

Developing Standardizing Recipes from Digitaria Exilis 'Acha' for Various Delicacies.

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Abstract:

Acha, with the botanical name Digitaria exilis depending on location, also known as findi, fundi, white fonio, fonio millet, and hungry rice or Acha rice, is commonly found in the savanna region of West-Africa, with the largest harvesting in the Gambia. It is also grown well in Northern Nigeria. The highly nutritious crop can form a good delicacy if adequately harnessed. However, many people did not know about its potential, while there have not been standardised Acha's recipes in any of our hotels and restaurants, especially in Nigeria. In this research, planting, harvest, storage and Nutritive values of Acha were reviewed. The standardised mouth-watering dishes from the food commodities of Acha were prepared by creating new recipes and improving on the existing ones, enhancing their nutritional value and making them available to the experts in food and nutrition for tasting as a way of validating. It was discovered that these food commodities could be consumed for several purposes. The research will stimulate creativity on the part of the Caterers, students, lecturers and researchers in the hospitality industries as they can further expand this work. The study recommends the use of the standardised recipes from Acha as a good and nutritious delicacy for eating in our homes and menus in hotels, restaurants, schools, hospitals and any deserving good menus.

Keywords: Acha, recipes, food commodities and delicacy

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I. Introduction.

Developing and standardising recipes are different ways of creating new dishes and bringing them into an acceptable state by the generality of people. Perhaps, one of the drawbacks of Nigeria's hotel industries in producing a variety of dishes from our local crops is the inability to be creative and/or use imagination on the part of Nigerian Caterers and homemakers. Caterers should find it a challenge to formulate, develop and standardise a variety of recipes from our various crops and be able to compare them to their counterparts in other parts of the World. On this note, this research has used acha for varieties of recipes.

A recipe is a set of instructions for preparing a particular dish, including a list of the ingredients required. Human being derives their energy sources from plants and animals. There are various types of foodstuffs from which recipes can be formed. Food classification is essential to studying nutrition, which makes it possible to choose from various alternatives if particular food becomes scarce. Food can, therefore, be classified into the following:

- i. Staple food
- ii. Legumes, Pulses, Nuts and seeds
- iii. Fruits and vegetables
- iv. Animal foods
- v. Fat and Oil.

The staple food is food which forms the largest part of a nation's diet. They are of plant origin and are classified into three main groups.

1. Cereals and grains
2. Root and Tubers
3. Starching fruit.

1. Cereals and Grains:- This group include rice, wheat, and Acha; the importance of this group is that they are easy to store.

2. **Roots and Tubers:** - This group include Yam, Cocoyam, Sweet Potatoes and Cassava. This group is readily perishable and cannot be stored for long.

3. **Starchy foods/Fruits:** - Examples include plantain, and they are classified as the staple food because they are part of the population's diet. The staple foods are rich in carbohydrates, abundant in quantity and cheap when in season.

The research is based on staple food, and Acha has been selected from the group.

Acha is botanically known as *Digitariaexilis*. The popular name in Northern Nigeria is 'Acha'. Depending on the location, it is known by other names such as findi, fundi, white fonio, fonio millet, and hungry rice or Acha rice. It is a grass species. It is a grain and the most important of a diverse group of wild and domesticated *Digitaria* species: According to National Research Council (1996), Acha is a small cereal grain of ancient cultivation. It is probably the oldest African cereal. West Africans have cultivated it across the dry savannas for thousands of years. Even though few other people have ever heard of it, this crop remains important in areas scattered from Cape Verde to lake Chad. In certain regions of Mali, Burkina Faso, Guinea, and Nigeria, it is either a staple or a major part of their diet. Nnam (2000) demonstrated that the Acha crop grows with reasonable yield in areas with low rainfall and poor sandy or iron stone soil. Consequently, the crops are grown extensively in parts of Bauchi, Nassarawa, Plateau and Kaduna states of Nigeria, even where the soil cannot support the adequate growth of some of the more popular cereals, the maize, sorghum and millet.

It belongs to a class of foods known as the cereal grain, the major staple food and a source of energy required by most people living in developing countries. It is also a good supplement for diabetes patients.



Figure 1: Acha
(Source: World Crop Database, 2022)

Chemical and Nutritional Properties National Research Council (1996) Acha is among the most nutritious grains. Its seed is rich in methionine and Cystine, amino acids vital to human health, which is deficient in today's major cereals (wheat, rice, maize, sorghum, barley and rye). Purselove (1975) states that the Acha grain's composition comprises carbohydrates, fat, protein, fibre, water and ash. The chemical composition of Acha grains are as follows:

Moisture (%) 10, cystine 2.5, Food energy (kcal) 367: Isokoucine 4.0, Protein (g) 9.0, Leucine 10.5, Carbohydrate (g) 75, Lysine 2.5, Methionine 4.5, Fat (g) 1.8, Fiber (g), Phenylalanine 5.7, Ash (g) 3.4, Thereonine 3.7, Thiamin (mg) 0.417, Tryptophan 1.6, Niacin (mg) 1.9, Trysotine 3.5, Riboflavin (mg) 0.10, Valine 5.5, Calcium (mg) 44, Iron (mg) 8.5, Phosphorus (mg) 177

Fonio is an excellent source of protein and is rich in amino acids, methionine and cysteine, which are deficient in rice maize and sorghum. Also, in comparison with these other cereals, fonio supplies the most significant amount of iron, zinc, magnesium and vitamin B6

Planting: Fonio is typically planted later in crop rotation cycles. After maize or sorghum, Acha can be planted during May or June before the beginning of the short rainy season. The plant required low rain. In addition, drought tolerance can survive in poor soils without using fertilisers and is resistant to flooding.



Figure 2: Acha grains
(Source: Kitchn, 2022)

Harvesting: the plants are harvested in September. The fonio harvest breaks the famine period, providing food during a time of critical shortage before other crops such as sorghum and maize are ready for harvest.,

Storage: The threshed Acha grains are stored in a granary called "Rumba" (n Hausa). They are stored for as long as 3-4 years without using chemicals to control the pest. Odeh and Ijih (1993) stated that granary is mixed with local clay. Acha straw in the form of a multi-storey structure with props also of clay. The ground floor is divided into a kitchen and a staircase. The upper storey has several chimney-like compartments. Sometimes there is even a third storey. Within a few days, the grain is put in storage. The heat and smoke from cooking on the ground floor drive out or kills any pest stored inadvertently with them. This generally keeps away new pests. The heat reduces the moisture, which prevents fungal or microbial growth. They further (in 1993) asserted that the government had started building huge steel silos. Some farmers claim that they can store Acha for up to 10 years without any problem.

Uses of Acha Grain

Acha grain is used in a variety of ways. For instance, it is made into porridge and couscous, ground and mixed with other flour to make loaves of bread, popped brewed for beer. It has also been described as a good substitute. for semolina to make spaghetti and other kinds of pasta. According to Nnam (2000), Acha has many promising nutritional attributes, and it is used to make GusGus (Jollof Acha) and Gwate (Acha porridge) or combined with vegetables and other cereals as a meal, more recently. Acha flour has been utilised in producing biscuits, cookies, chin-chin and puff-puff. Acha can also be used for breakfast, lunch and dinner menus. Cattle's sheep, donkeys and other ruminant livestock digest Acha efficiently. The straw and chaff are also fed to animals. Acha is also best for the patient with diabetes.

Menu Planning: Before embarking on developing and standardising selected recipes from any food crop, there must be proper menu planning as to the commodities to be used, knowing the consumers of the dishes, and identifying what to be added to existing dishes in order to improve them.

Ceserani et al. (1996) defined a menu as a bill of fare, and a means of communication, informing the customer what the caterer has to offer. Compiling menus is one of the caterer's most important jobs- whether for an establishment, such as restaurants, aiming to make a profit or those working on a budget, such as hospitals and schools.

II. Methodology

The techniques used for this research are desk research, questionnaire, oral interview and personal observation. It is essential in conducting successful research findings.

The practical cooking method helps the research build up the pertinent facts and results from the actual product obtained from Acha.

The food commodities from Acha were examined, and standardised mouth-watering dishes from the food commodities of Acha were prepared. One of the significant recipes in most of the Menus is Acha flour. The main ingredient is Acha grains. The research, therefore, gives the flowchart of the production of Acha flour Figure 1.

Preparation of Acha Flour

Acha flour can be produced using the following steps

Step 1: Purchase of Acha grains: The quantity will depend on the usage and number of people who will consume the flour products. Large quantities may be purchased for commercial purposes or storage, as the flour can stay for a long time without spoiling or changing taste.

Step 2: Cleaning: -Acha should be adequately washed with water. There should be no additive or any other chemical.

Step 3: Draining: The water used for washing should be appropriately drained

Step 4: Drying: The drained Acha should be dried either naturally by spreading in the sun or use of the dryer

Step 5: Milling: the dried Acha should be ground into powdery form.

Step 6: Sieving: the milled Acha should be sieved to remove the shaft to have a smooth fine flour.

Step 7: Flour the product of the sieved. Acha will give the flour.

The above procedures are as shown in the flowchart in Figure 2:

Flowchart for the Production of Acha Flour

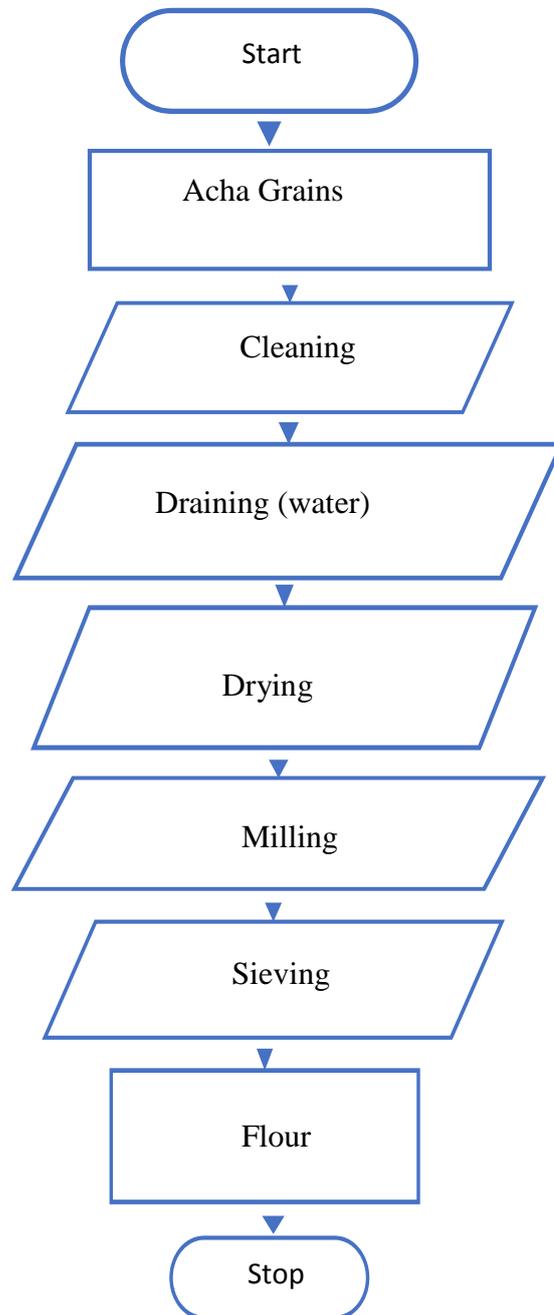


Figure 3: Flowchart for the Production of Acha Flour

The food commodities, recipes and preparation methods are tabulated as shown in Table 1.

Table 1: Table of Food Commodities, Recipes and Steps in Preparing the delicacies

S/No	Food Commodities	Recipes	Method of Preparation
1.	Acha Salad	300g cooked Acha Two tomato medium size one onion medium 50g peas (cooked) Salt, pepper Egg (cooked) Salad cream	1. skin and remove seeds from tomatoes 2. cut in ½ cm (1/4 in) dice 3. clean and cut the onion into ½ cm (1/4in) dice 4. Mix with the acha and peas 5. add salt, pepper and salad cream, taste and correct seasoning 6. Dress neatly and garnish with slice egg serve
2.	Achavita	Acha flour 3 cups Water 1.5 litres	1. Boil water in a pot; when the water is hot, make a paste with 1½ cups of flour and add to the water; stir continuously to prevent lumps until the paste is thick. 2. Cover and allow it to cook for about 10mins. 3. Pour in the remaining flour, stir very well until the mix is thick enough 4. Cover and allow it to cook for another 10min; add a little water if necessary. 3. Stir and portion. Serve with chicken in Oghono soup
3.	Chicken in Oghono with Achavita	Chicken ½ or whole Oghono ½ of the cup (grounded) Fresh Pepper 3 pieces (chopped) Dry Crayfish 1 tablespoon (grounded) Smoked fish 1 small (cleaned) Palm oil cooking spoon Salt to taste Ugwu 1½ Tie (washed) Onion 1 small chopped) Maggi 2 Cubes Dry fish medium (cleaned) Potash optional pinch	1. Clean and wash the chicken and cut it into serving-size pieces Season the chicken and boil until soft and tender 2. Melt palm oil in another pot, add onion, fresh pepper and potash (if required) 3. Add crayfish, smoked fish, and dry fish stir and add stock or water 4. Cover to cook for 10 mins. And add the oghono, stir very well 5. Allow it to cook for 5mins, and add the chicken. 6. Add the washed Ugwu leaves. 7. Stir and taste when necessary; correct the consistency and serve with achavita.
4.	Acha Pudding	100g Sugar 2 Eggs 10g baking -powder 100g butter or margarine 100g Acha flour 50g flour Few drops of milk	1. Cream the butter or margarine and sugar in a bowl until fluffy and almost white 2. Gradually add the beaten eggs. mixing vigorously 3. Sieve both the flour and baking powder 4. Gradually incorporate into the mixture as lightly as possible, keeping to a dropping consistency by the addition of the milk 5. Place in a greased pudding basin. 6. Cover securely with greaseproof paper steam for 1½ hours. 7. Turn out onto a flat silver dish and serve with custard sauce
5.	Custard Sauce	50ml milk 25 g castor sugar 10g custard powder	1. Dilute the custard powder with a little of the milk 2. Boil the remainder of the milk 3. Pour a little of the boiled milk onto the diluted custard powder. 4. Return to the saucepan 5. Stir so that the boil can mix in the sugar
6.	Acha Biscuits	100g Acha flour 50g flour 50g sugar 100g butter or margarine One egg Pinch salt	1. Cream the butter or margarine and sugar till fluffy 2. Add the well-beaten egg 3. Lightly fold in the flour and roll out 4. Roll carefully on a floured table or board to the shape of a round ½ cm (1/4in) thick. 5. Cut out to the desired shape and bake 6. Bake in a moderate oven (23 ⁰ to 25 ⁰ C) approx. 15- 20 mins
7.	Acha Cookies	100g Acha flour 50g Flour 100g butter or margarine 75g Sugar One egg vanilla flavour	1. Cream butter or margarine with sugar till soft and fluffy 2. Add the well-beaten egg 3. Lightly fold in the flour, allow to rest for 10-15 mins 4. Roll on a floured table or board, cut into different shapes and c 5. Bake in a moderate heat oven (23 ⁰ C to 25 ⁰ C) for approximately 15 -20 minutes
8.	Acha and Sweet Potato Drink	1 Cup Acha flour cup sweet potato flour Sugar to taste Vanilla flavour	1. Mix the flour and soak overnight 2. Take half of the past and keep it aside 3. Bring water to boil 4. Pour in the remaining paste and stir continuously until thick; bring it down and allow to cool 5. Add the paste that was kept aside and mix very well 6. Pass through a strainer, add sugar and flavour 7. Chill and serve

All the dishes were improved using standard recipes in their preparation, with some accompaniments and garnish used to improve their appearance.

Verification and Quality: Verification of data quality is an important part of any geodetic and other scientific research, as it helps to ensure that the data used in the models are accurate enough to satisfy the requirements of the application at hand. Data validation assisted in the identification of suspicious and invalid cases such as outliers, variables, and suspicious data values in the active data set (Aleem, 2013). Since we do not have available data to use as the gold standard, we relied on observations and experience of experts in food and nutrition and the questionnaire. To this end, twenty experts were invited from the Departments of Food Science and Technology, Hotel and Catering Management, and Sociology, while three others randomly selected customers from the restaurant.

They were provided with an already designed questionnaire to examine, taste and comment on the appearance, colour, flavour, taste, palatability and presentation. The result as presented in Table 1 for Acha Salad. The same for done for other dishes (Achavita, Acha Pudding, Acha Biscuits and Acha Cookies)

III. Results and Discussions:

Standard recipes are a written formula for producing a food item of a specified quality and quantity for use in a particular establishment (Kinton et al., 1996). It should show the precise quantities and qualities of the ingredients together with the sequence of preparation and services. It enables the establishment to have greater control over cost and quantity.

Therefore, there is a need to develop standardised recipes from Acha to specify the ingredient quality and quantity and the preparation sequence. This is one of the central focuses of this paper.

Table 2: Respondent on the quality of Acha Salad

Respondent	Appearance	Colour	Flavour	Taste	Palatability	Presentation
1	5	4	3	5	3	5
2	4	4	3	5	3	5
3	4	4	3	5	4	5
4	4	5	4	4	4	5
5	5	5	4	4	4	4
6	4	5	3	4	4	4
7	5	5	4	4	4	4
8	5	5	4	5	3	4
9	4	5	4	5	5	4
10	4	4	5	5	4	4
11	3	4	5	4	4	5
12	5	4	4	5	4	5
13	5	4	4	4	3	5
14	5	5	3	5	3	4
15	4	5	4	5	4	4
16	4	5	4	5	3	5
17	4	5	5	5	4	4
18	5	5	4	4	4	4
19	5	4	4	5	4	4
20	5	5	4	5	4	4
Average	89/20	92/20	78/20	93/20	75/20	88/20
Scores	4.45	4.6	4	4.7	4	4.4

The summary of the results showed that 100% of the respondent are also satisfied with snacks from Acha, while 87% of the respondent suggested further advertisement on different media. Acha flour may be fortified with other cereals in biscuits, cakes etc.

With the result and general acceptance of the respondents, it is hoped that all Hotels and Restaurants will welcome the standard recipes and methods of preparing different dishes from Acha in the Federation.

The research will stimulate creativity on the part of the Caterers, students and researchers in the hospitality industries as they can further expand this work beyond the present author's imagination to make these dishes available in restaurants, schools, hospitals and our different homes.

The availability of different dishes from Acha will enhance their nutritive values. The food was made attractive, and garnishes were used to improve their appearance for better presentations. The availability of dishes will boost the economy of the farmers as there will be more demand and can encourage them to produce more for the growth of our economy.

The findings will help caterers and homemakers handle the materials to accurately measure the ingredients for the preparation of the dishes so that the consumer will benefit from the nutritive value of this crop.

IV. Conclusion And Recommendation

Acha, botanically called *Digitariaexilis*, is a grain and the most important of a diverse group of wild and domesticated *Digitaria* species. It is also one of the most nutritious of all grains. This paper has reviewed its chemical and nutritional properties. It also looked at the planting, harvesting, storage and uses of Acha grains, especially in menu planning. The food commodities from Acha were examined, and standardised mouth-watering dishes from the food commodities of Acha such as Achavita, Acha pudding, Acha biscuits and Acha cookies were produced, given their Recipes and Steps in preparing the delicacies. Experts from food and nutrition validated the quality of the dishes.

The summary of the results showed that 100% of the respondents are also satisfied with snacks from Acha, while 87% of the respondents suggested further advertisement on different media. We hope the product will generally be accepted in the Federation hotel and restaurants. The research will stimulate creativity on the part of the caterers, students and lecturers and researchers in the hospitality industries as they can further expand this work beyond the present author's imagination to make these dishes available in restaurants, schools, hospitals and our different homes.

Recommendation:

The researcher wishes to recommend using the standardised recipes from Acha as a good and nutritious delicacy for eating in every home and as menus in hotels, restaurants, schools, hospitals and any other places where a good menu is deserved.

Due to its chemical and nutritional value, it is recommended as a good supplement for diabetes patients.

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