



Consumers' Preference for Underutilized Indigenous Vegetables in Osun State, Nigeria

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Abstract

Understanding the attributes of consumers' desire in Underutilised Indigenous Vegetables (UIVs) will ensure demand driven supply. This paper therefore, examined the preferences of consumers for UIVs consumed in Osun State. A purposive sampling technique was employed to select 150 respondents in Osun State. Data were analysed using descriptive statistics and conjoint analysis. The result of the descriptive statistics showed that 48% of the surveyed consumers were married, 78% were educated with the mean age of 44.15 ± 13.66 years and 4 ± 2.89 household members. Also, the average annual income earned by the respondents was $\text{N}736,032.00 \pm \text{N}534,270.81$. The result of the conjoint analysis showed that great preference was placed on indigenous vegetables that have bitter taste, highly medicinal with moderate price and available all year round. The study therefore recommended that scientists should develop UIVs seeds that can produce the combination of these attributes, preferred by the consumers.

Keywords: Conjoint analysis, Consumers preference, Indigenous vegetable, Underutilised vegetable

Introduction

Indigenous vegetables are vegetables whose production is confined to a particular location or have been introduced to that location for a long period of time and thus can be referred to as traditional vegetables. These traditional vegetables are area and ethnic group specific (Luchen and Mingochi, 1995; Padulosi *et al.*, 2013). For instance, indigenous vegetables in Africa continent are referred to as Africa Indigenous Vegetables. Therefore, its choice and consumption are strongly influenced by traditions (Kimiye *et al.*, 2005). In Africa, Nigeria ranked second in the production of these indigenous vegetables, producing 11,940,600 metric tonnes per year (FAOSTAT, 2012). The production of these vegetables is mostly on small-scale which often requires very little input, in rare occasions, application of organic manure and inorganic fertilizers

(Onyango *et al.*, 2009).

Over the years, indigenous vegetables were underutilised, seen as poverty crops, food for the poor and the lower class, especially with the introduction of exotic vegetables into the African continent (Abukutsa-Onyango, 2010; Oladele, 2011). In the recent times, there has been significant awareness towards the consumption of these underutilised indigenous vegetables (UIVs) for food security and income generating abilities inherent in them (Padulosi *et al.*, 2013). UIVs are chief sources of nutrients, vitamins, antioxidants, minerals, and proteins (Odhav *et al.*, 2007; Gayatri *et al.*, 2014). They also comprise some non-nutrient phytochemicals linked to protection against non-communicable diseases (Sifelani, 2015). Some are sold fresh while some are sold locally for medicinal purposes by natives (Eifediyi *et*

al., 2008), thus improving economic and health status of communities involved in their production.

In a bid to promote the future of Underutilised Indigenous Vegetables worldwide, many organisations and research institutes such as Consultative Group on International Agricultural Research (CGIAR), International Plant Genetic Resources Institute (IPGRI), Food Organisation and Agriculture, Department for International Development (DFID) among others, have carried out projects to create more awareness about the production, marketing and consumption of these vegetables. With the recently concluded MICROVEG project in Nigeria, more awareness was created in order to increase the consumption of underutilized indigenous vegetables through a regular jingle on popular FM radio station in southwestern Nigeria (Adebooye *et al.*, 2014).

Since the inception of UIVs promotion in Southwestern Nigeria, a number of researches had focused on the production (Ajekiigbe *et al.*, 2017; Ayinde *et al.*, 2016; Amujoyegbe *et al.*, 2015), marketing (Ayanwale *et al.*, 2011), demand (Ayanwale *et al.*, 2016) and gender (Deji *et al.*, 2013) analyses of UIVs. However, there is dearth of studies on the consumers' preference for these promoted UIVs in the area where they were promoted. It is therefore, necessary to evaluate and determine the consumers' preference for specific attributes of UIVs consumed in the study area. In view of this, the objectives of the study were to determine the social economic characteristics of UIVs' consumers; analyse the consumers' preference for the UIVs' attributes consumed, and also identify the levels of attributes preferred by the UIVs'

consumers. This study will help both the researchers, farmers and marketers to know the particular attributes that the consumers prefer in order to ensure demand driven supply.

Materials and Methods

The study was conducted in Osun State. Osun State is an inland state in southwestern Nigeria (NPC, 2006) on the Latitude, 7.7667, Longitude, 4.5667, Altitude 1013 fts; The State is primarily an agrarian community where UIVs' production, marketing and consumption were promoted in the recent time. All the three federal senatorial districts in Osun State (Iwo, Osogbo and Ife/Ijesa) were selected because promotion of UIVs was carried out in the whole State. Fifty consumers of indigenous vegetables from each senatorial district were purposively selected to give a total sample size of 150 respondents. Primary data were collected from the UIVs' consumers using a well-structured questionnaire administered through personal interview. The questionnaire was drawn to get information on socio-economic characteristics of the respondents, source of income and preference of consumers based on the UIVs attributes consumed (taste, availability, medicinal value and price). Data were analysed using descriptive statistics of frequency tables, mean, standard deviation and percentages, and conjoint analysis.

Conjoint analysis

The conjoint analysis was used to determine the consumers' preference for the UIVs attributes and the levels of the attributes included in the analysis. Conjoint analysis is defined as "any decomposition method that estimates the structure of a

consumer's preferences such as partworths, importance weights and ideal points given their overall evaluations of a set of alternatives that are pre-specified in terms of levels of different attributes" (Green and Srinivasan 1990, Kotri, 2006). The first step in a conjoint analysis is to define the product attributes and corresponding levels that will be used in the study. A numerical partworth utility value is then estimated for each attribute level to give the relative importance of the respondent's level. Partworths reflect the attractiveness of an attribute level, while relative importance of an attribute provides basis to draw conclusions about the role attribute plays in vegetable consumption. A larger partworth implies greater preference and from the partworths, the relative importance of different attributes can be found. The consumer's rating on their preference for each vegetable is the amount of satisfaction, or utility, that consumer gets from consuming specific vegetable.

In general agriculture, Lin *et al.* (1996) performed an opinion survey to determine important attributes; Oltman *et al.* (2014) utilized Adaptive Choice Based Conjoint to determine prominent attributes (color, firmness, size, skin, texture, interior, seed presence, flavor, and health benefits) for desiring fresh tomatoes by consumers. Also, Alberto (1999) examined apple consumers and identified five attributes that made consumers demanded for it to be crispness, size, flavor, price, and color. Harrison *et al.* (2002) tested preferences for the products' form, price, and flavour; Sy *et al.* (1997), utilized focus groups to have better understanding of the significance of attributes (purebred breeders, commercial cow-calf producers, and cattle feeders). Also, Adenegan *et al.* (2016) surveyed

buyers of organic vegetables using conjoint analysis and identified method of production, quality and price as attributes and the partworths estimate indicated high preference for good quality.

Since all influential attributes could not be included in this study, four major attributes and different levels were decided on and these were price/bunch (N20.00, N30.00, N50.00), taste (sweet, tasteless, bitter), availability (seasonal, always) and medicinal value (high, low). To estimate the partworths and relative importance of product attributes, the ordinary least squares method was chosen as estimation method and the model is specified as follows:

$$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + E_i$$

Where Y = consumer's preference rank for vegetables

B_0 = the intercept

$B_1, B_2, B_3, \text{ and } B_4$ = parameters of independent variables showing the partworths (utility) of different vegetable attributes for a particular consumer to be estimated

X's are different levels of attributes:

X_1 = price (N20.00, N30.00, N50.00)

X_2 = taste (sweet, tasteless, bitter)

X_3 = availability (seasonal, always)

X_4 = medicinal value (high, low)

E_i = error term.

Results and Discussion

Socio-economic characteristics of the consumers are shown in Table 1. About 48% of the respondents were married with the mean age of 44.15 ± 13.66 years. Most (78%) of the respondents were literate as the respondents had secondary and tertiary education. This shows that respondents are in their middle age, have the capability to -

Table 1: Socio-economic characteristics of the respondents

Variables	Frequency	Percentage (%)	N=180
Age (years)			
= 20	1	0.7	
21 -40	67	44.7	
41 - 60	59	39.4	
61 and above	23	15.3	
Mean Value	44.15		
Standard Deviation	13.663		
Gender of the respondents			
Male	86	57.3	
Female	64	42.7	
Marital status			
Single	43	28.6	
Married	72	48.0	
Divorced	22	14.7	
Widowed	13	8.7	
Level of education (years)			
No formal education	8	5.3	
Some primary school	3	2.0	
Primary school	9	6.0	
Some secondary school	13	8.7	
Secondary school	44	29.3	
College of education	41	27.4	
Others	32	21.3	
Household size			
1-3	47	31.3	
4-6	93	62.0	
7-9	10	6.7	
Mean	4.26		
Standard deviation	2.89		
Income (?)			
= 100000	1	0.7	
100001 - 400000	41	27.3	
400001 - 700000	44	29.3	
700001 - 1000000	34	22.7	
1000001 - 1300000	4	2.7	
1300001 - 1600000	13	8.7	
1600001 and above	13	8.7	
Mean Value	736032.66		
Standard Deviation	534270.81		

select vegetables they desire, and with their level of literacy, can perfectly rank these vegetables based on the utility derived from its consumption. More than 60% of the respondents had between 4 to 6 household members with the average of 4 ± 2.89 members. The result also revealed that the average annual income earned by the respondents was N736,032.00 $\pm$ N534270.81. This implies that consumers (respondents) can afford vegetables provided it possesses the attributes they desire.

Consumers' preference for underutilized indigenous vegetable attributes

Table 2 presents the partworth (utility) estimates from the conjoint analysis of the consumers' preference for underutilized indigenous vegetables attributes. The Adjusted R^2 of 0.723 indicates that about 72.3% of the variability in the consumers' preference for UIVs is explained by the specific independent variables included in the model. All the attributes (price, availability, medicinal value and taste)

included in the model were significant at 1% and 5% levels. Higher utility value indicates greater preference. Consumers gave higher preference to attributes level of price (₦ 20.00 and ₦ 50.00 per bunch) at 4.016 and 4.971, respectively; availability (always) at 4.632; medicinal value (highly medicinal) at 4.632 and taste (bitter) at 3.485 utility estimates. However, the price coefficients (utility estimates) at ₦ 50.00 per bunch corresponding to -4.971. This reveals an inverse relationship between price level and utility, because at higher price, little quantity can be bought and thus reduce the utility derived by the consumer. This implies that, consumers prefer UIVs that are always available with high medicinal value and bitter taste. Here, price is a major concern, since preferred attributes by consumers are not bore by one type of vegetable, higher price will prevent buying the collection of vegetables that can provide these attributes. As a result of this, consumers will prefer vegetables that are not too expensive for them to be able to purchase more UIVs with these attributes,

Table 2: Conjoint analysis estimations of utility for underutilized indigenous vegetable

Attributes	Levels	Utility Estimate	Relative Importance (%)
Price	₦50.00	-4.971	25.47
	₦30.00	-3.677*	
	₦20.00	4.016*	
Availability	Always	4.632**	1.93
Seasonal		4.535	
Medicinal value	Highly medicinal	2.792*	36.25
	Low medicinal	4.632	
Taste	Tasty	1.639*	36.35
	Tasteless	2.786*	
	Bitter	3.485	
Constant	4.632		
Adjusted R^2	0.723		

* = significant at .01 level

** = significant at .05 level

translating to more utility.

The relative importance from the conjoint analysis revealed that taste had highest relative importance 36.35% closely followed by medicinal value (36.25%). Thus, both “taste” and “medicinal value” turned out to be the most important attributes with “availability” being the least important attribute. It appears price is not as important a factor as taste and medicinal value to the consumers. This result implies that the respondents are most concerned about the taste and medicinal value of UIVs consumed and might be willing to pay more if these attributes are found in a type of vegetable. This signifies that consumers value the health potentials in UIVs. Hence, availability, highly medicinal value and vegetables with bitter taste correspond to a higher utility by the consumers.

Conclusion and Recommendations

Based on the findings of this research, we conclude that consumers' preference is greatly placed on indigenous vegetables that are highly medicinal and have bitter taste, and that consumer will buy more of these at moderate prices. Hence, understanding consumers' preference will better inform farmers on the production systems to employ and type of vegetables to grow based on the specific attributes that consumers look out for in the vegetables they consume. This will also provide useful and important information for the seed scientists on the attributes of UIVs that consumers prefer. In addition, there is a need for food scientists to provide vital information on the nutritional values of agricultural products to encourage their consumption since many are conscious of what they consume for health reasons. Policies that will encourage demand-driven

supply of agricultural products in the country should be encouraged.

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