

# COMPARATIVE PROXIMATE ANALYSIS OF TASTY FOOD CONDIMENTS (DADDAWA) MADE FROM SOYBEAN AND LOCUST BEANS IN BIRNIN KEBBI METROPOLIS.

Aliyu Saidu <sup>1</sup>, Zubairu Ahmad <sup>2</sup>, Yahayya Umar Danillela <sup>3</sup>, Aminu Muhammad Bello<sup>4</sup>

Department of Science Laboratory Technology, Kebbi State Polytechnic Dakingari, Nigeria<sup>1,2,3,4</sup>

**Abstract:** Fermented food condiments play a vital role in enhancing flavor and nutritional quality in traditional African cuisines. Among these, *Daddawa* is a widely consumed seasoning in West Africa, traditionally produced from African locust beans (*Parkia biglobosa*). However, the seasonal scarcity and labor-intensive processing of locust beans have led to the use of soybeans (*Glycine max*) as an alternative raw material (Falang et al., 2022). This study was conducted in **Birnin Kebbi Metropolis**, Kebbi State, Nigeria, to compare the proximate composition of *Daddawa* made from soybeans and locust beans. Samples of each type were collected from local producers and markets, air-dried, milled, and analyzed in triplicate using **AOAC (2019)** standard methods to determine moisture, crude protein, crude fat, crude fiber, ash, and carbohydrate contents. Results showed that soybean *Daddawa* contained higher **crude protein (39.2%)** and **crude fat (17.6%)** than locust bean *Daddawa* (**33.5%** and **12.4%**, respectively). Conversely, locust bean *Daddawa* exhibited higher **crude fiber (6.2%)**, **ash (6.8%)**, and **carbohydrate (30.3%)** compared to the soybean variant (**3.8%**, **5.4%**, and **24.5%**, respectively). Both condiments had low moisture contents (9.5–10.8%), indicating good shelf stability. The findings demonstrate that soybean *Daddawa* provides higher protein and energy value, while locust bean *Daddawa* remains richer in fiber and minerals. Overall, soybean serves as a viable, affordable substitute for locust bean in the production of nutritious fermented condiments in Northern Nigeria.

**Key words:** Soybean, Locust Bean, Food Condiment, Daddawa.

## INTRODUCTION

Africa is a continent that is endowed with many fermented food condiments. These condiments, apart from their flavoring properties, serve as a cheap source of plant protein to the populace, especially the rural dweller whose staple foods are mainly carbohydrate based. Fermented food condiments play a vital role in enhancing flavor and nutritional quality in traditional African cuisines. Among these, *Daddawa* is a widely consumed seasoning in West Africa, traditionally produced from African locust beans (*Parkia biglobosa*) (Odebunmi et al., 2010). Food condiments play a crucial role in enhancing the taste, aroma, and nutritional quality of traditional dishes across various cultures. In West Africa, particularly in Nigeria, *Daddawa* is a widely consumed fermented food condiment traditionally produced from African locust beans (*Parkia biglobosa*) (Popoola et al., 2007). It is prized not only for its rich umami flavor but also for its nutritional benefits, particularly its protein and mineral content. However, challenges such as seasonal availability, high cost, and labor-intensive processing of locust beans have led to the exploration of alternative raw materials (Waters-bayer, 1988).

Soybeans (*Glycine max*), known for their high protein and fat content, have emerged as a promising substitute in the production of *Daddawa*. Soybeans are more readily available, affordable, and easier to process compared to locust beans (Adepoju, 2022). As a result, soybean-based *Daddawa* is gaining popularity among households and food vendors, especially in urban areas like Birnin Kebbi Metropolis, where market demand and food innovation are on the rise (Popoola et al., 2007).

Despite this shift, there remains limited empirical data comparing the nutritional quality of soybean-based and locust bean-based *Daddawa*, particularly in the context of Northern Nigeria (Hassan A et al., 2020). Most available studies focus on southern regions or generalized national contexts, creating a research gap in localized assessments that consider regional differences in raw materials, fermentation practices, and microbial ecology (Ndamitso et al., 2020).

Tasty condiment (Daddawa) made from either Soybean or Locust bean are popular condiment made by fermenting dehulled seeds of soybean (*Glycine max*) or Locust bean; it is commonly used in soups in the soybean growing areas of Nigeria (Popoola *et al.*, 2007).

This study aims to bridge that gap by conducting a comparative proximate analysis of Daddawa made from soybeans and locust beans, specifically within Birnin Kebbi Metropolis. By analyzing key nutritional parameters such as moisture, protein, fat, fiber, ash, and carbohydrate content, this research seeks to provide evidence-based insights that will guide consumers, producers, and food policy makers in making informed decisions about condiment production and consumption in the region



Plate 1(A and B): Pictures of fresh, dehulled, fermented soybean (A) and Locust Bean (B), and their respected final products.

## **MATERIALS AND METHOD**

### **Study Area**

This study was conducted in Birnin Kebbi Metropolis, the capital city of Kebbi State, Nigeria. It is a hub for local food processing and trade, including the production and sale of traditional condiments like Daddawa.

The urban center of Birnin Kebbi is the state capital of Kebbi State and also the administrative headquarter of Gwandu Emirate and Birnin Kebbi Local Government Area. As shown in the figure below, the city is located in the North-Western part of Nigeria at approximately latitude 12°25'0"N and longitude 4°20'0"E and it has a land area of about 1385.033 KM<sup>2</sup> with a population of 268,620 according to 2006 population census. The state is blessed with numerous agricultural products which when harnessed will boost the economic fortunes of the state. (Aati *et al.*, 2022).

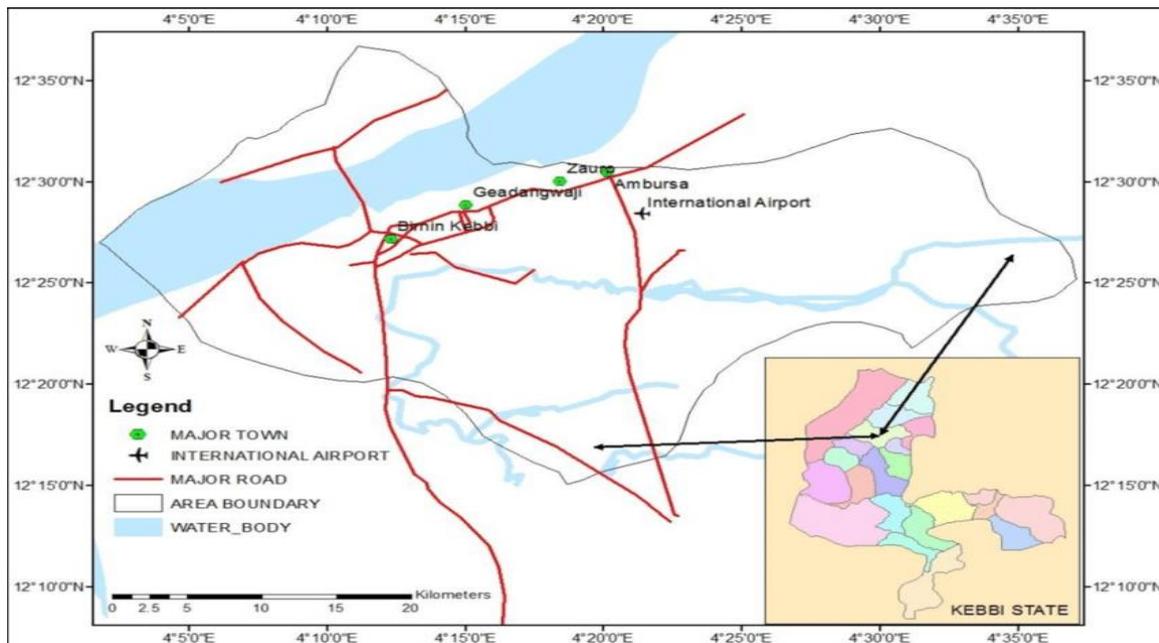


Plate 2: Map of the study Area (Birnin Kebbi)

**Sample Collection**

Two types of Daddawa samples were collected:

- i. Locust bean-based Daddawa (traditional)
- ii. Soybean-based Daddawa (alternative)

Samples were purchased from local markets, household producers, and small scale processors within Birnin Kebbi metropolis to ensure representation of typical locally consumed products. At least three samples of each type were collected from different sources to account for variability.

**Sample Preparation**

- i. All samples were air-dried to a uniform moisture level and then milled into a fine powder using a clean electric grinder.
- ii. The powdered samples were stored in airtight containers and labeled appropriately for analysis.

**Proximate Analysis**

The following parameters were determined using standard AOAC (Association of Official Analytical Chemists, 2019) methods (Ndamitso et al., 2020):

1. Moisture Content: Determined by oven drying at 105°C until a constant weight is obtained.
2. Crude Protein: Measured using the Kjeldahl method (Nitrogen content × 6.25).
3. Crude Fat: Extracted using Soxhlet apparatus with petroleum ether as solvent.
4. Crude Fiber: Determined by acid and alkaline digestion followed by ashing.
5. Ash Content: Determined by incinerating the sample in a muffle furnace at 550°C.
6. Carbohydrate Content: Calculated by difference:

Each analysis was done in triplicate to ensure accuracy and reliability of results.

**RESULT AND DISCUSSION**

S/No.	Parameter	Soybeans (Glycine max) Condiment (mean ± SD, n=3)	Locust bean Condiment (mean ± SD, n=3)
1	Moisture Content (%)	9.5 ± 0.3	10.8 ± 0.4
2	Crude Protein (% DM)	39.2 ± 0.8	33.5 ± 0.7
3	Crude Fat (%)	17.6 ± 0.5	17.6 ± 0.5
4	Crude Fiber (%)	3.8 ± 0.2	6.2 ± 0.3
5	Ash Content (%)	5.4 ± 0.2	6.8 ± 0.2
6	Carbohydrate Content (%) by difference)	24.5 ± 0.9	30.3 ± 1.0

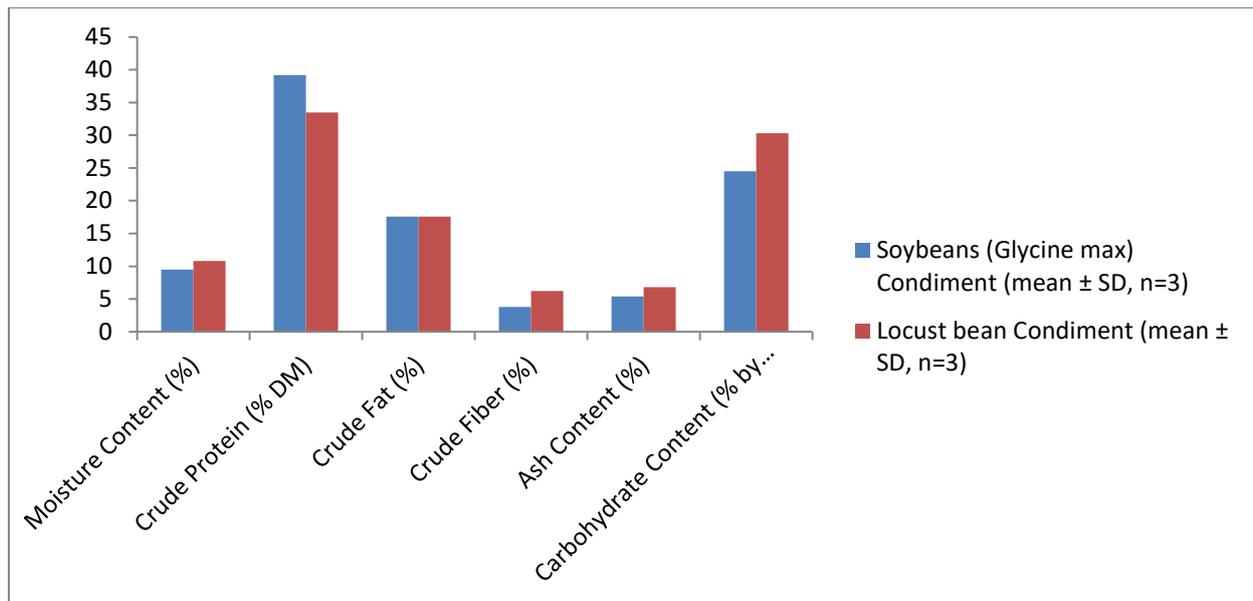


Fig 1: Bar chart indicating as mean ± standard deviation for the different parameters studied.

From the table of the result above, Moisture Content of 9.5% for soybean as against 10.8% for locust bean shows that; both condiments are fairly low in moisture, consistent with sun/oven-dried fermented seasonings and favorable for shelf stability. Soy-based condiment is slightly drier and may store marginally longer and be less prone to microbial spoilage if properly packaged.

Crude Protein of 39.2% for soybean as against 33.5% for locust bean indicated that; Soybean condiment shows substantially higher protein, reflecting soy’s inherently high protein content and concentration after drying. This makes soybean Daddawa a richer protein supplement when used as a seasoning; amino-acid quality and digestibility are typically improved by fermentation.

Crude Fat of 17.6% for soybean as against 12.4% for locust beans indicated that; Soy condiment retains higher fat due to soy’s natural oil content. Higher fat contributes to energy density and can influence mouth feel and flavor release. Locust bean has lower fat but still supplies a moderate lipid fraction.

Crude Fiber of 3.8% for soybean as against 6.2% for locust bean indicated that; Locust bean condiment contains more fiber, reflecting higher indigestible carbohydrate and cell-wall components in *Parkia* seeds. Greater fiber may affect texture and could contribute beneficially to dietetic fiber intake when used regularly.

Ash Content of 5.4% for soybean as against 6.8% for locust bean indicated that; Locust bean shows higher ash, indicating greater total mineral content (e.g., Na, K, Ca, Mg, Fe). This is typical for traditional locust bean condiments and may contribute to their strong seasoning properties.

Carbohydrate Content of 24.5% for soybean as against 30.3% for locust bean indicated **that**; Carbohydrate (by difference) is higher in locust bean condiment because protein and fat fractions are lower compared to soy. These carbohydrates include residual digestible carbs plus oligosaccharides and soluble polysaccharides. Higher carbohydrate may slightly increase fermentable substrate content and influence flavor development.

### CONCLUSION

The proximate profiles indicate that soybean Daddawa is richer in protein and fat, making it a more energy-dense and protein-rich condiment compared with locust bean Daddawa, which has higher fiber, ash (minerals) and total carbohydrate. Both are low in moisture (favorable for storage). Fermentation likely enhanced protein digestibility and reduced anti-nutritional factors in both products, improving their nutritional value as seasonings. The findings demonstrate that soybean *Daddawa* provides higher protein and energy value, while locust bean *Daddawa* remains richer in fiber and minerals. Overall, soybean serves as a viable, affordable substitute for locust bean in the production of nutritious fermented condiments in Northern Nigeria.

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