

CONSUMER WILLINGNESS TO PAY FOR SAFETY LABELS IN NIGERIA: A CASE STUDY OF POTASSIUM BROMATE IN BREAD

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ABSTRACT

The study analysed consumer willingness to pay for safety labels in Nigeria by a case study of potassium bromate in bread in Benin City, Edo State. It specifically investigates factors that promote willingness to pay for label among consumers of bread in Benin City, Edo State. Data used for the study were obtained through a well-structured questionnaire from 200 respondents. Both descriptive analytical methods and probit regression models were used for the analysis. The study revealed that 73% of the respondents are in their active working age with 50 percent of the respondent being male and female respectively. 67 percent of the respondents are married with 55 percent having an average of 5 members per household. 99 percent of the respondents are educated i.e. they have the capability of being able to read and write. Respondents purchased bread mainly from hawkers (60%) with about 60% of them being aware of the presence of bromate in bread. 40% of the consumers used labeling as a way of identifying bromate free bread. Other methods reported deal with differences in price of bread with same weight, aroma and taste. Result also revealed that 60% of the respondents got to know about the negative effect of bromate from news (both print and mass media). Econometric results show that variables like education, gender, income, prior knowledge of bromate and perception held by respondents of negative implications of bromate significantly influence the willingness to pay for safety labels. Education, gender, income and prior knowledge of bromate positively influence the probability of consumers' decision to pay for safety label, while price of bread and confidence and perception held by respondents of negative implications of bromate on human health influence consumers willingness to pay more for safety labels. The study, thus, suggests a defined market for bread purchases, community based awareness programme and extension of National Agency for Food and Drug Administration (NAFDAC) role beyond media advertisement.

KEYWORDS: Consumer Willingness, Safety Labels, Nigeria, Potassium Bromate, Bread

INTRODUCTION

Consumer demand for high quality food has been on the increase in the developed countries of the world based on their increased knowledge about links between diet and health, awareness of quality characteristics and access to information about new production and processing technology [1]. This is unlike the developing countries where the consciousness of food safety on the part of the consumer has just begun to emerge. Marketing of food products through labels only indicates the nutritional attributes. The safety attributes are yet unpopular in the developing countries [2]. Bread being a staple and common food throughout the world, sometimes has potassium bromate as one of its constituents [1]. In some countries like the USA the use of potassium bromate in bread production has been banned [3]. Research over the years has shown that potassium bromate is a source of food poisoning, but regrettably, its use as a flour modifier vis-à-vis bread production still exists. Thus, as a check on the producers, the consumer must have access to information on quality, through quality signals, such as brand names, labels, advertisement and warranties, etc. [1].

Mensah et al [4] stated that food borne disease illness is a major international health problem and an important factor of reduced economic growth. The problem of food safety in the industrialized world differ considerably from those faced by developing countries. Whereas, traditional methods are used for marketing fresh produce in the developing countries, food processing and packaging are the norms in industrialized countries. In developing countries, a large proportion of ready-to-eat food is sold on the streets. The consumption of street food is common in many countries where unemployment is high, salaries are low, work opportunities and social programs are limited [5]. People who depend on such food are more interested in its convenience than in questions of its safety quality and hygiene. The hygiene aspects of operations are a major source of concern for food officers [6]. Unnevehr [7], reported that enhanced food safety is the key to improvement in health and nutrition, which, after all is the ultimate goal of food security improvement in food availability and will not benefit many of those at nutritional risk without a corresponding improvement in the nutritional quality and safety of food as well as a reduction in food borne illnesses. But in order to address food safety in this context, developing countries must evaluate such investment within the scope of public health, nutrition and food system policies. Kaferstein [8] examined the health and economic consequences of food contamination and how it differs amongst countries and regions of the world. The study found out that the

consequences depend on factors such as climate, and degree of social and economic development. It further discussed prevention and control of food contamination through improvement of hygienic quality of raw food stuff at the agricultural level utilization of food processing technologies and education of food handlers in the principle of safe food preparation.

Caswell [9] stated that countries regulate food safety through the use of processed products or information standards. Process standards specify how the product should be produced and the product standards specify what the final product should contain. Food safety issues are related to the level of trust and confidence consumers have in food industry and in the ability of the government regulatory process to protect them. Food safety is an attribute that must be accepted on trust and can be largely considered as a credence attribute [1]. Swinbank [10] revealed that the provision of food is a basic economic activity in any society. In hunting/gathering economies, time, effort and skill have to be deployed in collecting food and its preparation. The study further stated that a basic requirement is that of an adequate and dependable food supply, to prevent starvation. Furthermore, it needs to be a varied supply so as to ensure a balanced diet; and with increasing levels of real income and life expectancy, this characteristic of food becomes more important. The study explained further another desirable characteristic of food supply. Not all plants or animals, cooked or uncooked can be eaten with impunity. In the course of human history, many lives must have been lost and days of pain endured as society learnt by trial and error which potential food sources were 'safe'. The modern citizen, enjoying the benefit of modern science tends to view 'safety' in general and 'food safety' in particular, as an absolute concept. To assure safe food supply to the consumer, there must be guarantee on the level of potassium bromate residue and its implication on their health status. Potassium bromate when present in food has cancerous effect on the consumer with low tolerance to it. Illness due to contaminated food was perhaps the most widespread health problem in the contemporary world [11]. CSPI, [12] reported that bromate addition to flour causes cancer of the lungs. Also, the Food and Drug Administration in conjunction with the Center for Science in the public interest were petitioned by consumer groups to ban the use of bromate as a flour improver. Thewlis [13] observed that the consumption of bread with high potassium bromate reduces vital nutrient content of the body and this could consequently reduce body immunity against diseases. Ford et al [14], reveal the toxicological implication of bromate consumption in bread with result of low growth and reproductive performance on some

tested individuals by experimentations on rats. Baker [15] reported the health effect of bromate to include irritation to the respiratory tract, gastro intestinal tract, persistent coughing, shortness of breath, nausea, vomiting, diarrhea and pains as symptoms. He further stated that continuous irritation may lead to eye damage, impaired liver and kidney functions.

Food safety is affected by the decisions of producers, processors, distributors, food service operators and consumers as well as government regulations [9]. In developed countries, the demand for higher levels of food safety has led to the implementation of regulatory programs that address different types of safety-related attributes and impose stricter standards for those attributes [9]. NAFDAC [16] posited that some food items particularly bread, contained active ingredients with poisoning and health effect on consumers and accumulation of these ingredients could be dangerous. This explains the efforts to eradicate the use of the ingredients through the Association of Master Bakers. An international programme on chemical safety [17] reported that bromate effect in short-term can cause irritation of the eyes, the skin and the respiratory tract. It further explained the effects on bromate on kidney, gastro intestinal tract and central nervous system by ingestion as well as carcinogenic effects of bromate consumption in the long run.

Due to the high profit margin accruable to bakers when they use bromate in bread, bakers do not care about the level of bromate in their bread and in most case consumers are unable to differentiate bread with and without bromate content. In the same vein, consumers have no means of getting information on safe food. Odigie [3] revealed that the market place is dotted with assorted labels of different brands. To a layman on the street, it is not easy to identify bread-containing bromate. Based on all this associated health related problem of the use of bromate in bread production it has become necessary to look for a way to stop the use of potassium bromate in bread that has been proven to have negative effects on consumers' health. One way of achieving this aim is to force producers to affix safety labels on their product and also examine whether consumers are ready to pay more for safety labels. Arising from the foregoing, the study intends to assess the consumers' socioeconomic characteristics that promote their willingness to pay for safety labels. In this connection, willingness to pay for safety labels implies a good knowledge of the negative implications of potassium bromate in bread. The major objective of this study is to analyse the extent to which bread consumers consider food safety labels before consuming the product. The specific objectives of the

study are: to describe the socioeconomic characteristics of consumers, examine the source of bread purchased by the consumers and determine the factors that influence consumers' willingness to pay for safety labels in bread.

METHODOLOGY

The study was carried out in Benin metropolis, Edo State. Geographically, the state is located between longitude 6° 4' East and 6°43' East and latitude 5° 44' North and 7° 34' North. The state has a population of 2,159,848 on a landmass of 17,802 sq km [18]. The study made use of data obtained mainly from primary sources. The source involves the use of structured questionnaires which were administered. The bread consumers in the study area were randomly selected through a random sampling technique for the sample frame. The analytical tools employed for this study are descriptive statistics (frequency distribution) and probit models. The approach adopted here follows [19] that estimated two econometric models in consumers' willingness to pay for food safety labels in urban Turkey. The first model in [19] aims to estimate the demand shift due to the presence of a label and thus consumer's willingness to pay claiming that pesticide residues in tomatoes are safe. The second model aims to estimate the probability of purchasing under an alternative scenario. A probit model can be expressed as described by [19]. The model is expressed as:

$Q = f(x_i, \beta + e_i)$, where,

Q = Consumers' willingness to pay for safety labels

=1, i.e pay higher price so far as there is safety label

Otherwise = 0

β = Vector of respective parameters

e_i = Independent distributed error term

x_i = Vector of explanatory variable

The explanatory variables are:

x_1 = Income in Naira

x_2 = Age of Consumers in years

x_3 = Level of Education in years

x_4 = Household Size (number of people in the house)

x_5 = Gender (female= 0, Male= 1)

x_6 = Unit price of bread (P_2) in Naira due to payment for label

x_7 = Residue (0= bromate residue is absent, 1= bromate residue is Present)

x_8 = Perception (=0 indicating no chance of health problem due to bromate, and =1 meaning a chance of health problem due to bromate over time)

x_9 = Consumption in kg per week per household
 x_{10} = Knowledge 0 = Not aware of bromate use in bread
 1 = Aware of bromate use in bread

The present study uses the above probit model with the 10 variables.

RESULTS AND DISCUSSION

The socioeconomic characteristics of respondents analyzed are age, household size, level of education, gender, marital status and occupation. The distribution of the respondents by socio-economic variables is presented as follows. The age distribution in Table 1 shows that 73 percent of respondents are in their active working age (i.e. between 21 – 50) with about 27 percent of the respondents in their non-active working age. Male and female respondents were equally interviewed. Findings show gender unbiasedness. The majority of the respondents interviewed (67%) were married while the remaining were single. More than half of the households (55%) had an average size of not more than 5 members per household. Only 12% had between 6 and 10 members in the household. Table 1 shows that 99% of the respondents are educated (i.e. should be able to read and write). Education is expected to influence the

awareness of consumers as regards the negative effect of potassium bromate on consumer’s health. Therefore, respondents sampled in the study are likely to be well informed on issues related to the negative effect of potassium bromate on human health. More than half of the respondents interviewed were workers and employees with occupations ranging from farming to civil service.

Source of Bread Purchased by Consumers

It is evident from Table 2 that consumer mostly purchased their bread from hawkers (60%). The implication of this finding by empirical studies is that bread products purchased from hawkers have been identified as products of bakers that use bromate in the making of bread [16]. Finding revealed that 75 percent of consumers reported that they identify quality bread through labeling and price differentials per unit of bread sold in their locality. In the same vein, the study shows label options chosen by the consumers to include trade mark (42%), NAFDAC number (28%) and ministry inscription (30%). It shows that bakers in the area do not have NAFDAC compliance and there is a tendency that most bread produced by them are not free from bromate. Findings revealed that 60 percent of consumers reported that they got to know about the negative effect of bromate on human beings from news (both print and mass media). The other sources

Table.1 Personal characteristics of Respondent

Age Group (years)	Frequency	Percentage
< 20	22	11
21-30	104	52
31-40	22	11
41-50	20	10
> 50	32	16
Total	200	100
Household Size		
0-5	110	55
6-10	24	12
> 10	66	33
Total	200	100
Level of Education		
No formal	2	1
Primary	10	5
Secondary	20	10
Tertiary	168	84
Total	200	100
Occupation		
Civil Service	120	60
Farming	24	12
Trading	22	11
Student	34	17
Total	200	100

identified include advertisement, friends, sales agent and experience.

Econometric Results

The probit model has a good fit and it is significant at 1 percent or 5 percent level, respectively. This is so since the calculated χ^2 which is the same as the likelihood ratio is 2254.60 for the model. Since this value is greater than the tabulated values of χ^2 at 1 percent and 5 percent significance levels respectively ($\chi^2_{0.01, 189} = 135$, $\chi^2_{0.05, 189} = 124$), the model is considered to be a good fit and consistent with theory. The probit model seeks to explain the probability of willingness to pay for safety labels as a result of the ten identified independent variables. The signs of the coefficients of the independent variables and the significance of the independent variables were estimated to determine the impact of each variable on willingness to pay for safety labels in bread.

Table 3 reveals the results of the probit model which is applied to explain the bread-purchasing behaviour of consumers due to payment for label. The model reveals that the probability of willingness to pay more for safety labels in bread is positively affected by the individual knowledge, income, education, household size and consumption. However, on the other hand, it is negatively affected by price and confidence as regards safety of bromate in bread over time as the perception-variable, indicates. Some factors that influence the probability of willingness to pay for safety labels in the bread were

significant at 1 percent and 5 percent level of significance. Gender and perception about residue in bread and a prior knowledge of effect of bromate on human health were significant at 1 percent level of significance. The significance of gender implies that both male and female consumers are willing to pay for safety labels. Income and educational level of respondents were factors that were significant at 1 and 5 percent level of significance respectively. The implication of this finding is that the more educated consumers have the higher probability of their willingness to pay for safety labels in bread. The negative sign on variable x_8 (perception) implies that consumers' fear of chances of health problem as a result of consuming bread with bromate also increases their probability of willingness to pay for safety labels. Result also revealed that the higher the awareness level of respondent on the bromate, the higher the probability of their willingness to pay more for a safety labels by the consumers.

CONCLUSION AND RECOMMENDATION

The purchase of bread through hawkers by the majority of consumers sampled (60%) is an indication of the low level of awareness of health risks encountered in consuming bread from that source. The number of respondents (40%) who used label as a way of identifying bromate free-bread showed on the average the importance of labeling as a marketing function and its importance in stimulating

Table 2: Source of Bread Purchased by the Consumer

Source	Frequency	Percentage
Supermarket	40	20
Lock up Shops	30	15
Stalls	10	5
Hawkers	120	60
Total	200	100
Method	Frequency	Percentage
Taste	20	10
Aroma	30	15
Labeling	80	40
Difference in Price	70	35
Total	200	100
Source	Frequency	Percentage
Friend	8	4
Experience	16	8
Advertisement	44	22
News	120	60
Sale agent	12	6
Total	200	100

Table 3 Probit Model Result

Variables	Coefficients	t Value Coefficients/S.E
Constant	-3.5296 ^x (0.38708)	-9.118
Income, x ₁	0.00002 ^{xx} (0.00001)	2.000
Age, x ₂	0.00214 (0.00377)	0.5676
Education, x ₃	0.03663 ^x (0.02306)	1.58830
House hold Size, x ₄	0.4693 ^x (0.3177)	1.4804
Gender, x ₅	0.28178 (0.04982)	5.6559
Price, x ₆	-0.00466 ^x (0.01040)	0.44835
Residue, x ₇	0.2043 (0.04874)	-4.1916
Perception, x ₈	-0.9388 ^x (0.04806)	-1.95342
Consumption, x ₉	0.00569 ^x (0.00360)	1.5805
Knowledge, x ₁₀	0.54379 (0.16914)	2.8411
χ^2	2254.606	
Degree of Freedom	189	
N (Sample size)	200	

x- Significance at the $\alpha \leq 0.01$ level ; xx- Significance at the $\alpha \leq 0.05$ level
(Figures in parenthesis are standard error)

consumption of safe bread among consumers depending on their level of education and source of information on health risks associated with bromate content in bread. However, the level of awareness of bromate in bread and willingness to pay is skewed to the active, middle aged group (civil servants), and thus implies that older people who may prefer bread as part of their diet may not want to pay more for safe bread and are not aware nor believe in the harmful effect of bromate in bread. Based on the findings of this study, the following recommendations were reached: There is need to create awareness among the older group who live far from sources of information regarding the harmful effect of bromate in bread. There should also be need for continuous awareness actions to enlighten the illiterates who consume bread. This is important because of their inability to read and write and possibly to comprehend the message through news and media. This form of awareness could be through extension officers who speak and understand their language. Given the fact that consumers sampled are mostly the middle income earners and mainly civil servants by occupation,

it is believed that with rising income their purchasing power will increase and willingness to pay more for safety label increases as well. Consumers themselves can assist the process of safety improvements by partly exposing bakers in their environs to regulatory agencies in order to monitor their activities, so as to guide them against bromate inclusion in bread.

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