Review Article

Evaluation of Factors Influencing Consumers' Preference for Genetically Modified and Wild Caught Catfish in Delta State Central, Nigeria

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Abstract - The study evaluation of the factors influencing consumer preference for genetically modified and wildcaught catfish in Delta State Central, Nigeria, was necessitated by identifying different quality attributes between two types of breaded catfish. The study aimed at identifying the extent to which taste, price, and nutritional value influence consumers' preference between genetically modified and wild-caught catfish. A descriptive survey research design was adopted by administering a questionnaire to 400 sample size of catfish consumers in three local government areas of Delta State. The data were cross-tabulated and analyzed with descriptive statistics, and the hypotheses were analyzed with logistic regression analytical tool, with the aid of a statistical package for social sciences (SPSS). The findings reveal that most of the consumers in Delta State Central in Nigeria preferred the wild-caught catfish to genetically modified Catfish.

Moreover, the findings indicated that consumers in Delta State Central were influenced by taste, price, and nutritional, wild-caught caught catfish characteristics. In the same vein, the analysis of the hypotheses showed that there is a significant relationship between taste, price, nutritional value, and consumers' preference for genetically modified or wild-caught catfish in Delta State Central in Nigeria. Based on the findings, the following conclusion was made; the majority of the respondents' studies preferred wild-caught catfish to genetically modified ones. Furthermore, it was established that taste, price, and nutritional value of catfish have a great influence on the Catfish purchased by consumers. The study, therefore, recommends that there should come public enlightenment to educate the consumers on the taste, healthiness, and nutritional value of wild-caught catfish and aquaculture products in general. Furthermore, the government should encourage people to embark on catfish production genetically modified to meet the high demand by consumers.

Keywords - Genetically modified Catfish, Wild Catfish, consumer's preference.

I. INTRODUCTION

The recent drop in the price of crude oil globally has necessitated a shift from the oil sector of Nigeria's economy to the Agricultural sector. Hence, the Nigerian Government called for an increase in the participation of Agricultural production in the country to reduce the insufficient food supply in Nigeria. Okowa (2015) states that the agricultural sector, also known as the farming sector, is very vast and has not been properly explored. In Nigeria, fish farming is one of the Agricultural activities and is currently a lucrative business, and it's mainly boosted by the continuous rise in the demand for fish. Fish and fisheries are an integral part of most social and make important contributions to the economic and social health and wellbeing of many countries and areas such as Delta State. The most common species of fish that fishermen and farmers cultivate for commercial purposes are mainly salmon, Tilapia, and Catfish. However, in Delta Central Senatorial Zone, Catfish is predominantly cultivated for consumption and commercial purposes. According to the oxford dictionary (2016), catfish is a fish that has one or more pairs of whisker-like feelers by its mouth. (Kevern: 2001). According to Eschmayer and Fong (2013), a fish is any member of a group of organisms that consist of grillbearing aquatic craniates animals that lack limbs with Moreover, fish can be seen as any numerous digits. vertebrate animals that live in water. Fish have gills for obtaining oxygen, a lateral line for sensing pressure changes in water, and a vertical tail.

Catfish which is commonly referred to as "Orueren" in Delta State senatorial Zone, is highly consumed by the indigenes. Annie (2017) and Maryann (2016) claimed that Catfish offers a lot of benefits such as high-quality protein, vitamins, nutrients, Omega 3 oil, and healthy fats, etc., that are necessary for human growth. They stressed that catfish help to lower and protect against diseases such as heart disease, depression and improve cognitive ability. In the same vein, Annie (2017) and Maryann (2016) posited that Catfish might provide some benefits to a wide range of diseases like cancer, asthma, depression, cardiovascular diseases, etc. Thus, the aforementioned benefits of catfish have necessitated an increase in the demand and consumption of catfish. Consequently, sustaining catfish suppliers from captured fisheries from ocean, rivers, lakes, and streams, etc., have not been able to meet the growing demand for Catfish in Delta Central Senatorial Zone in Nigeria. In Nigeria, there are basically two ways of breeding catfish – Wild-caught (fishes caught in natural water like- rivers, seas, ocean, stream, etc.) and genetically modified (i.e., catfish whose genetic material has been altered). The incessant increase in the demand for catfish has made a lot of fish farmers adopt genetically modified fish farming in order to boost catfish production in Nigeria.

The genetically modified catfish are mostly cultivated in ponds, tanks, and other constituted places. Wikipedia (2016) informed that genetically modified catfish are organisms from taxonomic clade, which include the Agnatha (Jawless Fish), Cartilaginous, and Osteichthyes (bony fish) whose genetic material has been altered. Apurva, Rachayceta, and Rajendrani (2016) asserted that genetically modified Catfish had been modified to grow six times faster than the normal wild-caught catfish in a cooler climate and controlled environment. Furthermore. Mustapha (2007) claimed that genetically modified (GM) catfish had been shown to boost the production of fisheries worldwide. Besides, he stressed that genetically modified Catfish offers numerous benefits to consumers, such as poverty and hungry reduction, meeting the nutritional requirement, and raising the standard of living of the majority of people. Moreover, it helps to feed more people for less money and complement captured and aquaculture fisheries, thereby making more protein available to hungerravaged Nigerians.

On the contrary, Sear (2015) informed that wildcaught catfish are caught by fishermen in their natural habitats - rivers, lakes, oceans, etc. The main benefit of wild-caught Catfish is that the fish just eat organisms found in their existing environment, which by nature is far more diverse than what genetically modified Catfish eat on a regular basis. Furthermore, Christine (2018) claimed that wild-caught Catfish are always good for human health because they are higher in Omega 3 fatty acids. Thus Omega 3 fatty acids are a major reason to eat Catfish for cardiovascular health. Other benefits include low fats, a lower risk of heart attack and strokes, etc. Thus, in the purchase of products such as Catfish. Consumers make decisions amid the wild-caught and genetically modified Catfish by allocating their limited income to the catfish that they will derive maximum satisfaction. Thus, in the quest to maximize satisfaction, consumers tend to make a preference between wild-caught or genetically modified Catfish.

Consumer preference is an option that has the greatest anticipated value among a number of options (Chris and Tanika, Julie, Chenowth, Tereza; 2010). In the same vein, Lombardo (2008) asserted that consumers' preference is a set of assumptions that focus on choice that results in different alternatives such as satisfaction or utility. The consumer chooses among completing product brand probably relying on information placed on the product (Egele, Ikechi, and Ozo, 2017). Consumer preference describes the reasons for the choices people make when selecting products and services, like; Catfish, cars, etc.

The introduction of the breeding of genetically modified Catfish and the naturally wild-caught catfish resulted in a situation where consumers had to make a preference between wild-caught catfish and genetically modified (GM) Catfish. Researches have shown that consumers view output qualities of these two methods of breeding catfish (i.e., wild-caught and genetically modified) differently.

Johnson (2013) and Harmon (2014) have argued that genetically modified food is risky and harmful and that a lot of information is needed by consumers to know whether to take the risk or avert it. In the same vein, Taylor and Francis (2008) asserted that genetically modified Catfish have higher fats, pesticides, etc., which can result in a more toxic effect on consumers, and this can result in ailment such as hepatic cancer and acute renal failure, etc. On the contrary, Joe (2015) informed that wild-caught catfish reduce high blood pressure and risk for certain cancer inflammatory conditions such as rheumatoid, arthritis, and even mental decline. Furthermore, they claimed that the wild-caught cat has less fat; it is safe and has more nutritional value.

Thus, the specific objectives are;

- To ascertain if taste influences consumer preferences for wild-caught or genetically modified Catfish in Delta Central Senatorial Zone in Delta State, Nigeria.
- To ascertain if price influences consumers' preference for wild-caught and genetically modified Catfish in Delta Central Senatorial Zone in Delta State, Nigeria.
- To know if nutritional value influences consumers' preference for wild-caught and Genetically modified Catfish in Delta Central Senatorial Zone in Delta State, Nigeria.

While the following hypotheses for the study are articulated as follows:

Ho₁: There is no significant relationship between taste and consumers' choice for Catfish.

Ho₂: There is no significant relationship between price and consumers' choice for Catfish

Ho₃: There is no significant relationship between Nutritional value and consumers' choice for Catfish.

II. REVIEW OF RELATED LITERATURE

A. Conceptual Review

a) Consumer Preference

Consumer preference is defined as the subjective (individual) taste, as measured by the utility of several bundles of goods (www.usiedubusines.com). They permit the consumer to rank these bundles of goods according to the levels of utility they give to the consumer. In the same vein, Chris and Tanika, Julie, Chenowth, and Tereza (2010), asserted that consumer preferences are used similarly to mean an option that has the greatest anticipated value among a number of options. Consumer preference can also be seen as a set of assumptions that focus on consumer choice that results in different alternatives such as happiness, satisfaction, or utility. Thus, the entire consumer preference process results in an optimal choice (Lombardo, 2008), which depends on factors that affect consumers to make a decision on perceived usefulness and perceived ease of use (Prasad, 2019). Consumer preference is an attribute of consumer behavior and also leads to the attitude which is formed based on perceived usefulness and perceived ease of use. Supporting this viewpoint, Yaman and Aydin (2020) asserted that while people behave towards specific subjects (products), the various attitude has formed that frame their behavior.

b) The Concept of Fish

FISH: A fish is any member of a paraphyletic group of organisms that consists of all gill-bearing aquatic, craniate's animals that lack limbs with digits. Included in this definition are the living hagfish, lampreyi, and cartilaginous and bony fish, as well as various extinct related groups. Furthermore, a fish can also be seen as a cold-blooded animal that lives in water, breathes with gills, and usually has fins and scales. Fish as a member of the Animals kingdom can be classified into phylum Chordata and vertebrate sub-phylum. Fishes pose notochord, tubular name chord, paired gills, segmentation of the body parts, post and pal, ventral heart, and an endoskeleton to be a member of the chordate; (www. animalsworld; 2009). Thus, in order for the fish to be a vertebrate, it poses a backbone. This bone supports and protects the Spaniard cord. The different species of fishes found in the world can be classified into three groups they are; Aqnatha - jawless fish, Cartilaginous fish, bony fish

Catfish: Catfish are a group of bottom-feeding fish that are found in freshwater habitats and coastal regions on and around every continent in the world (open crypt: 2016). According to the Columbia encyclopedia (2016), catfishes are classified in phylum chordate, subphylum vertebrate, class Antimophterygii, and order Siluriformes. Catfish are most easily identified by the flat, broadheads and the long whisk–like barbells that project from the mouth of that Catfish. The long barbells of the catfish contain the taste bits of the Catfish, so they are most often commonly used for something and therefore sensing what is about to eat (and to hide from) in surrounding water. However, despite the name, not all catfish species have prominent whiskers-like barbells.

Catfish species in Nigeria aquaculture include; clarias qariepinus, Heterobranchus bidorsalis, clarias Heterobranchus hybrid (i.e., Heteroclarias). However, the Heterobranchus is the more commonly cultured fish in the south-south/eastern parts of Nigeria. Yusuf (2015) informed that the clarias and heterobranchus can be crossbreeded to get hybrid. He posited that a lot of clarias can be stocked in a pond, but feeding and water management are very important. However, the hybrid, which is a crossbreeding clarias and Heterobranchus, grows well, needs feeding and good water management.

Wild-Caught Catfish: Wild-caught catfish are fishes that are directly taken from their natural habitat, for example, lakes, rivers and seas, Ocean waters. Most catfish are bottom feeders and mainly eat invertebrates (in -VER- te braces) or animals without a backbone. Moreover, some catfishes eat fish, and some feed on fallen leaves and trees as well as algae, which are any plant-like growths that live in water and have no tree roots, stems, or leaves. Some also eat the blood of other fish.

c) Catfish Attributes

Taste: This refers to the sensation of flavor perceived in the mouth and throat on contact with a substance like catfish that enables you to differentiate between wildcaught and genetically modified Catfish. According to O' Dierno, Govindasamy, Puduri, Myers, and Island (2006), taste is the most important reason participants consumed fish. Moreover, studies carried out by Johnson and Roheim (2006) informed that species (i.e., Types of fish offered for sales), when ranked, were always preferenced by taste, regardless of production method.

Price: This is the amount of money charged for or product or service. Price can also be referred to as the sum of all the values that customers give up in order to gain the benefits of having or using a product or service. According to George (2011), prices are an expression of the consensus on the values of different things like wild-caught catfish, genetically modified catfish soap, ball, etc. Thus, every society that permits exchanges between people has a price. Price is one of the attributes that can influence the purchases of a product.

Nutritional Value: The nutritional value of food refers to the quality and quality of nutrients found in the food item. It gives information about the energy (measured in calories), the macronutrients (carbohydrates, protein fats). Micronutrients (Vitamins and materials) and phytochemicals of the food. It is also important to know that the nutritional value of food defines what a food is made of and its impact on the body (Novella, 2015). Studies here shown that Catfish is rich in protein, vitamins, and minerals and low in saturating) fats.

d) Differencing Between Wild Caught and Genetically Modified Catfish

The genetically modified and wild-caught Catfish can be differentiated with respect to the intrinsic and extrinsic variables.

Quality of the Catfish: The low quality that has been associated with genetically modified Catfish is due to the fact that a large part of the fish is fed with a low-quality meal (i.e., a mixture of corn, grain, fish oil, and ground up). Besides, the genetically modified feed contributed to the

low quality of the catfish. However, wild-caught catfish are caught by fishermen in their natural habitual rivers, lakes, oceans, etc. The high quality of the wild-caught catfish stemmed from the fact that the fish eat organisms found in their existing environment, which by nature is far more diverse than what genetically modified fish get to eat on a regular basis.

In addition, wild-caught catfish have the benefit of not containing antibiotics, as wild fish do not have the same risk of diversity or infection as farmed or genetically modified fish.

Overall Nutritional Content: The nutritional value of wild-caught fish is thought to be much higher than the genetically modified Catfish. This is because; wild fish are out in the wild, eating a diverse range of foods that create a varied blend of nutrients by the time consumers get the fish.

However, Genetically modified catfish are generally fed with the same crops day in day out, and they live in a contained environment with no access to the variety of wildlife, hence a lower quality of nutrients when compared to wild-caught catfish.

Fat Content: Genetically modified catfish are generally subject to some pretty Dismal culinary options since the primary goal is to fatten them in short order. However, because these catfish don't get the best food or the most varied, the fat content of genetically modified tends to be higher than the wild-caught catfish. On the other hand, wild-caught are responsible for finding their own food and have the ability to swim long distances during their life at sea. This tends to reduce their fat content.

B. Empirical Review

Cecilia Kelvin, Julius, Charles, Kwamena, and Quagraine (2014), conducted a study to investigate Consumers' preference of wild and farmed (i.e., genetically modified) Nile Tilapia in selected urban centers in Kenya. The study adopted a survey method, random sampling techniques and administered 384 questionnaires to fish consumers and retailers in the open market of five urban The data were analyzed using a centers in Kenya. statistical package for social sciences (SPSS) - Anova and chi-square. The result from the analysis showed that consumers preferred wild-caught to farmed Tilapia. Furthermore, the findings indicated that the following factors affect consumers' preference for Nile Tilapia fish in Kenya urban centers; Price, overall fish quantity, nutritional value, and healthiness. They also asserted that the aforementioned factors were found to differ between urban centers in Kenya. Although the aforementioned factors examined Nile Tilapia fish in Kenya, could these same factors influence consumers' preference for wildcaught and genetically modified Catfish in Delta central senatorial Zone in Nigeria?

Kenn, Mercy, Jonathan, Paul, Domitila, Ernest, Cecilia, Harrison (2014) conducted a study on factors influencing consumer preference and marketing trends in demand for Nile catfish within Kirinyaga and Vihiga countries in Kenya. A consumer survey was adopted using a questionnaire and a multistage purpose sampling to select sampling units of a fish market. At the same time, random sampling was used to select a total number of 153 respondents, which comprised 95 and 58 consumers of fish from Kirinyega and vihiga, respectively. The data collected from the field were analyzed statistically using the statistical package for social science (IBM-SPSS) Inc. Version 20.0). Descriptive analysis was done using the mean, standard deviations, percentages, and frequency distribution tables. The inferential statistics was done using the chi-square (X^2) test of goodness of fit. The findings of the study showed that most consumers in both countries purchased Nile tilapia over Catfish. Moreover, the result indicated that the major determinants of consumers' preference for both farmed Tilapia and catfish are mainly in the fish attributes-like taste, overall quality, healthiness, nutritional value, etc. It is interesting to know that the aforementioned factors (taste, nutritional value, etc.) are major determinants of the farm. Tilapia and catfish Kirinyega and Vihiga countries in Kenya, could these same factors influence the preference of wild-caught and genetically modified Catfish in Delta State Central Senatorial Zone in Delta State, Nigeria?

Amoa and Ayantoye (2014) conducted a study to examine the effects of certain factors on the preference pattern of some forms of fish in Oyo State, Nigeria. The study was carried out in the Ibadan metropolis, Ibadan, with a population of about 3.5 million. The stratified random sample techniques were used by grouping households into homogenous classes or strata of low, middle, and high-income density areas. A total of 400 households were randomly sampled. The descriptive statistic used includes; tabular presentation, frequency, and percentages, and the Tobit regression was used to determine the effect of the explanatory variable on the forms of fish consumed.

The findings revealed that consumers of preference for fish are influenced by the nutritional value of fish, price, and its relative cheaper. Although, the above-mentioned factors are found in Ibadan, Oyo State. Will these factors affect consumers' preference for wild-caught fish and genetically modified Catfish in Delta State Central Senatorial Zone in Delta State, Nigeria?

Moses, Daniel, Giroh, Zalkwi, and Akindele (2015) examined the influence of socio-economic characteristics on consumers' preference on fish purchase in Yola North Local Government Area of Adamawa State. A total of One Hundred (100) respondents were selected using Multistage random sampling tools of frequency distribution and percentages, and inferential statistical tools of multiple regressions were used. The study revealed that consumers' preference for fish in Yola North Local Government Area of Adamawa State was determined by income, age, educational qualification, and household size. Furthermore, the findings indicated that most consumers preferred fish consumption because of its taste, nutritional value, cheap price, etc. Will the aforementioned characteristics have any influence on consumers' preference for wild-caught and genetically modified Catfish in Delta Central Senatorial Zone in Delta State?

Jimoh, Popoola, Ibrahim, Ayeloja, Ayanwale, and Akinosho (2003), carried out a study to investigate factors Influencing consumers' preference for frozen and fresh fish within the Ibadan metropolis towards developing a functional fish processing strategy. A multistage sampling technique of 150 respondents for 6 local government areas within Ibadan. Descriptive statistics and chi-square contingency test for independence and association were employed using SPSS statistical package (16.0, 2007) to determine whether each of the factors considered was independent of consumers' preference for fresh and frozen fish. The findings indicated that fish consumption was enhanced by nutritional awareness, taste, package, cost, and availability, respectively. Although, the study indicated that consumers' preference for frozen and fresh fish is determined by factors like nutritional awareness, taste, cost, availability, etc. Could these factors also influence consumers' preference for wild-caught and genetically modified Catfish in Delta Central Senatorial Zone in Delta State, Nigeria?

C. Theoretical Framework

The theoretical framework adopted in this study is the Lancaster Consumer Theory. The Lancaster Consumer Theory was propounded by Lancaster (Lancaster, 1966). The theory state that goods are selected by consumers, either independently or in combination, based on their characteristics which are the sources of consumer's utility. Lancaster's theory originated from the observation that traditional demand theory was ignoring highly pertinent and obvious information and the properties of goods themselves (Lancaster, 1971), and he proposed to concentrate on the properties or characteristics of this He posited that consumers would expect aspect. information on the properties of goods to be more easily obtainable and to be more universal in character than properties of individual preference ordering. Thus. Lancaster changed the traditional consumers' theory when he asserted that utility is derived from the characteristics of a good, not from the consumption of the good in itself.

Lancaster's consumer theory can be summarized in the following assumption; the first assumption is that each good has characteristics relevant to the choice people make on the goods (Lancaster, 1971). He affirmed that "the goods, per se, do not give utility to the consumer. It possesses characteristics, and these characteristics give rise to utility (Lancaster 1966). The aforementioned assumption implies that people value goods and services purely on the basis of their characteristics and that consumers' choice of product is done on the features that the products possess. Thus, the characteristics which do not influence choice or utility are irrelevant.

Lancaster (1971) asserted that every product possesses the economic number of physical characteristics like size, shape, color, small, chemical composition, etc. In the same vein, the product also possesses certain intrinsic characteristics like taste, nutritional value, smallness, freshness, quality, etc. These characteristics are determinants of satisfaction derived from the product by consumers. Brown and Prescott (2002), in support of the assumption of Lancaster's consumer's theory of preference, posited that consumers' choice for wild-caught catfish is determined by certain characteristics like: nutritional value. sensory and food safety attributes. Furthermore, Caswell (2002) identified five broad groups of genetically modified catfish attributes, namely - safety, nutrition, value, package, and production process. He stressed that these attributes could influence consumers' preference for goods purchase - such as wild-caught and genetically modified Thus, in line with Lancaster's consumer's Catfish. preference theory, consumers will be satisfied with Catfish that have the following characteristics - good taste, low fats, nutritional values, freshness, etc.

Lancaster's second assumption states that, in general, a good (or product) will possess more than one character, and many characteristics will be shared by more than one good. Thus, these characteristics give rise to utility.

III. RESEARCH METHODOLOGY

A descriptive survey research design was adopted for the study. The choice of the research design stemmed from the fact that survey research design will afford the researcher the opportunity to collect information by asking questions from the respondents.

The population of the study consists of the entire consumers of catfish in the three Local Government Areas of the eight Local Governments in the Delta State Central, Nigeria. The population of the Local Governments Areas is; Ughelli North - 312, 028, Ethiope East - 200, 792, and Sapele - 172, 652. Hence the total population size is 664 472 (NPC; 2006).

The choice of the three (3) Local Government Areas stemmed from the fact that the Local Government Areas have a high concentration of consumers, and there are rivers in these localities. Besides, the areas are easily accessible; the per-capital income is high compared to other local government areas. Yaro Yarmen's formula was used to determine the sample size of 400 consumers in the proportion of Ughelli North – 193, Ethiope East – 121, and Sapele – 86. At the same time, convenience sampling was used to select consumers.

The primary source of data collection was basically through the questionnaire. The questionnaire was developed on 5 points Likert scale-strongly agree-5, Agree-4, Neutral -3, Disagree-2, and strongly disagree-1. A

computer programming (i.e., statistical package for social science (SPSS), Logistic Regression Analysis was used to test the hypotheses stated for the study.

IV. RESULT AND DISCUSSION A. Consumption Rate of Catfish

Table 1. Consumers'	That Consumed	Wild-Caught and	d Genetically
	M 10 10	4.04 1	

Catfish	Frequency	Percentages
Wild-caught	224	57.29
Genetically modified	167	42.71
Total	391	100.0

Source: Fieldwork; 2019.

The above table showed that the majority of the respondents, 224 (57.29%), preferred wild-caught catfish, whereas 167 (42.71%) of the respondents consumed genetically modified Catfish. The findings of this study showed that the majority of the respondents in Delta Central Senatorial Zone in Nigeria preferred Wild-caught genetically modified Catfish. catfish to The aforementioned findings conformed with the work of Safina, Christopher, and Rodrick (2014), that majority of respondents prefer wild-caught catfish to genetically modified Catfish. Moreover, Dasguphta, Eaton, and Caporelli (2010) and Drake, Draka, Daniel, and Yates (2006), discovered in their study that consumers preferred wild-caught to farm-raised or genetically modified Catfish. They asserted that wild-caught is favored primarily for taste preference among consumers in the Nyanza region in Kenva.

B. Influence of taste on consumers' preference for wildcaught and genetically modified Catfish in Delta Central Senatorial Zone, Delta State Nigeria.

Table 2. Mean Scores and Standard Deviation on Consumers' Preference For Wild-Caught and Genetically Modified Catfish.

13.25
167

Source: Field Work; 2019.

The findings from Table 2 indicated that taste influences consumers' preference for wild-caught and genetically modified Catfish. This is validated by the mean scores of 13.25 for respondents that prefer wild-caught and 12.20 for those that preferred genetically modified Catfish. The standard deviation showed that there is a difference between wild-caught and genetically modified Catfish with respect to taste. The findings are in agreement with O'dierno, Govindasamy, Puduri, Myers, and Islam (2006) that most consumers purchase seafood products. Like; catfish, clams, shrimp, e.t.c in New Jersey, U.S.A, because of its taste, price, nutritional value, etc. They stressed that taste is one of the major factors for the purchase of Catfish, strings, etc. C. Influence of price on consumers' preference for wildcaught and genetically modified Catfish in Delta Central Senatorial Zone, in Delta State, Nigeria.

Table 3. Mean Scores and Standard Deviation on Consumers' Preference For Wild-Caught and Genetically Modified Catfish.

		Ν	
Mean	SD		
Wild-Caugh	t Catfish 224		8.32
1.92			
Genetically	modified		167
7.41	1.45		
Source: Field Wo	ork; 2019.		

An analysis of table 3 depicts that price influences preference for wild-caught and genetically consumers' modified Catfish. This is confirmed by the means scores of 8.32 for respondents that preferred wild-caught catfish, and 7.41 mean scores for those that preferred genetically modified Catfish. The standard deviation showed that there is a difference between the wild-caught and genetically modified Catfish with respect to price. The findings of this study are supportive of the work of Brunso, Fjard, and Grunert (2002), that price is an important parameter in consumer choice of product. In the same vein, Elena, Johana, and Renate (2011) asserted that price is a notable factor in the purchase of products. They stressed that price, if consumers actually notice, may be perceived as high or low not only in relation to the perceived quality but also in relation to the subjective reference price, which again is based on the previous experience. Thus, a high price may even be regarded as positive, a sign of high quality.

D. Influence of nutritional value on consumers' preference for wild-caught and genetically modified Catfish in Delta Central Senatorial Zone, in Delta State, Nigeria.

Table 4. Mean Score and Standard Deviation on Consumers' Preference For Wild-Caught and Genetically Modified Catfish.

		Ν	
Mean	SD		
Wild-Caugh	t Catfish 224		16.56
2.92			
Genetically	modified		167
14.69	2.32		
C E' 111	V 1 2010		

Source: Field Work; 2019.

The data in table 4 indicated that the nutritional value of catfish could assert a lot of influences on customers' preference for wild-caught and genetically modified Catfish. This is validated by the mean score of 16.56 for respondents that preferred wild-caught catfish and 14.69 for those that preferred genetically modified Catfish. The standard deviation indicated that there is a difference between wild-caught and genetically modified Catfish with respect to the nutritional value of catfish. The findings of this study agree with the work of Cecilia et al. (2014) that the nutritional value of Catfish is a sensitive factor that influences consumers' preference for the purchase of catfish. Mccalmon (2014), in his study, informed that the nutritional value in wild-caught fish is much higher than that of the farmed raised variety. He observed that the artificial ingredient used in producing genetically modified Catfish makes it have inferior nutritional value when compared to the wild-caught catfish.

E. Hypothesis One

HO 1: There is no significant relationship between taste and consumers' choice for Catfish

Table 5. Summary of Logistic Regression Analysis	With Taste As Determinants Of Consumers' Choice of Catfis
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	В	S.E	Wald DF	P-Value Ex	кр (B)*	
Step 1 ^a Taste (1)	.215	.050	18.4401	.001*	1.239	
Constant	- 2, 451	.650	14.224 1	.000	.086	

variable(s) entered on step1: Taste. *odds ratio** P<0.05

In table 5, the taste was found to significantly influence consumers' choice for Catfish. This is validated by the value of the wald test (18.440) and corresponding P. value (.001), which was less than 0.05 level of significance. Thus, since the P-value of .001 was less than 0.05, we reject the null hypothesis (Ho) and accept the alternate hypothesis (H_A) and conclude that there is a significant relationship between taste and consumers' choice for Catfish in Delta Central Senatorial Zone in Delta State, Nigeria. The findings of this study are in agreement with the work of Kenn et al. (2014), that of the fish product attributes, such as quality, availability, and taste, etc., taste had the greatest influence on consumers' preferences. Hence the attribute (taste) needed to the stressed in-market promotional activities. In the same vein, Keriko et al. (2010) posited that the majority of consumers in Kenya preferred wild-caught tilapia because of the taste which is associated with natural food items found on the bottom of the mud of lake waters.

Conclusively, this study established that consumers of catfish in Delta Central Senatorial Zone in Delta State, Nigeria, are greatly influenced by taste in the choice of wild-caught and genetically modified Catfish. This implies that consumers of catfish will be highly interested in the taste of Catfish purchased.

F. Hypothesis Two HO2: There is no significant relationship between Price and consumers' choice of catfish. Table 6. Summary of Logistic Regression Analysis With Price As A Determinant of Consumers' Choice of Catfish

В	S.E	Wald	DF	P-Va	alue Exp (B)*		
Step 1 ^a Price (1)	.294	.062	22.73	1	.000*	1.342	
Constant	- 2,032	.499	16.60	1	.000	.132	

variable(s) entered on step1: Price. *odds ratio** P< 0.05

Table 6 indicates that price has a significant influence on consumers' choice of catfish. This is confirmed by the value of the Wald test (22.73) and corresponding P-value (.000), which was less than the 0.05 level of significance. Thus, since the P-value of .000 was less than 0.05 (.000 < 0.05), we reject the null hypothesis (Ho) and accept the alternate hypothesis (H_A) and conclude that there is a significant relationship between price and consumers' choice for Catfish in Delta Central Senatorial Zone in Delta State, Nigeria. The findings of this study conform to the work of Brunso et al. (2002), that price is an important parameter in consumer choice of a product. Furthermore, Kenn et al. (2014) asserted that quantities and prices of Tilapia and catfish are important determinants of the preferences of Kenyan consumers for both farmed tilapia and Catfish.

Thus, this study established that price is a strong determinant in the purchase of wild-caught and genetically modified Catfish in the Delta Central Senatorial Zone.

G. Hypothesis Three

HO3: There is no significant relationship between nutritional value and consumers' choice of catfish.

 Table 7. Summary of Logistic Regression Analysis With Nutritional Value As Determinant Consumers' Choice For Catfish.

		В	S.E	Wald	DF	P-Valu	ie Exp (B	3)*
Step 1 ^a Nutrition (1) Constant	.256 - 3	.043 , 715	35.87 .657	791 30.295	.000* 1	.000	1.292	.024
	•		* 0 00	-				

*Variables on step1, Nutrition*odds Ratio**P < 0.05*

Table 7 showed that Nutritional value has a significant influence on consumers' choice of catfish. This is shown by the value of the wald test 35.879 and corresponding Pvalue .000, which was less than 0.05 level of significance. Thus, since the P-value of .000 was less than 0.05 (.000 < 0.05), we reject the null hypothesis and accept the alternate hypothesis and conclude that there is a significant relationship between Nutritional value and consumers' choice for Catfish in Delta Central Senatorial Zone in Delta State, Nigeria. The above-mentioned findings give credence to work Musa and Ala (2011) that consumers' in Sokoto metropolis preferred Catfish (Clarias) because of its nutritional benefit and as a source of protein. Moreover. Sear (2001) claimed that wild-caught catfish possess a lot of nutritional fats like protein, calories, vitamins, minerals, etc., and these are some of the features that made consumers prefer wild-caught to genetically modified Catfish. This study established that consumers' preference for wild-caught Catfish was a result of the high nutrient found in the fish.

V. SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

A. Summary of Findings

After a careful analysis of the data collected from the respondents, the following findings were made; Majority of the respondents, 224 (57.29%), preferred wild-caught catfish to genetically modified ones. Their reasons for the preference stemmed from the fact that the wild-caught catfish have good taste, high nutritional value, low fats, and its safe for consumption (i.e., healthy). It was also discovered that those consumers that preferred genetically modified Catfish (i.e., 42.71%) did so for the

The following reasons; readily available, cheap price, and low-income status. Furthermore, the study revealed that taste, price, and nutritional value have a great influence on consumers' preference for Catfish in Delta Central Senatorial Zone. The study also revealed that there is a significant relationship between taste, price, and nutritional value and consumers' of catfish in Delta Central Senatorial Zone in Delta State.

B. Conclusion

Based on the analysis of data and the discussion of the findings, the following conclusion was made;

It was evident in the study that the majority of the respondents affirmed that they preferred wild-caught catfish to genetically modified Catfish. They gave the following reasons to justify the choice; it is caught in the natural environment, it contains low fatt, it is safe for consumption, it has high omega-3 acids, it contains high vitamin minerals, it is fresh, and it has low pesticides and pollutants. On the other hand, those small proportion that purchased genetically modified Catfish did so for the following reasons; it has low price, it provides protein and other essential minerals like vitamin Omega-3 oil, it is readily available. Furthermore, it was established in the study that taste, price, and nutritional value, have a great influence on consumers' preference for Catfish in Delta Central Senatorial Zone in Delta State, Nigeria. The study found that there is a significant relationship between taste, price, nutritional value, and the choice of catfish in Delta Central Senatorial Zone, Delta State, Nigeria.

C. Recommendations

Based on the findings of this study, the following recommendations were made;

- The government should Endeavour to develop fishery manpower through regular seminars, workshops, and conferences.
- Farmers of genetically modified Catfish should Endeavour to carry out research with a view of improving the feeds of Catfish by reducing pesticides, pollutants, e.t.c to enhance the taste and nutritional value, and healthiness of genetically modified Catfish.
- Government should encourage people by giving them loans and other incentives like; interest-free loans, subsidizing feeds of fish, e.t.c to embark on fish production to meet the high demand of consumers and reduce high unemployment be experienced in Nigeria today.
- The State and Federal governments should enact laws that would protect the fish in our rivers, seas, oceans, etc., from being caught when they are young.
- Public enlightenment should be carried out in Delta State and its environs to encourage consumers to patronize sellers of Catfish since it contains protein, nutrients, and other minerals that will enhance human beings and can also be a substitute for meat since herdsmen value their cow meat more than human beings.
- The government should establish a laboratory where the feeds of genetically modified Catfish can be researched in order to improve the contents of the feeds.

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