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CONSUMER PREFERENCE OF THE POWDERED EGG IN ILORIN METROPOLIS

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Abstract

In the marketing of any technology innovation, consumer preference is very important. Hence this study compared the consumers' preference of various poultry egg powder products with fresh egg in the study area. Data was collected by from one hundred and twenty respondents, comprises of equal number of dependants and non-dependants, with the use of questionnaire aided with samples of snacks produced from the powdered egg products and fresh egg. Data were analysed using Descriptive Analysis and Likert Scale. The results revealed that the mean age of the respondents was 27 years with monthly income of N52,818.33. More so, 16.7%, 18.3% and 23.3% preferred the powdery products than fresh egg for albumen, yolk and whole egg powder respectively. Fear of loss of nutrients, fear of additives, and fear of high cholesterol were the major reasons for them not preferring egg powder to fresh egg. Nevertheless, the most preferred among the egg powder products was whole egg powder with 85.0%. More so, the consumers identified easy to carry, safer to handle, and extend the shelf life of the products as major benefits powdered egg possesses ahead of fresh egg. It can be concluded that the consumers preferred fresh egg especially with the fear that the powder egg possess lower nutrient. Hence it is therefore recommended that potential investors in the production and marketing of egg powder products should strive to sensitise the would be consumer on the nutritive value and constituents of the products to allay the fears of loss of nutrient, additives and high cholesterol as discovered in this study. It is therefore recommended that researches should focus more on the whole egg powder at initial stage until demand for other powdered products is high enough to generate desire profit level.

Keywords: Powdered Egg, Consumers' Preference, Marketing Innovation

1. INTRODUCTION

Egg is nutritious and highly rich in protein, vitamins and minerals required for human growth and development. It contains lutein and zeaxanthin which increases the concentrations of carotenoids in the blood and the macula of the eye (Burke, *et.al*,

2005, Mares, 2017). Evbuomwan (2009) identified egg as important in meeting the daily protein dietary requirement with estimated per capita animal protein consumption in Nigeria of about 20gm as against the recommended requirement of 75 gm. This shortfall calls for need to orientate the egg consumers on the benefits of its consumption.

In recent years, there is increase in production of poultry eggs due to the "eat an egg a day" campaign since decades ago. This increase calls for innovation and diversification in the use of egg in order to meet up with its marketing challenges such as breakages in transit, poor storability, and deterioration during unfavourable climatic conditions. The percentage loss of fresh egg at the marketing level was estimated to be 8.13% (Adetayo, Adewumi, Adetayo, Falola, Olowogbon, Olatilewa & Oyebamiji, 2015). This has led to the introduction of innovations like egg powder, which are processed eggs in powdery form. Dried egg is quite stable with less risk and has long shelf life with its nutrients intact (EDII, 2016). Although, the innovation of powdered egg is available in Nigeria, but the products are not popular in the market. The powdered egg can be used in the preparation of chicken burger, scotch eggs, salad, baked foods, hair shampoo, ice creams, custard, beverages, snacks and cakes etc. (Ayodele, 2013). Olayemi *et al.* (2016) dried fresh eggs into yolk powder, albumen powder and whole powdered egg at different temperatures, their results revealed that the powdery products (output) retain the initial constituents (i.e. fresh egg). The dried egg can last for two to five years if well stored (Tara, 2017).

In the marketing of any technology innovation, consumer preference is very important. Market potential is influenced by factors such as consumers' eating habits, access to the product, knowledge and consumer's preferences (Ayinde, Adewumi & Folorunsho, 2010). Satisfy consumer preference by producers has been a great challenge due to technology change (Ayinde, Abdulaye, Olaoye, & Akangbe, 2013). Consumers find its difficulty in making choices especially if it involves risk trade-off (Uchida, Roheim, & Johnston, 2017). The consumer preference for a product is the result of the relevant perceptual dimensions (a process affected by needs, motives, socio cultural or situational elements), the beliefs of the consumer with respects to the effectiveness of the dimensions against each other (preference function) and also changes in the demographic and socio-cultural variables, consumer attitudes and the developments of new lifestyles (Adewumi Ayinde, Ajewole, & Oladejo 2014). In order to promote egg marketing in Nigeria, another aspect worthy of investigation is to examine the preference of consumers of these products to fresh eggs. This study therefore aims at comparing consumers' preference on various powdered egg products with fresh eggs in the study area; investigate the price the consumers were willing to pay for various products of powdered egg; and identify the benefits of the powdered egg known to the consumers in the study area.

2. LITERATURE REVIEW

In terms of provision of the much needed protein to an average Nigerian, the performance of the livestock sub sector has not been encouraging. For instance, cattle supplies less than 2 kg of beef to an average Nigerian per year and just mere 4 kg of egg per annum could be supplied locally to each Nigerian during the period under consideration. The egg supply is very low being 10.56 g per day as compared with the usual recommendation that an egg should be consumed by an adult per day (Odupitan, 2015; Adetayo, 2015). This recommendation would imply a crate of 30 eggs per month. The protein intake of average Nigerian is abysmally low due to poverty. For instance, the British Medical Association recommends a minimum animal protein intake of 34g per capita per day (Okuneye, 2002).

Also, the Food and Agricultural Organization (FAO) of the United Nations recommends 20g of animal protein per capita per day as the minimum for consumption for developing countries but 75g as optimum for normal growth and development (FAO, 1992). However, according to Olayemi *et al.* (2016), the average animal protein intake daily per capita in Nigeria was just 7.6g which is about 38% of the FAO minimum requirement for developing countries and a mere 10% for excellent growth and development. It can be logical to suggest that the best solution to our national meat scarcity is to increase poultry production because of the popularity of poultry meat and their products particularly eggs in the diet of many Nigerians due to few or no social or religious stigma attached to them.

A study conducted by students from the College of Agriculture at the University of Kentucky in 2011 on consumers that were exposed to locally produced, commercial free-range and conventional eggs. Unaware of which sample they were evaluating; they were asked to answer a set of questions. Each sample was labeled with a randomly selected number that would correspond with a specific egg. This helped them to eliminate bias. The goal of the sensory evaluation was to find the attributes consumers find most important and to help determine whether taste is something to consider when purchasing a type of egg. After evaluating the collected data, the goal is to know whether there is a difference in taste between different types of eggs and which taste consumers prefer. This could be valuable information for creating an effective marketing strategy (UKSS, 2011).

Other studies of note include a 1996 British study on the consumer market for eggs *Segmenting the UK egg market: results of a survey of consumer attitudes and perceptions* (Fearne, Andrew, & Lavelle 1996), which found that there are various classes of consumers within the egg market – for example, it finds that there are a unique group of exclusive free-range purchasers who only buy free-range eggs regardless of price or taste differences, but rather because of animal rights ideals.

These classes were found to be highly related to socio-economic background. More recently, an informal study *A Good Egg* (Taylor, Kate 2002) taste tested different kinds of eggs-- cage-free, commercial, and two brands of organic eggs. Organic and cage-free eggs scored significantly higher than the commercial brand. On the other hand, another recent informal comparative study, *The Food Lab: Do 'Better' Eggs Really Taste Better?* (Serious Eats, 2010) Found that preference had much more to do with mindset of the taster than the eggs themselves, as tasters' choice of preference between cage-free, high-omega 3, and commercial eggs varied under different trials.

This Study used a choice experimental where the product was shown to the respondents to choose their preference. The used of choice experimental were based on the fact that it is usually used to access food that is yet on the market (Meas, Hu, battle, Woods & Ernst 2015). The study theoretically follows the utility theory of consumer behavior (Mcfadden 1975) that says consumer choice can be examined as a linear function. The study is also based on the concept of Lancasters (1966) that a product is a bundle of attributes. Hence the choice and description of the egg powder products by consumers were used in the study.

3. METHODOLOGY

This study was carried out in Ilorin metropolis, Kwara State. Ilorin is the capital city of Kwara State. Kwara State is one of the fastest developing states in Nigeria facing industrial growth with many emerging poultry farms, food and agro-allied industries. Ilorin is the capital of Kwara State. Kwara State is located on the 8°30'N 5°00'E, and has a total land area of 36,825 km² and an estimate population of 2,591,469 as at 2006 population census, with the population density of 43/km² (C-GIDD, 2008).

This study employed primary source of data collection. The Primary data were obtained through the use of structured questionnaire by interview scheduled which involved contact relationship where necessary with the respondents. Samples of various egg powdery products were sourced from the Processing Centre of Nigerian Stored Products Research Institute, Ilorin, Kwara State, Nigeria. From the egg powder samples, chin-chin were made and for fresh egg as control as well. Samples of the various egg powder products and the chin-chin were made available for respondents to aid data collection.

A three stage Sampling Technique was adopted for this study. The respondents were grouped into two: the students (representing the dependants) and employed (representing the non-dependants). At stage one, purposive selection of the Department of Agricultural Economics and Nigerian Stored Products Research

Institute (NSPRI) for dependant and non-dependant groups respectively for convenience sake. At the second stage, a level from the Department was randomly selected for the dependant group only (which is 200 Level). The third stage involved random selection of 60 respondents from each group for interview. This gives a total of 120 respondents in all using structured questionnaire / interview guide. The analytical tools that were used for this study are basically descriptive and Likert scale. Descriptive analysis was used to analyse the socioeconomic characteristics, and the benefits of powdered egg, while the order of preference of egg powder was analysed using 3-point Likert scale (i.e. less preferred, more preferred and most preferred).

4. RESULTS AND DISCUSSION

This section presents the results of analyses of data collected comprising the demographic and socio-economic characteristics of the egg consumers; their egg consumption pattern; and known benefits of powdered egg in the study area.

Socio-economic Characteristics

The results of socio-economic characteristics of the egg consumers is presented in Table 1.

Table 1: Socio-economic Characteristics of Egg Consumers

Socio-economics Variables	Group	Frequency	Percent	Mean
Age	Below 20yrs	22	18.3	27
	20 - 30yrs	48	40.0	
	31 - 40yrs	41	34.2	
	Above 40yrs	5	6.8	
Gender	Female	72	60.0	
	Male	48	40.0	
Level of Education	Undergraduate	60	50.0	
	First Degree	32	26.7	
	Post-graduate degree	28	23.3	
Average Monthly Transferred Payment	Less than 5,000	6	5.0	52,818.33
	5,000 - 10,000	33	27.5	
	10,001 - 20,000	19	15.8	
	20,001 - 50,000	3	2.5	
	50,001 - 100,000	48	40.0	
	Above 100,000	11	9.2	
Total		120	100.0	

Source: Field Survey (2017)

The results in table 1 shows that majority of the respondents were below 40 years of ages (93.3%). The mean age is 27 years. This falls within the ages group where high protein consumption is recommended (i.e. age group 18 – 40 years required 0.61 –

0.75g/kg of egg or milk per day which is an average size of an egg) (WHO, 1985).

More so, sixty per cent (60%) of the respondents were female, while their male counterpart accounted for the remaining forty per cent (40%). This poise an advantage to the study in the sense that females do more of the cooking than the males, and seems to have more interest in trying new recipes. The results further shows that all the respondents were educated as designed with fifty per cent (50%) undergraduates, twenty-six per cent (26%) first degree and twenty-three (23%) post graduate qualifications. Bohlen and Beal (1957) identified the importance of education in adoption of new innovations / ideas. This therefore has potential to aid willingness to pay for powdered egg in the study area.

Furthermore, most of the respondents earned / received between N50,000 and N100,000 monthly with Forty percent (40.0%), which were mainly the non-dependant group. This is followed by those that earned / received between N5,000 and N10,000 monthly with Twenty-eight per cent (27.5%) which were mainly the dependant group. Though, respondents' income is expected to be one of the main characteristics that will influence the consumers' willingness to adopt and pay for powdered egg, but the level of the respondents' income is considerably low based on the current economic challenges in the country today.

Egg Consumption Pattern

To investigate the consumers' willingness to pay for powdered egg, there is need to examine and describe the consumers' egg consumption patterns. The various egg consumption patterns are presented in Table 2.

Table 2: Consumers' Egg Consumption Pattern

Consumption Pattern	Group	Frequency	Percent	Mean
Frequency of egg consumption	Very rarely	6	5.0	
	Once a month	1	0.8	
	Twice a month	8	6.7	
	Once a week	23	19.2	
	More than once a week	82	68.3	
What form do you mostly consume egg	Boiled	85	70.8	
	Fried	28	23.3	
	Baked Products	7	5.8	
Cost of egg (crate)	Less than ₦900	28	23.3	
	₦900 - ₦1,000	76	63.3	937.8
	Above ₦1,000	16	13.3	
Quantity of egg Bought (crates/month)	Less than 1/2 crate	31	25.8	
	1/2 - 1 crate	51	42.5	1.08
	Above 1 crate	38	31.7	
Percentage Loss (percent / month)	No loss	99	82.5	
	1 - 5percent	11	9.2	13.01
	6 - 10percent	6	5.0	
	Above 10percent	4	3.3	
Ease of accessing fresh egg	Highly stressful	3	2.5	
	Little stress	72	60.0	
	No stress	45	37.5	
Desire to try powdered egg	No	36	30.0	
	Yes	84	70.0	
	Total	120	100.0	

Source: Field Survey (2017)

The results on the frequency of egg consumption as presented in Table 2 shows that Sixty-eight per cent (68.3%) of the respondents mostly eats egg more than once a week. Also, nineteen per cent (19.2%) of them eats egg once a week which is about 4 to 5 eggs in a month, while Five per cent (5.0%) rarely eat egg in a month. This is germane to the consumers' need and demand for value addition to egg.

More so, most of the respondents consume egg in boiled form with Seventy-one per cent (70.8%), while Twenty-three per cent (23.3%) and Six per cent (5.8%) mainly consumes egg in fried form and baked products respectively. This parameter is

important in informing their decision to settle for powdered egg or not. But, with majority eating egg boiled, the need to opt for powdered egg may be reduced, nevertheless, some may still go for powdered egg due to its availability.

On the cost of fresh egg, most of the respondents accessed a crate of fresh with about N1,000. Sixty-three (63.3%) of the respondents bought a crate of egg between N900 and N1,000, while Twenty-three (23.3%) bought egg less than N900 a crate. Only Thirteen per cent (13.3%) of the respondents bought their egg above N1,000 per crate. On the average, a crate of egg accessed by the respondents in the study area was N937.8.

Furthermore, in the area, forty-three per cent (42.5%) of the respondents bought between half and one crate of egg in a month, twenty-six per cent (25.8%) bought less than half crate per month, while Thirty-two per cent (31.7%) bought more than a crate. On the average, a family bought 1.08 crate of egg (about 33 pieces) in a month. With the mean household size of 5 people consuming about 33 eggs per month, this shows that an individual consumes 7 eggs a month which is less than 2 eggs a week. This egg consumption pattern is low for an adult with mean age of 27years when compared with recommended (WHO, 1985). In addition, majority (82.5%) of the respondents lost none of the egg bought, while the remaining Eighteen per cent (17.5%) of the respondents accounts for the 3.47% egg loss recorded.

Most of the respondents in the study area accessed fresh egg with little stress (60.0%), while Thirty-eight (37.5%) had no stress in accessing fresh egg. Only Three per cent (2.5%) found fresh egg highly stressful to access. Despite the easy access to fresh egg, it was discovered that most (70%) of the respondents were willing to try powdered egg, while the remaining Thirty per cent (30%) were not. This shows that should powdered egg is commonly available in the market, many of the literate class would at least try it once. This could be so, due to the literacy level of the respondents which disposes them to try new innovations.

Powdered Egg Preference among Consumers in the Study Area

The consumers' preference of among various powdered egg was carried out to compare the powdery products with fresh egg. To achieve this, snacks (i.e. chin-chin) was produced from the various products including fresh egg for sensory evaluation (taste only). The result of the responses given by the respondents is presented in Table 3.

Table 3: Distribution of Consumers' Preference of Various Products of Powdered Egg

Variable	Group	Albumen		Yolk		Whole Powdered egg	
		Freq.	Percent	Freq.	Percent	Freq.	Percent
Preference over fresh egg	No	100	83.3	98	81.7	92	76.7
	Yes	20	16.7	22	18.3	28	23.3
	Total	120	100.0	120	100.0	120	100.0
Reason for preference over fresh egg	More nutritious	10	50.0	14	63.6	16	57.1
	Better appearance	3	15.0	-	-	-	-
	Better texture	1	5.0	-	-	1	3.6
	Better utility	6	30.0	6	27.3	8	28.6
	More Convenient to use	-	-	2	9.1	3	10.7
	Total	20	100.0	22	100.0	28	100.0
Reason for not preferring powdered egg	Easy access to fresh egg	9	9.0	7	7.2	9	9.8
	Fear of nutrients loss	30	30.0	10	10.2	20	21.8
	Less nutritious	14	14.0	36	36.7	12	13.0
	Fear of additives	16	16.0	13	13.3	5	5.4
	Just not preferred (no specific reason)	31	31.0	31	31.6	38	41.3
	Fear of high cholesterol	-	-	1	1.0	-	-
	Cannot be served boiled	-	-	-	-	8	8.9
	Total	100	100.0	98	100.0	92	100.0

Source: Field Survey (2017)

The results in Table 4 shows that most of the egg consumers in the study area preferred fresh egg to the three powdered egg products presented to them. Nevertheless, few respondents gave their support of preference to the powdery products as 16.7%, 18.3% and 23.3 percent for albumen, yolk and whole powdered egg respectively. This implies that on the average, about 20 per cent of the egg consumers prefer powdered egg to fresh egg. This is also in line with Beal, Everett and Bohlen (1957) on the adoption of new innovation by the early adopters. The early adopters are usually about 13.5 per cent of the population which gradually increase as others sees the availability of the products in the open market to the early majority group which about 34 per cent of the population.

In addition, among the few that prefer powdered egg, the most supported reason for their choice is that the snacks made with powdered egg products is more nutritious than that of fresh egg with 50.0%, 57.1% and 63.6% for albumen, whole powdered

egg and yolk respectively. Besides, better utility is the second most supported reason with 27.3%, 28.6% and 30% for yolk, whole powdered egg and albumen respectively. This implies that the few respondents in the area that prefer powdered egg is mainly based on better taste and utility (i.e. can be used for more products) than fresh egg.

On the other hands, among the majority of the respondents in the area that preferred fresh egg to powdered egg, 31.0%, 31.6% and 41.3% never gave reasons for their preference. This might be due to lack of interest in the products generally. Moreover, for albumen, fear of loss of nutrients, fear of additives, less nutritious, and easy access to fresh egg were the major reasons for them not preferring powdered albumen to fresh egg with 30%, 16%, 14% and 9% respectively. Likewise, for yolk, less nutritious, fear of additives, fear of nutrient loss, easy access to fresh egg and fear of high cholesterol were the reasons for not preferring powdered yolk to fresh egg with 36.7%, 13.3%, 10.2%, 7.2% and 1.0% respectively. One could deduce that with appropriate packaging and label (with adequate information on the nutrients composition), more people might settle for powdered egg than what is obtainable now.

Consumers' Order of Preference

The order of preference has the potential to inform the consumers' decision on which product they will be willing to pay for. The results of the consumers' order of preference among the powdered egg products are presented in Table 4.

Table 4: Distribution of Order of Consumers' preference among the powdered egg products

Order of preference of powdered egg	Albumen (%)	Yolk (%)	Whole Egg (%)
Less Preferred	73.3	21.7	5.0
More Preferred	20.0	70.0	10.0
Most preferred	6.7	8.3	85.0
Weighted Mean Score	1.33	1.87	2.80
Rank	3 rd	2 nd	1 st
Total	100.0	100.0	100.0

Source: Field Survey (2017)

The results in Table 4 showed that most of the respondents preferred whole powdered egg most with Eighty-five percent (85.0%), followed by powdered yolk which is more preferred with Seventy percent (70.0%), while powdered albumen is the least preferred of the three products with Seventy-three percent (73.3%). This implies that whole powdered egg is the most preferred of the three products. This may be due to the nutrients advantage it has over other products.

Benefits of Powdered Egg

The consumers' opinion on the benefits of powdered egg in general over the fresh egg were investigated and the result is presented in Table 5 below.

Table 5: Frequency Distribution of Benefits of Powdered Egg

Benefits of powdered egg	Frequency	Percent
Easy to carry	62	51.7
Safer to handle with less risks	51	42.5
Extend shelf life	50	41.7
Easy to use	42	35.0
Better nutrition	9	7.5
Better quality	3	2.5
Nil	11	9.2

Source: Field Survey (2017)

The result in Table 5 revealed that easy to carry was the most reported benefits with 51.7%, followed by safer to handle with less risks when compared with fresh egg with 42.5%, followed by extend shelf life with 41.7%. More so, 35.0% of the respondents agreed that easy to use is also one of its benefits. Although, as against the prior expectation, 7.5% of the respondents (part of those that personally use egg for snacks) agreed that it will be better in nutrition than fresh egg. Nonetheless, only 9.2% of the respondents did not belief powdered egg had any comparative advantage over fresh egg.

5. CONCLUSION AND RECOMMENDATIONS

Based on the findings, this study therefore concluded that the egg consumption in the study area was low when compared with the recommended. Further, the powdered whole egg was more preferred than other powdered yolk and powdered albumen by the consumers, though fresh egg was mostly preferred than the powdered products, since they mostly consumed egg in boiled form. Also, the consumers identified easy to carry, safer to handle, and extend the shelf life of the products as major benefits powdered egg possesses ahead of fresh egg.

It is therefore recommended that potential investors in the production and marketing of egg powder products should strive to sensitise the would be consumer on the nutritive value and constituents of the products to allay the fears of loss of nutrient, additives and high cholesterol as discovered in this study. They should also try to focus more on the whole egg powder at initial stage until demand for other powdered products is high enough to generate desire profit level.

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