score for factors; it ranges from 1 to 6, nSM = Product of the number of respondent interviewed and the maximum score point of a determinant, n = Number of respondents interviewed.

Factors determining honey consumption in the study area were analyzed using four different functional forms of regression. The data were fitted into four different functional forms of regression analyses namely the Linear, Semi-logarithm, Exponential and Cobb-Douglas functional forms in order to determine the lead equation. The linear function was chosen as the lead equation because it exhibited better statistical diagnostic results (low standard error, high co-efficient of determination (R^2) and significant F-statistic ratio) than the other functional forms. The model specification is mathematically expressed as:

$$Y = f(X_1, X_2, X_3, X_4, X_5, \mathcal{E}) \qquad \text{(Equation 2)}$$

where Y = Quantity of honey consumed in g, X_1 =Age of respondent in years, X_2 = Level of education in years, X_3 = Household income in (₦), X_4 = Household size in number, X_5 = Price of honey in Naira (₦), Ɛ = Error term.

3. Results and discussion

3.1. Socio-economic characteristics of respondents in the study area

The socio-economic characteristics of the respondents are presented in Table 1. The highest percentage (43.9%) of the respondents were between 51-60 years of age, followed by those above 61 years with 30.6%, while the lowest of 5.3% was obtained for 30 years and below. Majority (58.8%) of the respondents were male and 78.6% were married. 70.2% of the respondents had tertiary school education while 64.9% had household size that is between three and six. The highest percentage of the respondents (51.1%) had household income that is between ₦50,000 and ₦100,000 and 52.6% of the respondents had been consuming honey for over 20 years. Furthermore, majority of the respondents (86%) were aware that honey were collected from domesticated bees while only 14% claimed not to be aware. The study also revealed that

39.8% of the respondents sourced for honey from specialized honey store, closely followed by 35.0% who sourced for honey from supermarket while the least (5.3%) sourced for it from road side hawkers.

Table 1. Socio-Economic Characteristics of Respondents in the Study Area

Variable	Frequency(n=266)	Percentage (%)
Age (Years)		
Less than 30	14	5.3
30 - 40	35	13.2
41-50	19	7.0
51- 60	117	43.9
61 and above	81	30.6
Sex		
Male	156	58.8
Female	110	41.2
Marital Status		
Single	33	12.4
Married	209	78.6
Divorced	19	7.1
Widowed	5	1.9
Highest Educational Level		
Primary School	14	5.2
Secondary School	65	24.6
Above Secondary School	187	70.2
Household Size		
1-3	23	8.8
3-6	173	64.9
6-10	70	26.3
≥10	-	-
Average Household Income per month (₦)		
≤50,000	28	10.5

50,000-100,000	136	51.1
100,000-150,000	35	13.2
150,000-200,000	23	8.8
≥200,000	44	16.7
Period of Consumption (Years)		
<5	47	17.7
5-10	140	4.5
10-15	39	14.6
15-20	28	10.5
>20	12	52.6
Awareness of Honey from domesticated Bees		
Yes	299	86
No	37	14
Sources of Honey		
Supermarket	93	35.0
Medicine Store	37	13.9
Specialized Honey Store	106	39.8
Roadside	16	6.0
Hawkers	14	5.3

Source: Field Survey, 2016

3.2. Frequency of honey consumption

The highest percentage (53.5%) of the respondents consumed honey occasionally. This is followed by 36.0% of the respondents who consumed honey on daily basis. Those who consumed honey on weekly and monthly basis were 6.1% and 4.4% respectively (Figure 1).

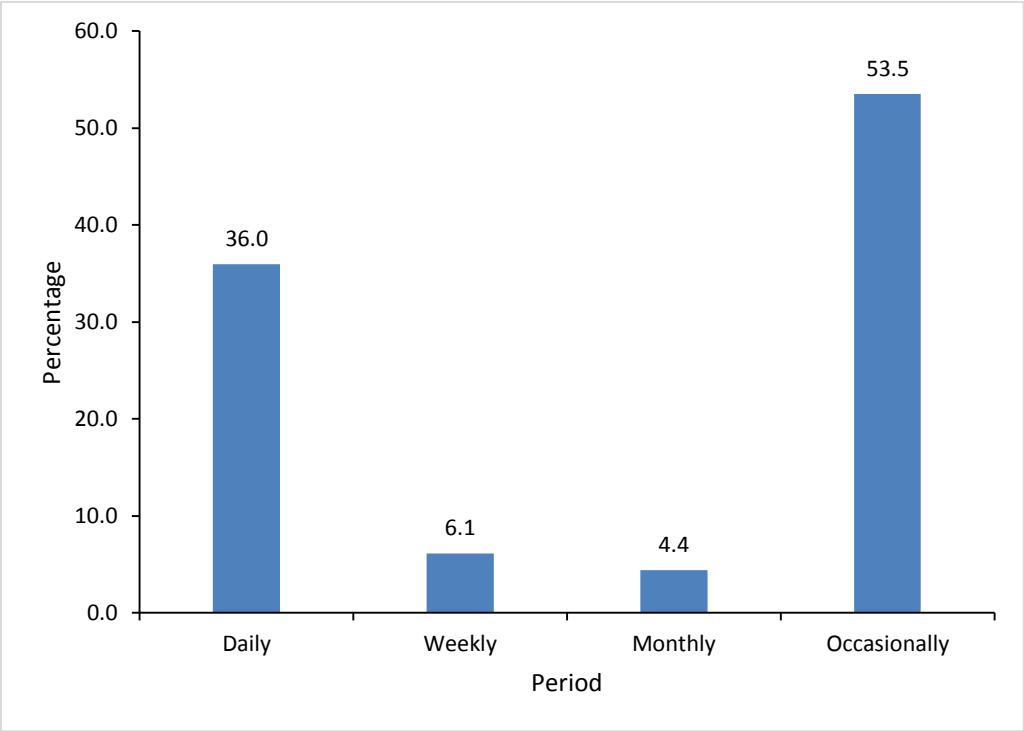

Figure 1. Frequency of Honey Consumption

3.3. Option ranking of factors influencing the frequency of honey consumption and uses of honey

Ranking of factors influencing the frequency of honey consumption is as shown in Table 2. Health benefit ranked highest with 96.5% followed by availability of honey (88.6%), Colour and texture of honey (86.0%), Packaging/Branding (79.8%), Availability of fund (70.2%), while selling price ranked lowest (63.2%). Uses of honey showed that honey was mostly used as Medicinal/therapeutics with 89.5% followed by food additives (74.9%). The use of honey for cosmetics ranked the least with 28.9%.

Table 2. Option Ranking of Factors Influencing the Frequency of Honey Consumption and the Uses of Honey

Variables	TS	SM	RV(%)
Health benefit	1,540	1,596	96.5(1st)
Availability of honey	1,414	1,596	88.6(2nd)
Colour and texture	1,373	1,596	86.0(3rd)
Packaging/ Branding	1,274	1,596	79.8(4th)
Availability of fund	1,120	1,596	70.2(5th)
Selling price	1,009	1,596	63.2(6th)

Uses of honey			
Medicinal/Therapeutics	714	798	89.5(1st)
Food additives	598	798	74.9(2nd)
Cosmetics	231	798	28.9(3rd)

TS = Total Score, SM = Maximum score-able point, RV = Rank Value (%)

3.4. Consumers Preference for imported honey and honey collected from wild and domesticated bees

Figure 1 shows that respondents' preference for imported honey was 27.2% while preference for honey collected from locally domesticated bees and wild was 30.7% and 42.1% respectively.

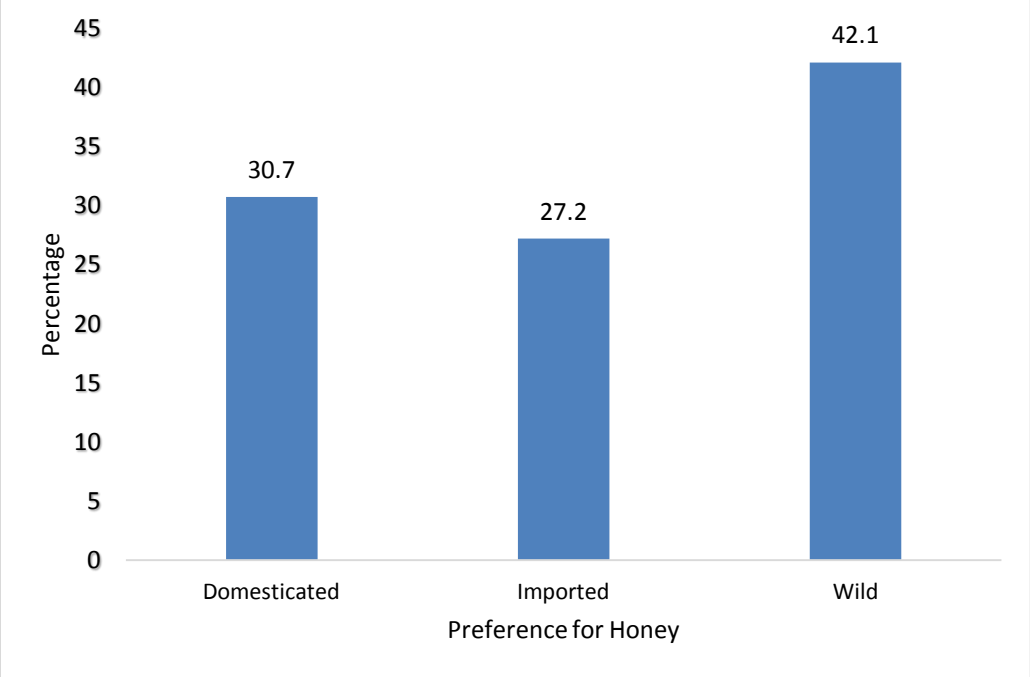

Figure 2. Consumers Preference for imported Honey and Honey Collected from Wild and Domesticated Bees

3.5. Determinants of honey consumption

From the four (4) functional forms of regression analysis used, the linear model was chosen as the lead equation due to its low standard error, high co-efficient of determinations (R^2) and significant F-statistic ratio (Table 3). The R^2 of the result was 79%. The F-statistic value was 57.31 and was statistically significant ($p<0.05$). The five regression variables, age of respondent (X_1), level of education of respondent (X_2), household income (X_3), household size (X_4) and price of honey (X_5) contributed positively to the quantity of

honey consumed. Two of the variables, age of respondent (X_1) and household income (X_3) were statistically significant ($p<0.05$).

Table 3. Regression Result for the Determinants of Honey Consumption

Determinants of Honey Consumption	Coefficients	Std. Error	t-Value
Constant	220.1541	72.3520	7.349
Age of Respondents (X_1)	0.4108*	0.0221	5.062
Level of education (X_2)	0.2574	0.0612	1.742
Household Income (X_3)	0.3411*	0.0069	4.128
Household size (X_4)	0.1574	0.0172	2.004
Price of Honey (X_5)	0.1202	0.0241	1.380
R^2	0.79		
R^2 Adjusted	0.72		
F-Stat	57.31*		

Note: represents 5% significant level*

4. Discussion

The reason why some respondents (36%) consumed honey daily could be due to the belief of the respondents, as obtained during the course of this study that refined sugar causes cancer hence their preference for honey which they consumed as additives when taking tea and beverages. This shows that respondents are aware of the benefits of honey, moreso that most of them (52.6%) have been consuming it for over 20 years. Health benefit was the most important factor (96.5%) influencing the frequency of honey consumption in the study area and this corroborates the findings of Ismaiel et al., (2014) and Zulail et al., (2014) that the major motivations for honey consumption are its medicinal and nutritional values. The health benefits which include prevention of hyperlipidemia, inflammation, bacterial, viral, ulcer, diabetic and cancer have been documented (Erejuwa et al., 2010; Khalil et al., 2015). Availability of honey which ranked second as factor influencing respondents consumption of honey revealed low supply of honey in the study area. The low supply of honey could largely be attributed to the country's importation of honey from China which was valued at about ₦3 billion ($10 million) annually (Ogbeh, 2017).

Furthermore, it was gathered during the period of this study from oral interview that respondents used colour and texture (which ranked third among factors influencing the consumption of honey) to assess the quality of honey. Respondents claimed that adulterated honey are commonly available in the markets and therefore would only consume gold and amber colour honey with high viscosity which they believed are not

adulterated. The use of physical characteristics such as colour and texture in assessing honey may however not be appropriate since honey has been found to come in a range of colours depending on the type of plants from which the bee consumes nectar. These colours vary from gold, white, amber, red, brown and black (Vanyi and Caspo 2009; Eleazu et al., 2013). Respondents also prefer well packaged and branded honey as packaging and branding ranked fourth during the study. It was equally observed that respondents would want the nutrient content and the place of production placed on the label of the package. The listed information on the label would provide consumers with knowledge of the quality of the product and help them to make choice (Roman et al., 2013). The fact that adulterated honey are in the markets made some respondents (27.2%) to prefer imported honey (especially during raining season when honey is not harvested) because imported honey is well packaged and branded with certification.

The value of the co-efficient of determinations (R^2) of the regression model which was 0.79 implies that 79% of the quantity of honey consumed was explained by the five independent explanatory variables. This shows that the independent explanatory variables were important determinants of consumption among the respondents while other unexplained variations were due to other relatively important variables that were not included in the equation. The F-statistic which was statistically significant ($p<0.05$) showed that the estimated linear regression had goodness of fit and that there was a linear relationship between honey consumption pattern and the five independent variables. The model equation further revealed the intercept as 220.15 which implies that in the absence of these interplaying variables, there could be honey consumption at the specified unit provided other economic variables are kept constant.

The positive contribution of the estimated regression coefficients of the variables: age of respondent (X_1), level of education of respondent (X_2), household income (X_3), household size (X_4) and price of honey (X_5) showed that increasing the value of these variables would further lead to increase in the quantity of honey consumption. Two of the variables, age of respondent (X_1) and household income (X_3) were statistically significant at 5% probability level. This connotes the relevance of age and income in honey consumption. Specifically, the result showed that a year increase in age of the respondents would increase their consumption by 0.41g. This is expected since majority of the respondents (43.9%) were between 51 and 60 years of age which could make them to be consuming more honey for health benefits. Moreso, that health benefits ranked highest as a major factor influencing the consumption of honey in the study area. Similarly, **o**ne naira increase in household income of respondents would increase their consumption of honey by 0.34g. Income has been considered to be one of the most important factors determining food consumption pattern. It has been estimated that with higher income, people consume more nutritious foods which are more expensive while lower income would make people to consume less expensive and less nutritious food (Abdulrahman, 1993; Jiang, et al., 2015).

The price of honey which contributed positively to the quantity of honey consumed is contrary to the basic law of demand which states that the higher the price of a commodity, the lower the quantity consumed or demanded. It could therefore be deduced that value derived from honey consumption would always justify the price at which consumers purchase it. Furthermore, reason that could be adduced for the positive linear relationship with the level of education is that majority of the respondents (70.2%) had tertiary education. Hence respondents were better informed about the nutritional and health benefits of honey. Studies have

shown that the quality of food consumed improves with the level of the education of people since education creates greater awareness on the quality and quantity of what to consume (Abdulrahman, 1993; Wilke et al., 2014)

5. Conclusion and recommendation

This study has shown that age of respondent and household income greatly influenced honey consumption as they were statistically significant. Health benefit, availability of honey as well as colour and texture, Packaging/Branding, availability of fund and selling price of honey in order of priority were the major factors influencing the frequency of honey consumption during the study. Furthermore, the study revealed that preference for honey collected from wild and from locally domesticated bees was high despite the fact that some respondents preferred imported honey because of adulterated honey found in the market.

Considering the fact that preference for honey collected from the wild and locally domesticated bees was high in the study area, there should be urgent need to direct efforts at encouraging bee keepers to vigorously pursue the domestication of bees for honey production and increase supply. On the other hand Government through NAFDAC needs to come up with good policy to prevent adulterated honey and ensure quality control with good packaging and branding. This would no doubt boost the patronage of locally produced honey while also increasing the frequency of consumption.

References

Abdulrahman, O. (1993), "Socio-Cultural and Economic factors affecting food consumption patterns in the Arab Countries", *The Journal of the Royal Society for the Promotion of Health,* Vol. 11 No. 3, pp. 68-74.

Adewunmi, A.A. and Ogunjimi A.A. (2011), "The healing potential of honey and propolis", *Asian pacific Journal of Tropical Biomedicine,* Vol. 1 No. 1, pp. 55-57.

Anonymous (2017), "Which Country Eats Honey Most in the World?", available at: www.indexbox.co.uk/news/which-country-consumes-the-most-honey-in-the-world/ (accessed on 18 September 2017).

Anyanechi, C.E. and Saheed, B.D. (2015), "Honey and wound dehiscence: A study of surgical wounds in the mandibular bed", *Nigerian Journal of Clinical Practices,* Vol. 18 No. 2, pp. 251-255.

Cosmina, M., Galenti, G., Marangon, F. and Troianno, S. (2016), "Attitudes towards honey among Italian consumers: A choice experiment approach", *Appetite*, Vol. 99, pp. 52-58.

Durrani, A., Srivastava, P. and Verma, S. (2011), "Development and quality evaluation of honey based carrot candy", *J. Food Sci. Technol.,* Vol. 48 No. 4, pp. 502-505.

Eleazu, C.O., Iroaganachi, M. and Okoronkwo, J. (2013), "Determination of the physico-chemical composition, microbial quality and free radical scavenging activities of some commercially sold honey samples in Aba, Nigeria: The effect of varying colours", *J. Nutr. Food Sci.*, Vol. 3 No. 2, pp. 189.

Erejuwa, O., Sulaiman, S., Wahab, M., Sirajudeen, K., Salleh, M.M. and Gurtu, S. (2010), "Antioxidant protection of Malaysian tualang honey in pancreas of normal and streptozotocin-induced diabetic rats", *Ann. Endocrinol.*, Vol. 19, pp. 291-296.

Georgina V.A,, Zsolt C. and Laszlo, K. (2014)," Honey Consumption in Europe with special regard to Hungary", available at: https://www.researchgate.net/publication/264852428/ (accessed on 18 February 2016).

Ismaiel, S., Zulail, A., Al-Kahtani, S., Al-Ghamdi, A. A., and Adgaba, N. (2014), "Factors that affect Consumption Patterns and Market Demands for Honey in the Kingdom of Saudi Arabia", *Food and Nutrition Sciences,* Vol. 5, pp. 1725-1737.

Jiang Y., House L., Tejera C., and Percival S. (2015), "Consumption of mushrooms: A Double-Hurdle Model Approach", Selected Poster presented at the Southern Agricultural Economics Association's 2015 Annual Meeting, Atlanta, Georgia, pp. 24-47

Khalil, M.I., Tanvir, E., Afroz, R., Sulaiman, S.A. and Gan, S.H. (2015), "Cardio protective effects of Tualang honey: Amelioration of cholesterol and cardiac enzymes levels", *Bio Med Res. Int*., Vol. 12, pp. 32-38.

Molan, P. C. (2006), "The evidence supporting the use of honey as a wound dressing", *International Journal of Lower Extremity Wounds*, Vol. 5 No.1, pp. 40-54.

National Geographic (2016), "Geography of Nigeria" available at: http://en.m.wikipedia.org/.../Geography (accessed 18 June 2016).

Ogbeh, A. (2017), "Nigeria's hosting the 2018 Api-Expo (bee-keeping)" available at: https://www.premiumtimesng.com/news/more-news/218540-nigerians-spend-n3-billion-annually-import-honey-china-minister.html (accessed 28 September 2017).

Roman, A., Popiela-Pleban, E. and Kozak, M. (2013), "Factors influencing consumer behavior relating to the purchasing of honey Part 1. The buying process and the level of consumption", *J. Apic. Sci.,* Vol. 57 No. 2, pp. 159-172.

Stomfay-Stitz, J. (1960), "Honey: an ancient yet modern medicine", The Science Counsellor Vol. 23 pp.110–125.

Tee, N.T. and Verinumbe, I. (2007), "Utility dynamics and prioritization of *Borassus aethiopum* (Mart) products in North-eastern Nigeria", *J. Agric. Res. Policies*, Vol. 3 No. 1, pp. 87-93.

Vanyi, G.A. and Csapo, Z. (2009), "Evaluation of Honey Consumption in the Main Cities of the North-Great Plain Region", *International Congress on the Aspects and Visions of Applied*, Chania, 3-6 September 2009.

Veselý, V. (2013), *Apiculture (Včelarství)*. 3rd ed, Praha, Czech Republic: Nakladateľství Brázda. P. 272.

Viuda-Martos, M., Ruiz-Navajas, Y., Fernández-López, J. and Pérez-Álvarez, J. (2008), "Functional properties of Honey, Propolis, and Royal jelly", *J. Food Sci*., Vol. 73, pp. 117-124.

Wilke, J.C., Carola T.M.S., Gerda R. and Dike-van, M. (2014), "Maternal educational level and children's healthy eating behaviour: role of the home food environment (cross-sectional results from the IMPACT study)", *International Journal of Behavioral Nutrition and Physical Activity,* Vol. 10 No.1 pp. 113-119.

Zulail, A., Ismaiel, S., Al-Kahtani, S., Al-Ghamdi, A.A. and Adgaba, N. (2014), "Qualitative Factors Affecting the Price and Demand of Honey in Saudi Arabia", *Australian Journal of Basic and Applied Sciences,* Vol. 8 No.10, pp. 199-206.