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Comparison of Functional Properties of Fufu Powder and Sensory Evaluation of the Dough Produced from TME 419, TME 693 and IBAO 11371 Cassava Varieties

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Abstract: Fufu is a dough-like food made from fresh or fermented cassava, found in West African. Cassava is known to be bulky, difficult to handle and transport to distant markets. This study comparedthe physico-chemical, functional properties and pproximate composition of fufu powder, and sensory evaluation of dough produced from IBAO11371, TME693 and TME419. The production was done in the International Institute of Tropical Agriculture (IITA), Ibadan, Oyo State, Nigeria. Cassava tubers were processed into fufu powder by peeling, retting, sieving, drying and milling. Physico-chemical, functional propertiess andproximate composition of the fufu powders were determined and sensory evaluation was also carried out on the dough. Data were subjected to a one-way Analysis of Variance (AOVA) using SPSS 20 while Duncan Multiple Range Test was used to separate the means at 5% significant level. The study revealed that the fufu powder produced from IBAO11371 had the highest pH (6.120 ± .000[a]) and lowest TTA (0.591 ± .003[c]). IBAO11371 had the lowest water absorption capacity (121.835 ± .021[c]), swelling capacity (15.350 ± .212[c]) and starch solubility (68.750 ± .028[c]), TME419 had the highest water absorption capacity (126.100 ± .424[a]) and swelling capacity (17.355 ± .035[a]), while TME693 had the highest pasting viscosity (33.550 ± .212[a]) and starch solubility (71.840 ± .028[b]). proximate composition of fufu powder produced from IBAO 11371 had the highest crude protein (2.24 ± .064[a]) and crude fat (1.16 ± .021[a]) contents, fufu powder produced from TMEB 419 had the highest crude fibre (0.38 ± .014[a]), ash (0.54 ± .021[a]) and moisture (13.09 ± .028[a]) contents, whereas fufu powder produced from IBAO 11371 had the highest crude fat (1.16 ± .021[a]), and lowest crude fibre (0.22 ± .014[b]), ash (0.33 ± .021[b]), moisture (12.54 ± .028[b]) and carbohydrate (83.53 ± .021[c]) contents. It was observed that carbohydrate was the major component in the powder samples. The carbohydrate content of TMEB 419 powder had slightly higher carbohydrate content (84.44%) which was similar to theresult which stated that the carbohydrate content of TME 419 flour was 85.44%. TME419 had the highest crude fiber (0.380 ± .014[a]) while TME693 had the highest carbohydrate (85.025 ± .001[a]) contents. The colour of fufu powder revealed that TMEB 419 and TMEB 693 were both whitish but IBAO 11371 was yellow. The sensory evaluation results indicated that fufu dough produced fromIBAO 11371 which was yellow in colour was generally acceptable among the fufu dough produced from different cassava cultivators. In conclusion, this study indicated that IBAO11371 has suitable proximate properties and was generally acceptable after the sensory evaluation.

Keywords: Proximate Composition, Functional Properties, Sensory Evaluation, Fufu Powder, Fufu Dough, Cassava, Physico-Chemical

1. Introduction

Fufu (or fufuo, foofoo, fou fou) is a wet paste made from cassava [1]. It is a dough-like food made from fresh or fermented cassava, found in West African [2]. It is often made in the traditional Ghanaian, Ivorian, Liberian, and Cuban method of separately mixing and pounding equal portions of boiled cassava with green plantain or cocoyam, or by mixing cassava/plantains or cocoyam flour with water and stirring it on a stove [2]. It is a fermented cassava product which is traditionally produced and consumed in some West African countries especially in Nigeria, Cameroon, and Ghana [2]. The sour taste, flavor, appearance, and texture are generally recognized as the main factors that determines the acceptability of the product (fufu) [2]. The consumer considers the product best when it has a smooth texture, a characteristic sour aroma, and a creamy-white color [2]. The viscosity is then adjusted based on personal preference and eaten with broth-like soups.

Fufu is eaten with the fingers, and a small ball of it can be dipped into an accompanying soup or sauce. Nigerian fufu is an African food recipe that originated from Nigeria but common in most African countries [2]. Details of different methods of fufu preparation vary from locality which greatly affects the quality of the finished products. Fufu is traditionally sold in a wet form which renders it highly perishable [2]. The preference for fufu as a staple food is gradually developing in West Africa [6]. Fufu is usually processed by household and rural processors whose practices may differ by culture and region. The variation in processing methods may change the texture and sensory properties of cooked dough [7]. This knowledge of the textural attributes of products from different varieties would reduce the challenges of balancing the requirement of products from different varieties would reduce the challenges of balancing the requirements of producers with those of end-users in terms of their preferred quality traits [8].

Powdered fufu processing and packaging is an innovative process even though it's just emerging and not still practiced for a long scale as most other food products business such as sorghum, millet, maize etc. [3]. It's a prospective lucrative business for young and aspiring entrepreneurs in the regions where the raw materials of this food product can be easily sourced and the product itself has a potential market [3]. The business qualities as an innovative activity such as having a unique name of its own and involving selling a food product uniquely independent of all other business in the food industry. It prevents post-harvest losses, but still calling for massive investment by aspiring entrepreneurs especially in the west and central African regions where the product is mainly consumed [3]. Processing cassava in various food forms like fufu flour has the potential to help Nigeria improve its food security, diversify its food manufacturing base, generate more income, raise employment, and achieve trade balance [3]. Hence, this study compared the functional properties and proximate composition of fufu powder, and sensory evaluation of dough produced from three varieties of cassava tubers (TME 693, TME 419 and IBAO 11371).

2. Materials and Methods

2.1. Materials

The fufu powder was produced from three different varieties of cassava tubers (TME 693, TME 419 and IBAO 11371) which was obtained from International Institute of Tropical Agriculture (IITA) Ibadan, Oyo state, Nigeria. Other materials used also include palm oil, salt, onions, vegetables and beef which were obtained at the local market in Orita-Challenge, Ibadan, Oyo state, Nigeria.

2.2. Processing of Cassava Tubers into Powdered Fufu

The cassava tubers were peeled manually with a sharp knife [4]. It was washed and retted in water for 4 days then sieved with a plastic sieve into another clean water [4]. The sieved cassava was left in the water for 6 hours and then put in a cloth bag [4]. The cloth bag was placed on a clean surface for about 24 hours for dewatering after which it was pressed with a jack for about another 24 hours [4]. After pressing, the cake was scattered with hands and placed on a tray for oven drying [4]. It was oven dried for 2 days at 60°C and then milled as revealed in Figure 1 [4]. The milled fufu powder was sieved with a fine mesh and was packaged and kept for further analysis [4].

Fresh Cassava Tubers
▼
Peeling
▼
Washing
▼
Retting
▼ **(for 4 days)**
Sieving
▼
Bagging in a cloth bag
▼
Dewatering
▼ **(for 24hrs)**
Pressing
▼ **(for 24hrs)**
Drying
▼ **(In the oven for 2 days at 60°C)**
Dry milling
▼
Powdered Fufu

Figure 1. *Processing and production of fufu powder [4].*

2.3. Physico-Chemical Properties

The determination of TTA and pH measurement was carried out and compared among fufu powder produced from TME 693, TME 419 and IBAO 11371 cassava tubers.

2.4. Functional Properties

The functional properties analysis was carried out according to the Association of Official Analytical Chemist (A.O.A.C) for the loose bulk density, packed bulk density, water absorption capacity, pasting viscosity, swelling capacity, color, starch solubility, dispersibility and particle size [5].

2.5. Proximate Analysis

The proximate analysis was carried out according to the Association of Official Analytical Chemist (A.O.A.C) for moisture, ash, fat, crude fiber, crude protein and starch content [6].

2.6. Processing of Powdered Fufu to Fufu Dough

The fufu dough was prepared by reconstituting 1kg of the powdered fufu from each of the varieties in 3.25 litres water and cooked on fire until a consistent dough was achieved [7]. The fufu dough was served for sensory evaluation after which vegetable soup was served [4].

2.7. Sensory Evaluation

The quality of fufu dough was evaluated after preparation using a quality assessment questionnaire. Ten panelists consisting of students and staffs of Human Nutrition and Dietetics Department, Lead City University, Ibadan who were familiar with the quality attributed of the fufu dough were consulted. The panelists were asked to rate the sample for sensory properties (color, flavor, taste, texture). Acceptability of the sensory properties were also rated using a 5-point hedonic scale as shown in Table 1.

Table 1. *Description of sensory evaluation developed by sensory panel to evaluate the fufu dough.*

Attributes	Definition	Rating scale
Color	The color of the sample dough	White
		Cream white
		Yellow
Taste		Bland
		Tart
		Sour
Texture		Thick
		Slightly sticky
		Sticky
Acceptability for taste	The degree at which the panelists prefer the sensation of taste perceived in the mouth and throat on contact with the fufu dough.	Dislike much
		Dislike slightly
		Neither like nor dislike
		Like slightly
		Like very much
Acceptability for flavour	The degree at which the panelists prefer the distinctive flavour of the fufu dough.	Dislike much
		Dislike slightly
		Neither like nor dislike
		Like slightly
		Like very much
Acceptability for texture	The degreeat which the panelists prefer the of consistency of the fufu dough.	Dislike much
		Dislike slightly
		Neither like nor dislike
		Like slightly
		Like very much
General acceptability of the product	The degree of the overall acceptability of fufu dough	Acceptable
		More acceptable
		Most acceptable

2.8. Training of Panelists

The selected panelists were trained for 10 minutes. The qualities and preparation of the dough, the instructions and also the content of the questionnaire used was explained to ensure uniformity in the understanding among the panelists for the sensory evaluation.

2.9. Statistical Analysis

Samples were analysed using AOAC, 2005 method [6]. Data were subjected to a one-way Analysis of Variance (ANOVA) using Statistical Package for Social Sciences (SPSS) (20) while Duncan's Multiple Range Test (DMRT) was used to separate the means at $p<0.05$ significant difference. Results were expressed as mean values and standard deviation of the duplicate determination.

3. Results and Discussion

3.1. Functional Properties of Fufu Powder

Table 2 showed the comparison of functional properties of fufu powder produced from TME 693, TME 419 and IBAO 11371. The result showed that TME 693 had the highest loose bulk density when compared with the other two cassava varieties. From the result, there was a significant difference ($p<0.05$) in the packed bulk density of TME 693 ($0.52 \pm .00^{a}$), TME 419 (0.51 ± .00[b]) and IBAO 11371 (0.50 ± .00[c]) cassava species. However, TME 693 had the highest packed bulk density while the IBAO 11371 has the lowest packed bulk density. Also, findings revealed that there was no significant difference (p>0.05) in the loose bulk density of the fufu powder produced from the three (3) cassava varieties, TME 419 (0.43 ± .000[a]), TME 693 (0.43 ± .00[a]) and IBAO 11371 (0.41 ± .00[a]). The bulkiness of TME 693 and TME 419 may be because of their crude fiber content. The finding of the study was in agreement with a study that stated that bulk density of TME 419 (0.62±0.01[c]) and IBAO11371 (0.53±0.00[a]) were statistically different (p<0.05) [8]. This could also be attributed to the relatively lower protein and fat content of the cassava [9]. Values obtained in this work were similar to those obtained by some previous studies from fufu samples produced from cassava [9, 10].

Also, TME 693, TME 419, and IBAO 11371 had no similarities in their water absorption capacity and pasting viscosity which were (124.650±212b and 33.550±212b), (126.100±424a) and 30.400±1.13b), and (121.834±0.21c and 26.600±0.283c) respectively. Water absorption capacity is reported to be an essential processing parameter and has implications for viscosity [11]. There were no similarities (p<0.05) in the water absorption capacity of TME 419 (126.10 ± .42[a]), TME 693 (124.65 ± .21[b]) and IBAO 11371 (121.84 ± .02[c]). This indicated that their water absorption capacities were different from each other and TME 419 had the highest water absorption capacity. The finding of this study contradicted with a studythat reported that the ability of cassava flour to absorb water as measured by water absorption capacity ranged from 416.01±2.70 to 547.56±2.15% [8], flour produced from TME 419 had the lowest and the flour prepared from IBAO11371 had the highest.

A study noted that the higher the WAC, the greater the amount of water needed to make dough of desired quality [12]. Another study reported similar results for water-binding capacity which agrees with the present study [13]. Furthermore, the results showed that there were no similarities in the swelling capacity of TME 693, TME 419, and IBAO 11371. Fufu powder of IBAO 11371 had higher crude protein (2.24%) and fat (1.15%) contents which may account for the lower swelling power compared with the fufu powder from TME 419 and TME 693. Previous study has revealed that starches with low amylose content will exhibit higher swelling power.

Other factors such as starch granule size, botanical sources, the magnitude of interactions between amorphous and crystalline regions may also influence the swelling power of starch [14]. TME 693 and TME 419 were shown to be whitish in color, while IBAO 11371 was yellowish. Also, outcome of another similar study indicated that TME 419 was whitish in color [8]. The starch solubility of TME 693 (73.57 ± .028a), TME 419 (71.84 ± .028b), and IBAO 11371 (15.35 ± .212c) had no similarities (p<0.05). However, TME 693 had the highest starch solubility while IBAO 11371 had the least value. In terms of the particle size, the result disclosed that 91.32% of TME 693, 95.63% of IBAO 11371, and 93.85% of TME 419 passed through a sieve of 0.60mm aperture size.

Table 2. *Comparison of Functional Properties of Fufu Powder Produced from TME 693, TME 419 And IBAO 11371 Cassava.*

Component	IBAO 11371 (Mean±SD)	TME 693 (Mean±SD)	TME 419 (Mean±SD)
Loose Bulk Density (g/ml)	0.414 ± .000[a]	0.432 ± .000[a]	0.427 ± .000[a]
Packed Bulk Density (g/ml)	0.497 ± .000[c]	0.522 ± .000[a]	0.511 ± .000[b]
Water Absorption Capacity (g/100g)	121.835 ± .021[c]	124.650 ± .212[b]	126.100 ± .424[a]
Pasting Viscosity (ml/s)	26.600 ± .283[c]	33.550 ± .212[a]	30.400±1.131[b]
Swelling Capacity (g/g)	15.350 ± .212[c]	16.450 ± .212[b]	17.355 ± .035[a]
Color	Yellowish	Whitish	Whitish
Starch Solubility%	68.750 ± .028[c]	73.570 ± .028[a]	71.840 ± .028[b]
Dispersibility%	82.700 ± .014[c]	89.655 ± .021[a]	88.355 ± .021[b]
Particle Size	95.63% passes through a sieve of 0.60mm aperture size	91.32% passes through a sieve of 0.60mm aperture size	93.85% passes through a sieve of 0.60mm aperture size

Note: Figures with the same superscript letter in the same row are not significantly different (p>0.05) while figures with different superscript letter in the same row are significantly different (p<0.05).

Table 3. *Comparison of pH and Total Titratable Acidity of Fufu Powder from Three Cassava Varieties.*

Component	IBAO 11371 (Mean±SD)	TMB 693 (Mean±SD)	TME 419 (Mean±SD)
pH	6.120 ± .000[a]	5.380 ± .000[c]	5.550 ± .000[b]
%Titratable acidity (TTA) (as lactic acid)	0.591 ± .003[c]	0.714 ± .000[a]	0.695±000[b]

Note: Figures with the same superscript letter in the same row are not significantly different (p>0.05) while figures with different superscript letter in the same row are significantly different (p<0.05).

3.2. Physico-Chemical Properties of Fufu Powder

Table 3 revealed the comparison of the physico-chemical properties of fufu powder produced from TME 693, TME 419 and IBAO 11371 cassava. There was a significant difference in the pH of TME 693, TME 419, and IBAO 11371. IBAO 11371(6.120 ± .000[a]) had the highest pH and TME 693(5.380 ± .000[c]) had the lowest pH. Also, the TTA of TME 693, TME419 and IBAO 11371 had no similarities. TME 693(0.714 ± .000[a]) had the highest TTA content while IBAO 11371 (0.591 ± .003[c]) had the lowest TTA content.

3.3. Comparison of the Proximate Analysis

The comparison of proximate analysis of fufu powder produced from TME 693, TME 419 and IBAO 11371 cassava tubers was shown in Table 4. Results showed that there was no significant difference (p>0.05) variety while IBAO 11371 (2.235 ± .064^{a}) was significantly different. From the result, TME 693 had the lowest crude protein content while IBAO 11371 had the highest. According to a previous study, crude protein content of TME 419 was 0.51±0.08% and TMS 326 was 1.26±0.06%. This finding was similar with another study who reported that previous researchers who worked on five genotypes of cassava had similarly low values for crude protein which ranged from 1.2 to 1.8% [15]. Also, a study stated that protein content was normally low for both cassava cultivars but significantly higher in UMUCASS 36 (3.0±0.05%) than in TME 419 flour (2.0±0.07%) [5].

The result also showed that the crude fat content between TME 693 (0.170 ± .014^{b}) and TME 419 (0.220 ± .014^{b}) were not significantly different while IBAO 11371 (1.155 ± .021^{a}) was shown to be significantly different from the other two varieties. The finding of this study was in the range of a study who opined that the crude fat content of TME 419 was 0.94±0.16%and TMS 326 was 1.59±0.13% [15]. Also, another study reported a low crude fat content value of 0.1-0.8% [16]. The crude fiber content between TME 693 (0.400 ± .028^{b}) and IBAO 11371 (0.220 ± .014^{b}) were not significantly different while that of TME 419 0.265 ± .021^{b} was significantly different compared to the other two cassava varieties. This contradicted with the outcome of a study that reported a higher crude fiber content of TME 419 to be 2.15±0.14% and TMS 326 to be 1.95±0.08% [15].

Likewise, a higher value of crude fiber content which ranged from 1.5-3.5% was reported by another study [16]. There was no significant difference in the ash content between TME 693 (0.400 ± .028^{b}) and IBAO 11371 (0.325 ± .021^{b}). This was not in accordance with the outcome of a study previously conducted [15]. A study reported a higher values of ash content for TME 419 (1.99±0.09) and TMS 326 (2.50±0.03) [15]. Similarly, another study also reported total ash content between 1.3-2.8% [6]. However, the ash content of all the samples produced from different cassava varieties fell below the regulatory value of the codex Alimentarius Commission [17], and were within the range of values reported by a previous study (0.05-2.80%) and another study (0.25-1.51%) for flour produced from different cassava varieties [18, 10]. There was no significant difference between the moisture content of TME 693 (13.005 ± .035^{a}) and TME 419 (13.090 ± .028^{a}). However, the carbohydrate content was significantly different in the three samples.

Table 4. *Comparison of Proximate Analysis of Fufu Powder Produced from TME 693, TME 419 and IBAO 11371 Cassava.*

Component (%)	IBAO 11371 (Mean±SD)	TME 693 (Mean±SD)	TME 419 (Mean±SD)
Crude Protein	2.235 ± .064^{a}	1.135 ± .078^{b}	1.335 ± .078^{b}
Crude Fat	1.155 ± .021^{a}	0.170 ± .014^{b}	0.220 ± .014^{b}
Crude Fiber	0.220 ± .014^{b}	0.265 ± .021^{b}	0.380 ± .014^{a}
Ash	0.325 ± .021^{b}	0.400 ± .028^{b}	0.535 ± .021^{a}
Moisture	12.540 ± .028^{b}	13.005 ± .035^{a}	13.090 ± .028^{a}
Carbohydrate	83.525 ± .021^{c}	85.025 ± .001^{a}	84.440 ± .028^{b}

Note: Figures with the same superscript letter in the same row are not significantly different (p>0.05) while figures with different superscript letter in the same row are significantly different (p<0.05).

3.4. Sensory Evaluation of Fufu Dough

Table 5 showed the sensory evaluation (color, texture and taste) of fufu dough produced from TME 693, TME 419 and IBAO 11371.

3.4.1. Color of the Dough

The study showed that the three different cassava varieties are significantly different in colors at p<0.05. The fufu produced from IBAO 11371 was yellow, fufu produced from TME 693 was creamy white while fufu produced from TME 419 was white. This indicated that their colors varied significantly (p<0.05). A previous study reported that the color of the control sample (R) was significantly different (p<0.05) from the other two samples A and B [19]. The color of the fufu samples may be ascribed to the genetic make-up of the cassava cultivars [20]. It was stated that color and carotenoid retention could be influenced by drying technique employed during processing.

3.4.2. Texture of the Fufu Dough

It was observed that the texture of the fufu produced from TME 419 was significantly different (p<0.05) from the other two fufu samples, but the other two fufu samples produced from TME 693 and IBAO 11371 had similar texture. Outcome of a study showed that control sample was significantly different (p<0.05) in texture when compared with the other two fufu samples [20]. Findings of a previous research stated that there was no significant difference (p<0.05) in the texture.

3.4.3. Taste of the Dough

The taste of fufu produced from TME 419, TME 693 and IBAO 11371 showed no significant difference (p>0.05). This was not in accordance with a study who reported that there was a significant difference (p<0.05) in the taste of control sample (R) when compared with the other two fufu samples [21]. The finding of this study was a bit similar to a finding which stated that TMS 30572 and TME 419 were dislike in terms of taste [22].

Table 5. *Sensory Evaluation of Fufu Dough Produced from TME 693, TME 419 and IBAO 11371.*

Attributes	TME 693 (Mean±SD)	TME 419 (Mean±SD)	IBAO 11371 (Mean±SD)
Color	2.10±0.32^{b}	1.20±0.42^{c}	2.80±0.42^{a}
Taste	1.30±0.48^{a}	1.60±0.84^{a}	2.00±0.82^{a}
Texture	2.30±0.68^{a}	1.30±0.68^{b}	2.20±0.79^{a}

Note: Figures with the same superscript letter in the same row are not significantly different (p>0.05) while figures with different superscript letter in the same row are significantly different (p<0.05).

3.4.4. Acceptability of Fufu Dough

Table 6 revealed the acceptability for taste, flavor, texture and overall acceptability of fufu dough produced from TME 693, TME 419 and IBAO 11371. The fufu dough made from the three cassava varieties were not significantly different for the acceptability for flavor and the acceptability for taste but for the acceptability for texture the dough produced from the variety TME 419 (2.20±1.37^{b}) was significantly different at p< 0.05 from the fufu dough produced from the other two cassava varieties. This means that there is no obvious or significant difference in the flavor of IBAO 11371 (4.00±1.05^{a}), TME 693 (3.30±1.16^{a}) and TME 419 (3.30±1.42^{a}) when they are reconstituted from the powder form into a dough form. Also, for the acceptability of taste, the dough Produce from the cassava variety TME419 (3.00±1.41^{a}) was the least preferred, the dough produced from the cassava varietyIBAO 11371 **(**3.90±0.99^{a}) was the most preferred. Furthermore, the acceptability for texture reviews that the dough produced from the cassava variety TME419 (2.20±1.37^{b}) was significantly different from the dough produced from TME693 (3.50±1.18^{a}) and IBAO11371 (4.10±0.99^{a}) cassava variety.

The scores obtained for overall acceptability correspond to a degree of ‘slightly’ to ‘very much’. The dough produced from the cassava variety IBAO11371 significantly differs from the dough produced from the two other cassava varieties (p <0.05), which indicated that the dough produced from the cassava variety IBAO11371 is the most preferred and acceptable. Based on general acceptability, IBAO 11371 (2.70±0.68^{a}) had the highest rating of the product. This may be attributed to the good taste, texture and flavor in the product. Also, acceptability of the fufu dough may be ascribed to the processing method as described by a study conducted earlier [23]. According to the sensory evaluation conducted on dough prepared from the three cassava varieties, results revealed that odor, color, hand feel or texture, elastic quality and overall acceptability were all acceptable to the panelists [23].

Table 6. *Comparison of Mean Score for Hedonic Sensory Attributes of Fufu: The Acceptability of Flavor, Taste and Texture.*

Attributes	TME 693 (Mean±SD)	TME 419 (Mean±SD)	IBAO 1371 (Mean±SD)
Acceptability for taste	2.80±1.03^{a}	3.00±1.41^{a}	3.90±0.99^{a}
Acceptability for flavour	3.30±1.16^{a}	3.30±1.42^{a}	4.00±1.05^{a}
Acceptability for texture	3.50±1.18a	2.20±1.37^{b}	4.10±0.99^{a}
Overall Acceptability	1.50±0.71^{b}	1.30±0.48^{b}	2.70±0.68^{a}

Note: Figures with the same superscript letter in the same row are not significantly different (p>0.05) while figures with different superscript letter in the same row are significantly different (p<0.05).

4. Conclusion

In conclusion, drying is mostly used to preserve cassava, in other to reduce to post harvest and in the processing of cassava, the drying technique usually has effect on the chemical and sensorial properties of the resultant fufu dough. The results obtained in this study proved that the oven drawing method was quite efficient in reducing the moisture content of the fufu powder to a minimum that would be favorable for a long storage and also this indicates good processing practice. In addition, the sensory evaluation showed that the yellow flesh odorless fufu dough which is also known as IBAO11371 variety was generally liked by the panelists and selected for the overall acceptability it was highly rated and most preferred. The three varieties of fufu powder obtained had satisfying quality attributes in terms of moisture content, higher crude fat content, higher crude protein content, higher flavor acceptability, higher texture acceptability, higher test acceptability, and the highest overall acceptability.

5. Recommendation

Based on the findings of this study, more research on processes of fermentation, nutritional supplements and suitable chemicals as additives to the fufu powder should be carried out in order to obtain higher quality of fufu powder. Also, research on how to enhance the quality, colour, and nutritional value of the fufu powder should be done.

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