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Consumers' Preference and Willingness-To-Pay for Different Varieties of Pepper in Osun State, Nigeria

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ABSTRACT

The study was conducted to assess consumers' preference and willingness to pay for different pepper varieties in Osun State, Nigeria. The study used the major pepper types – *Capsicum chinenses (Rodo), C. annum (Tatase),* C. *frutescens (Sombo)* and *C. pubescens (Bawa),* being sold in the markets in Osun State, Nigeria. A multistage sampling technique was used to collect data from 100 respondents. The primary data collected were analysed using descriptive and inferential statistics. The study showed that consumers mostly preferred and were willing to pay more for *C. chinenses (Rodo)* than any other types of pepper. Household size, primary occupation, total household income, availability and meal-making ability of pepper were the factors that influenced consumers' preference for the different varieties of pepper while the willingness to pay for pepper varieties by consumers was influenced by affordability, availability, taste and thickness. The study recommends that since availability and affordability influenced preference and willingness to pay for pepper varieties, policies should be aimed at increasing farmers' production as this will ensure that pepper is readily available and affordable for consumers.

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Introduction

Pepper (*Capsicum spp*.) is one of the widely used food ingredients and the most widely grown spice crop in the world (Idowu-Agida et al., 2010). It is ranked third among the world's most important vegetable crops, after tomato and onion (Peet, 2006) and considered the first spice to have been used by humans (Hill et al., 2013). It is currently produced in various countries around the world including India, China, Pakistan, Indonesia, Sri Lanka, Thailand, Japan, Ghana, Nigeria, Uganda, and Ethiopia among others (Delelegn, 2011). The Pepper grown worldwide consists of approximately 22 wild species and five domesticated species (*C. annum* L., *C. frutescens* L., *C. Chinenses., C. baccatum* L., *and C. pubescens* R.) (Bosland and Votava, 2000). These species can be divided into several groups based on fruit/pod characteristics ranging in pungency, colour, shape, intended use, flavor, and size (Lin et al., 2013).

According to Dipeolu and Akinbode (2007), pepper is a rich source of vitamins such as vitamin A, E and C. Pepper contains more vitamin C than any other vegetable crops. It also acts as a therapeutic agent for cancer and helps in diabetic treatment. Pepper stimulates the flow of saliva, can raise body temperature and may have pain-relieving properties (Freudenreich, 2005). Pepper is not only used as a spice in households, but it also provides a variety of needs, such as enhancing the intake of dull diets; storing grains and as mild drugs (Bosland and Votava 2000). It is also used in stew and some local dishes all over the world in varying types and quantities based on different localities and cultures.

Most countries in Africa nurture the culture of spicing up their meals with pepper – making pepper an ingredient of no known close substitute in many African dishes. This has resulted in the mass production of pepper in this part of the world. Pepper production in tropical Africa is estimated at one million tonnes per annum with Nigeria (715,000 t from 90,000 ha) and Ghana (270,000 t from 75,000 ha) as the largest producers. Nigeria produces 50% of the total production of different varieties of pepper in Africa (Adesina et al., 2014). The varieties commonly produced in Nigeria include; Bird peppers – *Atawere* (*C. frutescens*), Cayenne pepper or red pepper – *Sombo* (*C. frutescens*),

Atarodo or *Rodo* (*C. chinenses*), *Tatase* (*C. annum*) and Nsukka yellow pepper (Alahira, 2014). These varieties can be used singly or combined together when making sauce or preparing meals. In addition, though, these varieties can be used for the same purposes, consumers' preference for the different varieties have often endeared them towards some particular varieties.

The different varieties of pepper also have different attributes that are peculiar to them and which directly or indirectly stimulate consumers' preferences and willingness to pay. Moreover, the seasonality of pepper causes the price to fluctuate (Dipeolu and Akinbode, 2008) and thus influence consumption patterns, preferences and purchasing behavior. This fluctuation in price has led consumers to move from their preferred type of pepper to other pepper types during periods of scarcity and price increase. Similarly, it is however interesting to note that during periods of scarcity, consumers frequently move from their preferred pepper type to other pepper types and/or reducing the quantity purchased of their preferred pepper type, giving reasons such as high prices, unavailability, low quality among other factors for their behaviour especially during these periods (Adenegan and Adeoye, 2011).

This behavior (of switching to other pepper types) can be influenced by their willingness to pay for their pepper type. Furthermore, previous studies on market research of pepper in Nigeria had been on price analysis of tomato in rural and urban retail markets (Adenegan and Adeoye, 2011), marketing analysis and consumption patterns of tomato (Oladejo and Oladiran, 2014). These studies had not concentrated on consumers' preference and willingness to pay for those pepper types which is necessary for proper production and marketing strategies. There is a thus a need to understand purchasing behavior of consumers for pepper and what factors results in its purchase. Doing this will not only give light to the mostly preferred pepper types but it will also ensure that there is adequate information on the pepper type(s) that consumers are either willing to pay a premium for or discount. Therefore, it is against this background that this study investigated the preference and willingness to pay for pepper varieties and also identified the factors that influenced preference and willingness to pay for different pepper varieties.

Materials and Methods

The study was carried out in Ife Central Local Government Area (LGA) of Osun State. A multistage sampling procedure was used for the study. The first stage involved a simple random selection of five communities from Ife Central LGA. At the second stage, twenty houses were systematically selected from each community. In the third stage, a consumer was selected from each house through convenience sampling to make a total of one hundred respondents. Primary data were collected with the aid of a well-structured questionnaire. The study used the pepper types that are mostly sold in the market as the required pepper types. They are: *Tatase* (*Capsicum annum*), *Rodo* (*Capsicum chinenses*), *Bawa* (*Capsicum pubescens*), and *Sombo* (*Capsicum frutescens*). For uniformity of measurement, the "*lambebe*" (the smallest container being used to sell pepper in the local market) was converted into kilogramme (kg). The prices and kg conversion (per *lambebe*) for each of the pepper type is as follows: *Tatase* (*Capsicum annum*): ₦200/kg, *Rodo* (*Capsicum chinenses*): ₦170/kg, *Bawa* (*Capsicum pubescens*): ₦210/kg, *Sombo* (*Capsicum frutescens*): ₦180/kg.

The data collected were analyzed using descriptive statistics, multivariate probit regression model and hedonic-pricing model. Descriptive statistics such as percentages, frequencies and means were employed to describe the socio-economic characteristics of the respondents and to identify consumers' preference for the different pepper types, the multivariate probit regression model was used to identify the factors that influenced the preference for the different pepper types while hedonic-pricing model was used to identify the willingness of consumers to pay for the different pepper types.

Factors Influencing Preference for Pepper Varieties: Multivariate Probit Regression Model

In order to determine the factors influencing consumers' preference for different pepper varieties, a multivariate probit regression model was used. This is because of the assumption that preference decisions among the different pepper types are not mutually exclusive as consumers can prefer and use more than one pepper type at a time for cooking and therefore, the random error components of the pepper types may be correlated. Thus for the purpose of this study, the estimation began with a probit model. The probit model was used because its likelihood function is well-behaved as it gives consistent Maximum Likelihood Estimate (MLE) coefficients (β) and standard error of the estimate(s) (Maddala, 1992). The probit model estimates the probability of preferring pepper types for a consuming household level data and measures this likelihood after controlling the relevant variables used in the model. The dependent variable in the first step was defined as a dichotomous variable with the values 1 for those who prefer and 0 for those who do not prefer.

To estimate the preference equations for all the pepper types, the simplest and most straight forward estimation procedure would be to estimate each probit equation separately. However, it is important to note that the data for the different pepper types were collected from one individual consumer at a given point in time. This may bring endogeneity within the data set that is, the error terms between the equations of different peppers might be correlated since data is being collected from the same individual whose decision on a particular pepper may affect the probability of selecting another pepper. As such, multivariate probit model was used to address this problem. Following Cappellari and Jenkins (2003), the multivariate probit model was structured as follows. Consider the M-equation multivariate probit model:

$$y_{im}^{*} = \beta_m' X_{im} + \epsilon_{im}, m = 1, \dots, M \quad (1)$$

$$y_{im}^{*} = 1 \text{ if } y_{im}^{*} > 0 \text{ and 0 otherwise} \quad (2)$$

$\epsilon_{im}, m = 1, \dots, M$ are error terms distributed as multivariate normal, each with a mean of zero, and variance-covariance matrix V, where V has value of 1 on the leading diagonal and correlations $\rho_{jk} = \rho_{kj}$ as off

diagonal elements. The multivariate probit model has a structure like the Seemingly Unrelated Regression (SUR), except that the dependent variables are binary indicators. The y_{im} might represent outcomes for M different preferences at the same point in time, for example, whether a consumer chooses M type of peppers. The X_{im} is a vector of explanatory variables and β_m are unknown parameters to be estimated. The probability function of the probit model is usually the standard normal density which provides predicted values within the range (0, 1). Therefore, a multivariate model allowing for the possible contemporaneous correlation in the decisions to choose the different peppers can be specified as follows:

$$y_{ij} = x_{ij}^{I}\beta_j + \varepsilon_{ij} \quad (3)$$

Where
i = observation of consuming household;
j = the number of peppers (j = 1, …,4);
ε_{ij} = unobserved error term;
y_i = pepper preferred by consumer;

Prob (y_i = j) = probability of preferring any of the selected peppers;

$$y_1^* = \alpha_1 + X\beta_1 + \varepsilon_1$$
$$y_2^* = \alpha_2 + X\beta_2 + \varepsilon_2$$
$$y_3^* = \alpha_3 + X\beta_3 + \varepsilon_3$$
$$y_4^* = \alpha_4 + X\beta_4 + \varepsilon_4$$

With y_1^*, y_2^*, y_3^*, and y_4^* a set of n-latent variables underlying each of the pepper preference such that $y_j = 1$ if $y_j^* > 0$; 0 otherwise.
β = the coefficients' vector;
X_i = vector of consumer characteristics,

where:
X_1 = age of consumer (years);
X_2 = household size (number);
X_3 = sex of consumer (dummy 1 = male and 0 = female);
X_4 = number of years spent in education (Years);
X_5 = Primary occupation (dummy 1 = civil servant and 0 = others);
X_6 = Income (natural logarithm);
X_7 = Affordability (dummy 1 = yes and 0 = no);
X_8 = Availability (dummy 1 = yes and 0 = no);
X_9 = Taste (dummy 1 = yes and 0 = no);
X_{10} = Health related (dummy 1 = yes and 0 = no);
ε_i = Error term

Willingness-To-Pay for Pepper Varieties: Hedonic Pricing Model

This is based on Lancaster's (1996) model of consumption theory. He regards the characteristics of the good and not the good itself as the direct object of utility. This concept has widely been used to estimate willingness to pay for quality of goods. Thus, price differences across different units of transactions are due mainly to quality differences that can be measured in terms of the characteristics. Ladd and Suvannunt (1976) used this concept to develop the consumer goods characteristics model which describes the price of a good as a linear summation of the implicit values of its attributes. For this study, revealed preferences as a measure of willingness to pay for pepper was used as the dependent variable in the hedonic model.

Different researchers (Lowenberg-DeBoer, 2001; Mundua, 2011; Ibrahim et al., 2013; Kalu and Ajetunmobi, 2013) have estimated the hedonic function using a regression technique. The consumer's commodity prices are regressed against the commodity characteristics to derive a coefficient representing the implicit price of the characteristics. The hedonic price function following Faye et al.(2002) is specified below:

$$P_i = \alpha_0 + \beta_{ik}\sum_{i=1}^{j=1} Z_{ik} + \mu \quad (4)$$

Where P_i is the price per unit of each pepper type, α_0 is the constant or intercept, β_{ik} is the marginal value of characteristics k in good i, Z_{ik} is the amount of characteristics k in good i, μ is the error term.

For this study, the Hedonic price function in equation (4) was expressed in the following form:

$$P_i=\alpha_0+\alpha_1 Z_{i1}+\alpha_2 Z_{i2}+\alpha_3 Z_{i3}+\alpha_4 Z_{i4}+\alpha_5 Z_{i5}+\ldots+\alpha_n Z_{in}+\mu \quad (5)$$

Where P_i is the willingness to pay for a type of pepper in ₦/kg, Z_1 is the consumption attribute, μ is the error term. The different attributes for pepper were entered as dummy variables. The approach used to create dummies for taste was to assign a value of one for sweet taste and zero otherwise. A value of one was assigned to affordability and zero otherwise. A value of one was assigned to availability and zero otherwise. Also, a value of one was assigned to if it is related to health issues and zero otherwise. The choice of these classes of dummy variables as base variables was important because it allowed for positive values of the regression coefficients for ease of interpretation of the results. For the expected signs for estimated parameters, the different attributes examined are expected to have positive signs.

Results and Discussion

Description of Respondents by Their Socio-Economic Characteristics

The descriptive statistics of the respondents were presented in Table 1. The result showed that the mean age of respondents was approximately 36 years. This finding indicates that respondents were mostly middle-aged, active and agile. This result conforms to the findings of Yeh and Hartmann (2016), who reported similar findings in their study on sweet pepper. The sex distribution of the respondents showed that majority (65.0%) of the respondents considered were female. The results obtained also indicate that the majority (67.0%) of the respondents were married. This implication of this is that those who are married would have more household size which will cause them to increase the quantity of pepper that is purchased and consumed compared to those who are not married. This result conforms to the findings of Khaliukova (2013), who in her study on pepper also reported more married pepper consumers.

Table 1. Socio-economic characteristics of pepper consumers

	Socio-economic characteristics	Frequency	Percentage
Age (years)	21 – 30	29	29.0
	31 – 40	47	47.0
	41 – 50	14	14.0
	51 – 60	8	8.0
	61 – 70	2	2.0
	Mean (Standard deviation)	35.93 (9.95)	
Sex	Male	35	35.0
	Female	65	65.0
Marital status			
	Married	67	67.0
	Single	33	33.0
Number of years of education attained	0	6	6.0
	1 – 10	30	30.0
	11 – 20	64	64.0
	Mean (Standard deviation)	12.38 (4.71)	
Primary occupation	Civil servant	31	31.0
	Artisan	26	26.0
	Private salary earner	15	15.0
	Trader	28	28.0
Household size			
	1 – 4	72	72.0
	5 – 8	28	28.0
	Mean (Standard deviation)	3.30 (1.73)	
Total household income (₦)	> 51,000	37	37.0
	51,000 – 100,000	41	41.0
	100,001 – 150,000	8	8.0
	150,001 – 200,000	7	7.0
	< 200,000	7	7.0
	Mean (Standard deviation)	82115.00 (54473.41)	

Source: Data Analysis, 2020

The result showed that the mean number of years spent in attaining formal education was approximately 12 years, hence, respondents can read and write. This is also expected to have an impact on their choice of pepper (Asano and Fiuza, 2003).

The result in Table 1 also revealed that majority (85.0%) of the respondents are either civil servants, artisans or traders. The primary occupation of consumers according to Obayelu et al.(2009) have been observed to have an effect on their consumption of pepper. The mean household size of the respondents was approximately 3 members. The implication of this is that households with more members are expected to purchase and consume more pepper than households with fewer members. The mean total household monthly income of consuming households was ₦82,115.00. This shows that consuming households will have more disposable income which could be used to purchase pepper.

Identification of Consumers' Preference for Pepper

The result in Table 2 showed that 75.0% of the consumers preferred *Tatase* (*Capsicum annum*), 91.0% preferred *Rodo* (*Capsicum chinenses*), 73.0% preferred *Bawa* (*Capsicum pubescens*) while 56.0% preferred *Sombo* (*Capsicum frutescens*). The results further showed that the consumers preferred *Tatase* (*Capsicum annum*), because of its availability (73.0%) and price (68.0%). Also, the consumers preferred *Rodo* (*Capsicum chinenses*) because of its availability (88.0%) and affordability (86.0%). In addition, the consumers preferred *Bawa* (*Capsicum pubescens*) because of its availability (71.0%) and affordability (70.0%). Finally, those who preferred *Sombo* (*Capsicum frutescens*) did because of its availability (54.0%) and affordability (52.0%).

Overall, the result showed that majority (66.0%) of the consumers preferred *Rodo* (*Capsicum chinenses*) over other types of pepper. This is followed by *Tatase* (*Capsicum annum*) (16.0%), *Bawa* (*Capsicum pubescens*) (12.0%) while *Sombo* (*Capsicum frutescens*) (6.0%) is the least preferred type of pepper. The fact that consumers mostly preferred *Rodo* (*Capsicum chinenses*) over other types of pepper is because even during scarcity of pepper when other pepper types are expensive, *Rodo* (*Capsicum chinenses*) was always available and the quantity sold per unit was more than other types of pepper. Also, *Rodo* (*Capsicum chinenses*) when prepared alone has a good taste unlike other pepper type which when prepared individually is bland and tasteless. The implication of this result is that consumers will buy more of *Rodo* (*Capsicum chinenses*) than any other type of pepper.

Factors Influencing Consumers' Preference for Pepper

The result of the multivariate probit model as presented in Table 3 revealed that the log-likelihood function was -179.549, the Wald chi^2 was 60.42 and that the Prob>chi^2 was 0.0017 indicating that the entire model was significant at the 1% level of significance. These diagnostic variables and the significance level reveal the fitness of the entire model.

Table 2. Preference of consumers for pepper

Pepper	Preference	Mostly preferred	Attributes	Frequency (%)
Tatase (*Capsicum annum*)	75 (75.0)	16 (16.0)	Price	68 (68.0)
			Affordability	65 (65.0)
			Availability	73 (73.0)
			Health-related	40 (40.0)
Rodo (*Capsicum chinenses*)	91 (91.0)	66 (66.0)	Price	78 (78.0)
			Affordability	86 (86.0)
			Availability	88 (88.0)
			Health-related	45 (45.0)
Bawa (*Capsicum pubescens*)	73 (73.0)	12 (12.0)	Price	69 (69.0)
			Affordability	70 (70.0)
			Availability	71 (71.0)
			Health-related	41 (41.0)
Sombo (*Capsicum frutescens*)	56 (56.0)	6 (6.0)	Price	46 (46.0)
			Affordability	52 (52.0)
			Availability	54 (54.0)
			Health-related	48 (48.0)

Source: Data Analysis, 2020

Table 3. Factors influencing the preference for pepper

Variable	*Tatase*	*Rodo*	*Bawa*	*Sombo*
Age	-0.85 (-1.25)	-1.447 (-1.31)	0.566 (0.77)	-0.068 (-0.12)
Household size	-0.135 (-0.68)	0.570* (1.67)	0.209 (0.94)	-0.284 (-1.53)
Income	0.378* (1.66)	-0.144 (-0.36)	-0.533** (-2.05)	-0.072 (-0.38)
Primary occupation	0.622* (1.73)	-0.353 (-0.76)	0.776** (2.08)	0.184 (0.64)
Affordable	-1.151 (-1.10)	-4.075 (-0.04)	-0.552 (-0.74)	0.990 (1.24)
Available	0.807 (1.44)	0.969 (1.19)	1.000* (1.91)	0.473 (0.92)
Meal-making ability	-0.176 (-0.41)	-2.517 (-0.13)	0.759** (2.05)	-0.062 (-0.18)
Health related	-0.080 (-0.27)	-0.767 (-1.59)	0.396 (1.27)	0.200 (0.73)
Constant	-2.922 (-1.02)	13.843 (0.12)	2.975 (1.08)	-1.776 (-0.70)
Rho21	0.408* (1.67)			
Rho31	0.227 (1.09)			
Rho41	0.503*** (3.29)			
Rho32	-0.527 (-1.41)			
Rho42	0.553*** (2.60)			
Rho43	0.071 (0.38)			
Log likelihood	-179.549			
Wald chi^2	60.42			
Prob>chi^2	0.0017			

Likelihood ratio test of the correlation coefficients of the pepper types rho21 = rho31 = rho41 = rho32 = rho42 = rho43 = 0: $chi^2(6) = 17.3731$; Prob > $chi^2 = 0.0080$. The figures in parenthesis represents the t-value while the *, ** and *** represents 10%, 5% and 1% level of significance respectively.

The result revealed that the coefficient of household size was positive and statistically significant for *Rodo* (*Capsicum chinenses*) at 10% level of significance. This implies that as the members within a consuming household increases, the likelihood of that household preferring and using *Rodo* (*Capsicum chinenses*) would also increase. This is not farfetched because on one hand, *Rodo* (*Capsicum chinenses*) when prepared alone has a good taste and on the other hand, it is always available and the quantity sold per unit is more than other types of pepper even during the scarcity of pepper when other pepper types are expensive. The result also showed that the coefficient of total household income was significant for *Tatase* (*Capsicum annum*) and *Bawa* (*Capsicum pubescens*) at 10% and 5% respectively. The result showed that whilst the coefficient of total household income was positively significant for *Tatase* (*Capsicum annum*), it was negatively significant for *Bawa* (*Capsicum pubescens*). This indicates that whilst an increase in the total income of a consuming household will increase the likelihood of that household preferring and using *Capsicum annum*, an increase in total household income will reduce the likelihood of consuming households preferring and using *Capsicum pubescens*. The positive significance of total household income with *Capsicum annum* is because *Capsicum annum* makes sauce very thick and rich when compared with *Capsicum pubescens* and as such consuming households with increased total income would be endeared towards it.

The result also revealed that the coefficient of primary occupation was positive and statistically significant for *Tatase* (*Capsicum annum*) and *Bawa* (*Capsicum pubescens*) at 10% and 5% respectively. The positive sign indicates that consumers who are civil servants will more likely prefer and use these two pepper types. Furthermore, the coefficient of availability was positive and statistically significant for *Bawa* (*Capsicum pubescens*) at 10%. This implies that consuming households will more likely prefer *Capsicum pubescens* because it is available. Finally, the coefficient of meal-making ability was positively significant for *Bawa* (*Capsicum pubescens*) at 5% which indicates that consuming households will more likely prefer and use *Capsicum pubescens* for their cooking. This is true as *Capsicum pubescens* adds colour to

sauce and other meals. It is known for its peculiar "reddish colour", thus making it suitable for different meals.

The expected multivariate interdependence of preference and use of the different pepper types were accounted for employing the multivariate probit simulation of the four pepper types. The null hypothesis that the correlations are jointly zero and the four decisions to prefer and use are independent was rejected at the 1% significance level. The results revealed that *Rodo* (*Capsicum chinenses*) enhanced the preference and use of *Tatase* (*Capsicum annum*). This is because the combination of these two pepper types always enhances the taste, thickness and richness of sauce or meals prepared (rho21). Also, the result showed positive interdependence of *Sombo* (*Capsicum frutescens*) and *Tatase* (*Capsicum annum*) (rho41). The positive interdependence is because *Capsicum frutescens* has the same characteristics as *Capsicum chinenses*, though it is bigger and longer than *Capsicum chinenses*. Hence, it can be combined with *Capsicum annum* just like *Capsicum chinenses* could be combined with *Capsicum annum*. The result also showed positive interdependence of *Sombo* (*Capsicum frutescens*) and *Rodo* (*Capsicum chinenses*). As stated earlier, these two pepper types have the same characteristics save for the difference in the size of the two. The positive interdependence indicates that the use of one pepper type gives the consumer the avenue to use another pepper type. Therefore, the positive interdependence showed that consumers' decision to prefer and use a pepper type does not affect or alter the decision to prefer and use another pepper type. Furthermore, the positive interaction showed that the activities done to promote one pepper type would also promote another pepper type.

Consumers' Willingness to Pay for The Preferred Pepper Type

The market price for each of the pepper types in ₦/kg was given in the materials and method section. Hence, the result in Table 4 revealed that consumers were willing to pay a premium of ₦109.33/kg for *Tatase* (*Capsicum annum*), ₦152.02/kg for *Rodo* (*Capsicum chinenses*), ₦92.03/kg for *Bawa* (*Capsicum pubescens*) and ₦84.56/kg for *Sombo* (*Capsicum frutescens*). The study further revealed that pepper consumers were more willing to pay for *Rodo* (*Capsicum chinenses*) than any other pepper type. This is because *Rodo* (*Capsicum chinenses*) is the best pepper type when used and prepared as sauce alone compared to others. The willingness to pay of consumers for *Capsicum chinenses* is also because it is readily available and affordable.

Factors Influencing the Willingness to Pay for Pepper

The result in Table 5 showed that all the estimations are significant at 1% alpha level and that the coefficient of determination (R^2) for each of the pepper types are 0.7400, 0.8334, 0.7240 and 0.6248 respectively. This implies that the independent variables were able to explain about 74.0%, 83.3%, 72.4% and 62.5% of the total variations in the willingness to pay of pepper consumers for the different types of pepper respectively.

The result further showed that the coefficient of affordability for *Tatase* (*Capsicum annum*), *Rodo* (*Capsicum chinenses*), *Bawa* (*Capsicum pubescens*) and *Sombo* (*Capsicum frutescens*) was positive and statistically significant at 5% and 1% respectively. This result shows that due to the affordability of these different types of pepper, consumers would be willing to pay a premium of ₦2.60, ₦2.66, ₦3.87, ₦3.67 for *Tatase* (*Capsicum annum*), *Rodo* (*Capsicum chinenses*), *Bawa* (*Capsicum pubescens*) and *Sombo* (*Capsicum frutescens*) respectively. The result also revealed that the coefficient of availability was positive and statistically significant for *Capsicum annum* at 10%. This indicates that consumers would be willing to pay a premium of ₦2.06 for *Capsicum annum* because it is available.

Table 4. Distribution of consumers by willingness to pay for the preferred pepper type

Pepper type	Average Willingness to Pay (AWP) ₦/kg	Standard Deviation
Tatase	309.33	136.73
Rodo	322.02	115.89
Bawa	302.03	143.11
Sombo	264.53	127.32

Source: Field Survey, 2020

Table 5. Factors influencing the willingness to pay for pepper

Variable/Pepper	*Tatase*	*Rodo*	*Bawa*	*Sombo*
Price	-1.491 (-1.20)	-0.137 (-0.14)	0.899 (0.74)	-0.200 (-0.15)
Affordability	2.604** (2.32)	2.661*** (2.89)	3.867*** (3.50)	3.365*** (2.86)
Availability	2.058* (1.69)	1.443 (1.45)	0.442 (0.37)	1.658 (1.30)
Taste	0.287 (0.26)	0.186 (0.20)	-2.592** (-2.30)	-2.322* (-1.93)
Meal-making ability	0.534 (0.73)	0.884 (1.47)	-0.042 (-0.06)	-0.168 9-0.22)
Health-related	0.052 (0.09)	-0.375 (-0.83)	-0.676 (-1.24)	-0.015 (-0.03)
Thickness	0.802 (1.38)	0.130 (0.27)	1.617*** (2.82)	0.315 (0.52)
Constant	6.256 (4.27)	4.366 (3.55)	3.806 (2.50)	4.047 (2.49)
R-squared	0.7400	0.8334	0.7240	0.6248
Adjusted R-squared	0.7205	0.8209	0.7033	0.5965
F	37.82***	66.48***	34.85***	22.12***

Source: Data Analysis, 2020, The figures in parenthesis are the z-values while *, **, and *** denote level of significance at 10%, 5% and 1% respectively

The result further showed that the coefficient of taste concerning *Bawa* (*Capsicum pubescens*) and *Sombo* (*Capsicum frutescens*) were negative and statistically significant at 5% and 10% respectively. This result indicates that due to the taste of these two types of pepper, consumers would discount a price of ₦2.59 and ₦2.32 *Bawa* (*Capsicum pubescens*) and *Sombo* (*Capsicum frutescens*) respectively. Finally, the result showed that the coefficient of thickness was positive and statistically significant for *Bawa* (*Capsicum pubescens*) at 1%, which implies that consumers would be willing to pay a premium of ₦1.62 for *Capsicum pubescens* because of its thickness

Conclusion and Recommendations

The study was conducted to assess consumers' preference and willingness to pay for different pepper varieties in Osun State, Nigeria. The study used the major pepper types being sold in the markets in Osun State, Nigeria. The study therefore concluded that consumers mostly preferred and were willing to pay more for *Rodo* than any other types of pepper. Household size, primary occupation, total household income, availability and meal-making ability of pepper were the factors that influenced consumers' preference for the different pepper varieties while the factors which influenced willingness to pay for pepper varieties are affordability, availability, taste and thickness. The study therefore recommended that since availability and affordability influenced preference and willingness to pay for different pepper varieties, policies should be aimed at increasing farmers' production, doing this will ensure that pepper is readily available and consequently, affordable for consumers. Finally, the result showed that household income significantly influenced preference for pepper varieties, hence, policies should be made at ensuring that the income of consumers are not adversely affected.

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