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Research Article

## Analysis of Soybean Products Utilization in Abakaliki Metropolis of Ebonyi State, Nigeria

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**Abstract:** This study assessed the utilization of soybean products in Abakaliki Metropolis, Ebonyi State, Nigeria. A multistage sampling technique was employed to select a total of 100 respondents. With the aid of a structured questionnaire, primary data were sourced from the sampled markets. Both descriptive and inferential statistics were employed in analysing the survey data. The results revealed a mean age of consumers as 41 years, who were mostly females and married, with an average household size of 4 persons. The primary occupations of the consumers are trading, civil service, and artisan. Soybean products were marketed and consumed as soy-ogi (fortified pap), soy liquid milk, soy flour, and soy fortified soup in Abakaliki metropolis. The study identified health, economic, and organoleptic factors to influence consumers' utilization of soybean products. Meanwhile, both extrinsic and intrinsic factors were identified as significant constraints to soybean products consumption and utilization among consumers in the study area. The study recommended that marketers and producers should employ intensive advertising for marketing soybean products; producers should improve the organoleptic features of soybean products to enhance acceptability among consumers; Government institutions like NAFDAC should organize a training programme for processors on how to improve the processing hygiene of the products.

### Highlights

- i. Soybean products were marketed and consumed as soy-ogi (fortified pap), soy liquid milk, soy flour, and soy fortified soup in Abakaliki metropolis.
- ii. Health, economic, and organoleptic factors influenced consumers' utilization of soybean products.
- iii. Both extrinsic and intrinsic factors were major constraints to soybean products consumption.

**Keywords:** Soybean, Consumption, Consumers, Constraints, Metropolis.

## Introduction

Nigeria's population, like in many African countries, is seriously facing the challenge of malnutrition, especially acute protein deficiency. Livestock constitutes a significant source of protein for the human body. Still, a combination of factors including the irregular rainfall pattern, high cost of feed and the poor performance of indigenous animals have led to the situation where the prices of such conventional livestock products such as meat, eggs and dairy milk have risen beyond the reach of ordinary man [5]. Given that, because of this problem, an alternative source of high-quality quality cheap protein was sought for and soybean was found to have the potential to meet part of this need.

Soybean (*Glycine max*) is a tropical, subtropical, and temperate legume whose origin can be traced to China around 1100 to 1700 BC. Soybean was introduced to Africa in the 19th century by Chinese traders along the east coast of Africa [17]. Legume was first introduced into Nigeria in 1908, but its first successful cultivation was in 1937 with the Malayan variety, which was found suitable for commercial production in Nigeria [15].

Soybean is valued as a productive and adaptable crop that fits nicely into the cropping patterns of varying agro-climatic conditions of Nigeria. Soybean is generally considered a highly versatile grain that has about 365 applications in the formulation of both human and animal foods and other industrial uses [1]. According to Mshelmbula et al. [15], Soybean is a cheap source of quality protein that is superior to all other plant foods because it has a good balance of the essential amino acids. Its seed has a close protein content and fairly close amino acids to cow milk [18]. The fat from the soybean is an unsaturated type, unlike saturated fats from animal origin, and hence is suitable for heart disease patients [19]. Other than the high protein content, it also has a good amount of calories and fat. Soybean includes 43g of protein per 100g, which is the highest among the pulses. It also contains 19.5g of fat, 21 g of carbohydrate, and provides 432 kcal per 100g [8]. It is one of the best vegetarian food items as far as protein content is concerned, with an average production cycle of 90-110 days from planting to harvesting [6].

Soybean is an essential source of high-quality but inexpensive protein and oil. According to the International Institute of Tropical Agriculture [11], it has an average protein content of 40% and an oil content of 20%. It is the only plant source that contains the eight essential amino acids and is a rich source of polyunsaturated fatty acids (including the good fat-omega 3) and is highly digestible and contains no cholesterol [14]. A “by-product” from the oil production (soybean cake) is used as a high-protein animal feed in many countries. According to Szostak, Głowacka, Kasiczak, Kiełtyka-Dadasiewicz, and Bakowski [23], soybeans have been used as food for centuries, and their excellent nutritional value is well documented. They further noted that soybean contains a good balance of amino acids and have, therefore, tremendous potential to improve the nutritional status and welfare of the families of resource-poor farmers. Sivashankari, Akash, Vijayakumar, Sadvatha, and Narayan [21] averred that soybean has benefits over other grain legumes commonly grown by smallholders, such as groundnut (*Arachis hypogea*), cowpea (*Vigna unguiculata*), and common bean (*Phaseolus vulgaris*). These include lower susceptibility to pests and diseases, better grain storage quality, a large leaf biomass, which gives a soil fertility benefit to subsequent crops, and a secure commercial market for the crop.

According to Kabiru, Hafidi, Jibrin, and Martin [12], Soybean consumption has increased dramatically, improving nutrition, particularly among the urban, poor, and middle-income groups. Soybean fortified products not only contain more protein and minerals than their non-fortified counterparts, but they are considerably cheaper than other sources of high-protein, such as fish, meats, milk, and other protein-rich legumes. Ezema [29] noted that the cost of protein when purchased as soybeans is only about 10-20% of the protein from fish, meat, eggs, or milk. Many Nigerians now incorporate soybeans into their diets, and the Nigerian Government has declared their production and utilization a national priority [25].

The International Development Research Center (IDRC) has sponsored projects that have been instrumental in encouraging the development of more than forty soybean-based foods, including soymilk, yogurt, soyflour, biscuits, baby food, condiments, and breakfast cereals [9]. These products are highly patronized because they are inexpensive, have acceptable tastes, and some are conveniently sold where people congregate. They have become significant sources of the daily protein intake of children and adults [22].

In Nigeria, so many households have started eating soybean foods [2]. A study by IITA carried out in Nigeria showed that the nutritional status of children in soybean-producing/using households was significantly better than those in households that did not use soybean products. The study also provided evidence that soybean processing had a positive impact on the producer's income [10]. Considering the value of soybeans both for satisfying human dietary needs and for compounding livestock feeds, there is a need to assess the utilization of the various soybean products in the Abakaliki metropolis of Ebonyi State.

However, in spite of the wide range of nutritional benefits soybeans and soy products present to the food industry in Nigeria, consumers still hold the view that consumption of soybean products could lead to diarrhoea, indigestion, and other gastric distresses [4]. This is apparently due to the lack of adaptability and unfamiliarity with proper processing and utilization methods. This constitutes a significant barrier to the expansion of the soybean products market. Ungureanu, Jitareanu, Ungureanu, Costuleanu, Ignat, Prigoreanu, & Leonte [26] noted that nutrition and product safety work simultaneously and are very important in shaping consumers' purchase decisions. In a similar view, Wijaya [28] asserted that the effect of nutrition information on individual dietary behaviour may vary over time due to a heightening awareness of diet-disease relationships, improving attitude about healthy eating, and evolving knowledge of food composition that lead to better food choices.

Akinkuolie, Ogunbode, and Adekiya [3] opined that despite the demand and supply gap that has been created by the voracious and excessive consumption of food crops caused by the ever-growing population in Nigeria, soybean products have not thrived well in bridging the gap to guard against food insecurity, hunger, and malnutrition. Since demand for healthy foods exceeds supply, there is a growing pressure on the few staple food crops that provide adequate nutrition and health. This is because, since greater quantities of the traditional food crops which are found on the domestic market are now threatened with inability to provide on a sustainable basis to meet growing demands for nutrition and health as a result of the population explosion.

Despite the high nutritional value of soybeans compared to other legumes, a lack of knowledge of their uses has limited their adoption, production, and processing in non-traditional areas of cultivation [20]. To bridge the gap, efforts are being made by research institutes, Non-Governmental Organizations (NGOs), and industries to promote the production, processing, and utilization of soybeans in Nigeria [25]. Notwithstanding these efforts, it appears not much has been empirically documented on the various forms of soybean products and their utilization in the Abakaliki metropolis of Ebonyi State.

To address this problem, the study described the socio-economic characteristics of consumers of soybean products in Abakaliki metropolis; identified the various forms of soybean products that are marketed and consumed in Abakaliki metropolis; ascertained the factors influencing consumers' utilization of soybean products in Abakaliki metropolis; assessed the extent to which consumers accept and utilize soybean products in Abakaliki metropolis; and analysed constraint to consumers consumption and utilization of the soybean products in Abakaliki metropolis.

## Methodology

### Study Area

The study was carried out in the Abakaliki metropolis of Ebonyi State. The metropolis is delineated into six (6) wards, namely: Kpiri-kpiri area, Abakpa main market area (town centre), rice mill area, Hausa quarters, Timber Shed area, New Layout area, etc. These areas were formed by the two Local Government Areas (LGAs), viz, Abakaliki and Ebonyi Local Government Areas. The recent population of people living in Abakaliki metropolis is 151,723, out of which 72,443 are males while 79,280 are females [16]. Geographically, it falls within the sub-tropical belt with two peaks of annual rainfall [18]. The pattern of rainfall defines the farming system or season. The annual rainfall is heavy, mainly between the months of May and September. The area is generally on the plain land with some hills found in Abakaliki urban such as the Juju hill. The soil type is predominantly sandy loam, with some swampy areas. The area lies on latitude 4°N and longitude 8°E (EBADep, 2008). Some local areas around the city are occupied by subsistence farmers, while within the city are occupied by some traders, artisans, and petty businesses, including civil and public servants and students. Significant markets in the metropolis are: Abakpa primary market, Meat market, Regional market, Kpiri-kpiri market, Rice mill market, Eke-Aba food stuff market, among other small food commodity markets scattered all over the state. Soybeans are among the common commodities marketed in these markets.

### Sampling Techniques

A two-stage sampling technique was used in the selection of the respondents for this study. Stage 1 involved the purposive selection of four (4) primary markets where foodstuff is marketed in the metropolis (Table 1). This is to ensure that only markets where soybeans and their products are marketed were selected for the study. Stage 2 involved the random selection of 25 customers who patronize these markets for soybeans and their products. Thus, a total of one hundred (100) respondents were selected from the four (4) markets and used as the sample size.

**Table 1:** Sampled Markets in Abakaliki Metropolis

Market	No. of Respondents
Regional market	25
Eke-Aba market	25
Kpiri Kpiri market	25
Meat market	25
<b>Total</b>	<b>100</b>

### Data Collection and Analysis

Data for this study were collected from the primary source only. The data were collected directly from the respondents in the sampled markets. This was done with the aid of a structured questionnaire that was administered to the 100 sampled respondents, while interview schedules were administered to the illiterate respondents, and their responses were recorded by the researcher. The study employed both descriptive and inferential statistics in realizing the objectives of the study. Specifically, objectives (i), (ii), and (iv) were achieved with the aid of descriptive statistics such as mean, percentage, and frequency distribution. Principal Component Factor analysis was employed to achieve objectives (iii) and (vi). Finally, Ordinary Least Squares multiple regression was used to actualize objective (v).

## Regression Model

The Ordinary Least Squares multiple regression model that was used to determine the influence of socio-economic characteristics of consumers on the utilization of soybean products in Abakaliki metropolis was stated as:

$$SBU = f(PHBS, PSP, PT, NA, HHI, EDU, GEN, AGE, CT) \dots\dots\dots \text{Implicit form (eqn 1)}$$

$$SBU = \alpha_0 + \beta_1PSHB + \beta_2PSP + \beta_3PT + \beta_4NA + \beta_5HHI + \beta_6EDU + \beta_7GEN + \beta_8AGE + \beta_9CT + et \dots\dots \text{Explicit form} \dots\dots (\text{eqn 2})$$

Where:

- SBU = Soybean utilization (various uses of soybean products)
- PHBS = Perceived health benefit of soybean (dummy)
- PSP = Price of soybean products (naira)
- PT = Perceived taste (dummy)
- NA = Nutritional awareness (dummy)
- HHI = Households' income (naira)
- EDU = Educational Attainment (years spent in formal schooling)
- GEN = Gender (1 = male, 0 = female)
- AGE = age (years)
- CT = Cultural taboo (dummy)
- $\alpha$  = Constant
- $\beta_1 - \beta_9$  = Coefficients of estimate
- et = Stochastic error term

## Results and Discussion

This section presents the analysis of data, presentation, and discussion of results in line with the specific objectives of the study.

### Socio-economic Characteristics of Soybean Products Consumers

This section examines socio-economic variables of consumers of soybean products. The variables investigated here include: age, sex, marital status, household size, educational qualification, annual income, primary occupation, and years of patronage of soybean products. The result of the analysis, as shown in Table 2, showed that the mean age of the consumers was 41 years. This is an indication that most of the soybean product consumers in the study area are middle-aged people who are still within their active, productive age. Thus, suggesting that soy-product consumers have the vigour to undertake the rigours involved in processing soybeans into forms of consumption. This follows the finding of Akinkuolie et. al. [3], who identified the average age of soy food consumers in Ghana to be 39 years.

The result further shows that the majority (69%) of the consumers were females, whereas the rest were males. This tends to agree with the traditional norm in Nigeria, where it is believed that food processing is a common practice among women; hence, the dominance of women as major consumers of soybean products reflects gender roles in food processing in this part of the world. This is in line with the findings of Saleh [19], who reported that 67% of consumers of soybean products in Ghana were females.

It was further observed that the majority (80%) of the respondents were married as against 20% who were not married. This implies that soybean products serve as family food and drink, which may not be unconnected with the increasing awareness of nutritional and health benefits of soybean products. In support of this, Akinkuolie et al. [3] averred that soy foods have low cholesterol, high protein content, and facilitate the retention of bone mass, thereby reducing fragile bone condition. It also agrees with the report of Ninkuu et al. [17], who posited that over 54.0% of consumers of soybean products in Orumba South LGA of Anambra State were married.

The result equally showed a mean household size of the consumers to be four persons, with the majority (71.0%) of the consumers having between 4-5 persons. This suggests that soybean products in Abakaliki metropolis have a small household size. Obviously, due to the biting economic condition, which has forced many couples to resort to keeping the number of children they can afford. More so, the increasing awareness of households on family planning must have compelled many households to reduce their household size.

Formal education has been reported to have a significant impact on shaping the consumption behaviour of an individual. From the result, it was observed that the majority (95%) of the consumers have acquired various levels of formal education, thus making the consumers literate enough to know the health and nutritional benefits of consuming soybean products. More so, the high number of literate population will facilitate the diffusion and adoption of any improved technology on soybean products processing and utilization in the study area.

The annual income distribution of the respondents shows an average of ₦214,500. This is an indication that the respondents are low-income earners, which is a reflection of the harsh economic state in the country. This economic reality has forced low to middle-income earners to resort to a cheap source of protein such as soybean products.

Meanwhile, the primary occupations of the consumers are civil servants (35%), traders (33%), artisans (20%), and farmers (12%). This implies that consumers of soybean products in the study area are mainly civil servants and traders. These consumers have, on average, consumed soybean products for 21 years. This implies that soybean products have been introduced into the study area for a relatively long time now. More so, high awareness created through various channels may have also enhanced the acceptability of soybean products in the area.

**Table 2:** Percentage Distribution of the Socio-economic Characteristics of Consumers of Soybean Products

Socio-economic variable	Frequency (n=100)	Percentage	Mean
Age			
≤ 30	25	25	41
31 – 40	14	14	
41 – 50	46	46	
Above 50	15	15	
Sex			
Male	31	31	-
Female	69	69	
Marital status			
Married	80	80	-
Unmarried	20	20	
Household size			
2 – 3	10	10	4
4 – 5	71	71	
6 – 7	19	19	
Educational qualification			
Never attended school	5	5	-
Primary education	20	20	
Secondary education	52	52	
OND/NCE	10	10	
B.Sc/HND	13	13	
Annual income			
≤ 100,000	35	35	214,500
100,001 – 150,000	25	25	
150,001 – 200,000	15	15	
Above 200,000	25	25	
Primary occupation			
Trader	33	33	-
Artisan	20	20	
Civil servant	35	35	
Farmer	12	12	
Years of patronage			
1 – 10	55	55	21
11 – 20	30	30	
21 – 30	15	15	

Source: Field Survey, 2024



### Forms of Soybean Products Marketed and Consumed in Abakaliki Metropolis

Soybean derivatives have been developed for use at homes and hospitals as they are good substitutes for conventional food ingredients like melon, cow milk, and cowpea. In this view, this section examines the various forms of soybean products that are marketed and consumed in Abakaliki metropolis. The result, as presented in Table 3, showed that there were multiple forms of soybean products that were marketed and consumed in Abakaliki metropolis. These forms include: soy-ogi (fortified pap) (72.0%), soy liquid milk (64.0%), soy flour (56.0%), and soy fortified soup (53.0%). This suggests that soybeans have been developed into a variety of products that are enjoying acceptability and patronage among consumers in the study area. This is in agreement with the assertion of Sivashankari et al. [21] that the acceptability of soybean products has been enhanced by modification of processing methods. This also conforms to Kudelka et al. [14] finding that soybean derivatives such as soy-garri, soymilk, soy-ogi, among others, have been developed and found to be suitable substitutes for more conventional food ingredients like melon, cow milk, and cowpea. Thus, the value of soybeans both for satisfying human dietary needs and for compounding livestock feeds cannot be overlooked. There is therefore an urgent need for policy-makers to stimulate and encourage the large-scale production of soybeans.

**Table 3:** Forms of Soybean Products Marketed and Consumed

Soybean Products	Frequency (n=100)*	Percentage (%)
Soy-ogi (fortified pap)	72	72.0
Soy liquid milk	64	64.0
Soy flour	56	56.0
Soybean fortified garri	38	38.0
Soy powder milk	25	25.0
Soy fortified soup	53	53.0

### Factors Influencing Consumers' Utilization of Soybean Products in Abakaliki Metropolis

Factors influencing consumers' utilization of soybean products in Abakaliki metropolis were ascertained and analysed using factor analysis. The interpretation boils down to identifying variables that load high in each component matrix, which were used in naming the factors. According to Kaiser's [13] rule of thumb, variables with a coefficient of 0.40 or more have high loading and may be used in naming a factor. This rule has been generally applied [7]. Hence, only variables with a factor loading of 0.40 and that are at 10% overlapping variance were used in naming the component factors in this analysis. The result presented in Table 4 shows that there are three major factors influencing consumers' utilization of soybean products in the study area. These factors were based on the extract of variables that loaded high according to the responses of the respondents. These factors were health (Factor I), economic (Factor II), and organoleptic (Factor III). Factor I was named the health factor because variables that loaded high relate to this factor. These variables were: nutritional value (0.495), health benefits (0.712), and product safety (0.800).

Factor II, which includes relative cost (-0.924), income level (0.755), price of substitute products (0.858), product availability (0.708), convenience in preparation and consumption (0.715), was extracted and named economic factor. Finally, Factor III was named the organoleptic factor because variables that loaded high were related to it. These were: taste (0.756) and flavour (0.579).

Increasing consumers' demand for soybean products has been driven by recent advances in health and nutritional claims [14]. According to Talierno, Whetten, Miranda, and Mian [24], plant breeders have developed soybean varieties with low levels of *linolenic* acid. These "Low-Lin" varieties allow food processors and consumers to benefit from the functionality of soybean products without adversely affecting health. Uwaoma [27] observed that the dramatic increases in soy food sales are primarily credited to the Food and Drug Administration's (FDA) approval of health claims for soy regarding their cholesterol-lowering ability (University of Kentucky in the New England Journal of Medicine). Old Chinese herbal institution suggests that soybean was a specific remedy for the proper functioning of the liver, kidney, heart, and stomach.

The demand for soy products is also influenced by price, which is an economic factor. Adam et al. [2] argued that the increase in the consumption of processed foods in Western diets increased the demand for low-cost and highly functional oils. In the United States, Brazil, and China, the oil added will likely come from soybeans. Today's supermarkets are full of processed foods with vegetable oil on the ingredient list. Oil is added for taste, nutrition, and cooking performance. Similarly, Hammond [30] surveyed the perception of soy products consumers, processors, and marketers and found that convenience, taste, price, health benefits, health knowledge, health motivation, and nutritional awareness were among the factors that influenced demand and consumption of soy products in Ghana.

**Table 4:** Factors Influencing Consumers' Utilization of Soybean Products

Factors	Factor I Health	Factor II Economic	Factor III Organoleptic
Nutritional value	0.495	-0.424	0.351
Taste	-0.198	-0.126	0.756
Relative cost	0.145	-0.924	0.152
Health benefits	0.712	-0.292	0.301
Flavour	-0.229	0.014	0.579
Product safety	0.800	0.086	0.089
Income level	-0.508	0.755	-0.038
Price of substitute products	-0.211	0.858	-0.124
Product availability	-0.007	0.708	0.333
Convenience in preparation and consumption	0.200	0.715	0.300

**Source:** Field survey, 2024. Significant based on Kaiser Normalization

### Consumer's Acceptance and Utilization of Soybean Products

This section assesses the extent to which soybean products have been accepted and utilized by consumers in the Abakaliki metropolis. The result obtained is presented in Table 5. The result shows the extent to which consumers accept and utilize soybean products in the study area. The consumers ranked the following soybean products high: utilization as liquid milk (90.0%), fortification of soybean with maize (75.0%), utilization as soybean flour (85.0%), soybean powdered milk (85.0%), soybean fortified garri and tapioca (55.0%) and use as animal feed (90.0%) while the soybean products that rank low include; use as cooking gas (80.0%), fortification of soybean with cocoyam (75.0%), and soy-*ebiripo* (70.0%). This implies that the extent to which soybean products have been accepted in Abakaliki metropolis is relatively high, considering the number of soy products that the consumers patronize far outweighs those underutilized. In support of this finding, Uwaoma [27] reported that soybean is used to fortify local foods so as to increase the protein content/quality of such foods. This includes mixing soybean with maize flour, cassava flour, wheat flour, etc, to make fufu. This is also in conformity with the reports of Naik and Gleason (2010); Schwarz and Allwood (2007), that soybean is used to fortify cereal products such as bread, cookies, sandwich spreads etc.

**Table 5:** Percentage Distribution of the Extent to Which Consumers Accept and Utilize Soybean Products

Soybean products	Response option (n=100)*	
	High	Low
Utilization as liquid milk	90 (90)	10 (10)
Use as cooking oil	20 (20)	80 (80)
Utilization as soybean cake/meal	40 (40)	60 (60)
Fortification of soybean with maize (Soy-tortilla)	75 (75)	25 (25)
Fortification of soybean with cocoyam	25 (25)	75 (75)
Utilization as soybean flour	85 (85)	15 (15)
Soybean fortified 'garri' and tapioca	55 (55)	45 (45)
Soybean powdered milk	85 (85)	15 (15)
Soy- <i>ebiripo</i>	10 (30)	90 (70)
Use as animal feed	90 (90)	10 (10)

**Source:** Field Survey, 2024. \*Multiple responses recorded; Figures in parentheses are in percentage.

### Constraints to Consumers' Consumption and Utilization of the Soybean Products

This section deals with factors that constrain the consumers' consumption and utilization of the soybean products in the area studied. Principal component analysis was also used to extract these factors, and those factors that loaded high were used in naming the components. The result of the analysis, as presented in Table 6, categorized the constraints component into two: extrinsic and intrinsic factors. Using varimax principal component analysis with Kaiser's normalization and rule of thumb, the identified extrinsic factors were: novelty and inertia to change (0.693), inadequate knowledge on appropriate processing technique (0.837), unhygienic processing environment (0.724), high cost of processing (0.930), and poor storage stability (0.843).

While it cannot be cooked and eaten like any other bean (0.895), non-palatability and beany/rancid off flavour (0.492), and indigestibility of soybean protein (-0.786) were identified as intrinsic factors that constrain consumers' consumption and utilization of soybean products in Abakaliki metropolis. Most likely, long cooking time is not a factor that constrains consumers' consumption and utilization of soybean products. In addition to inadequate knowledge on appropriate processing techniques, an unhygienic processing environment, high cost of processing, and poor storage stability were external factors that constrain the consumers' consumption and utilization of soybean products. The findings of Boluwaji et al. [5] indicated that a poor transportation system, inadequate financial resources, lack of market information, lack of processing facilities and methods, and non-availability of improved storage facilities were the critical constraints to the processing and use of soybean products in the area. Likewise, novelty and inertia to change, inability to be cooked and eaten like any other bean, non-palatability, and beany/rancid off flavour and indigestibility of soybean protein were identified as production factors that constrain consumers' consumption and utilization of soybean products. This is in line with Garima et al. [8], observation that consumers face a number of constraints in utilizing soybean products. He identified the constraints to include: novelty and inertia to change; cannot be cooked and eaten like any other bean; long cooking time; non-palatability and beany/rancid off-flavours; the scenario of no utilization, no production, no beans on the open market, and no utilization; and inadequate knowledge on appropriate processing techniques.

**Table 6:** Varimax Rotated Component Matrix of the Constraints to Consumers' Consumption and Utilization of the Soybean Products

Variables	Component 1 Extrinsic	Component 2 Intrinsic
Novelty and inertia to change	0.693	-0.137
Cannot be cooked and eaten like any other bean	0.180	0.895
Long cooking time	-0.153	-0.042
Unpalatability and beany/rancid off flavour	-0.040	0.492
Inadequate knowledge of the appropriate processing technique	0.837	0.073
Unhygienic processing environment	0.724	-0.432
High cost of processing	0.930	-0.105
Indigestibility of soybean protein	-0.345	-0.786
Poor storage stability	0.843	0.293

## Conclusion and Recommendations

This study assessed soybean products utilization in the Abakaliki metropolis of Ebonyi State. The result showed the various forms of soybean products marketed and consumed in Abakaliki metropolis as soy-ogi (fortified pap/maize), soy liquid milk, soy flour, and soy fortified soup. However, the health, economic, and organoleptic factors influenced consumers' demand for soy products utilization.

Due to the fact that soybean products are utilized by consumers in the study area, it is imperative to make necessary recommendations, considering the result of the study, in order to provide information that is helpful for policy making. Based on the findings from the study, the following recommendations were put forward:

- The marketers and producers should engage in intensive advertisement of soybean products through mass media and electronic media so as to increase consumers' awareness of safety, nutritional value, and the health benefits of consuming soybean products in order to attract increased patronage.
- The marketers and producers of soybean products should improve the organoleptic features of soybean products, such as taste and flavour, that will be acceptable to consumers.
- The Government and other relevant institutions should provide adequate technology that the marketers and producers can use to process and preserve soybean products in a form that will retain the quality of the products.

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