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Investigation Into The Effect Of Lenght Of Fermentation On The Processing Characteristics Of Cassava Tubers Into Garri

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***Abstract*—This paper focused on the effect of length of fermentation on the processing characteristic of cassava tuber into garri. The tubers collected from Rufus Giwa Polytechnic, Owo commercial farm were peeled, washed, grated, pressed, sieve, fried and allowed to cool. The cooled garri was subjected to analysis for its cyanide content, colour, taste and texture. Fermentation was carried out after grating and lasted between 0 to 186hrs. It could be deduced from the investigation that fermentation of the grated garri between five (5) and seven (7) days gave better result. The garri obtained within these days is most fit and safe for consumption.**

Keywords—Length of fermentation; Processing Characteristic; Cassava tuber; Garri

INTRODUCTION

Cassava is well known as Manihot spp, and it belongs to the family Euphorbiaceae. Cassava is believed to have originated in Northern Brazil and Central America (Roger, 1963). This popular crop is now grown in almost every tropical countries in Nigeria, it was introduced into Warri, the then Bendel state of Nigeria, by Portuguese explore in the 16th-17th century (Lean, 1976). Since then Nigeria have accepted cassava as one of their main non-cash crops staple and crop within the domain.

Similarly, (lean, 1976) reported that cassava was introduced into Central Africa from South America in the 16th century by Portuguese exporters. It was probably the incapacitated slaves who introduced the crop into southern Nigeria as they returned to the country from South America through the island of Sao Tome and Fernando Po. Cassava is important, not only as food but even more processed forms such as garri, fufu, tapioca, e.t.c. it can also be used as cassava hay in feeding livestock, the leave is used for making soup, the bitter variety of cassava leaves are used to treat hypertension, headache pain and as source of biofuel.

Cassava has virtually turned to pure gold in Nigeria, less than five years ago, the country was desperately looking for export market for the farm produce as a result of glut in the local market. The situation has changed due to the trade promotion policy of the federal Government.(Ogbo F. C., 2005). Stressing the influence of the presidential initiative on cassava in Nigeria. He also observed that the trade promotion policy of the Federal Government has created a very strong domestic demand market so strong that big time cassava farmers now earn almost as much money from the produce locally than they could makes, if they exported the commodity.

The cultivation of cassava are associated with a lot of problem such as pest and diseases, poor storage facility, poor soil, crude implement, lack of finance, these has hampered the production of the crop on a large scale in the tropics.

The tolerance of cassava to extreme stress conditions, its low production resource requirements, its biological efficiency in the production of energy, its availability throughout the year and its stability for farming system make cassava products gain more popularity in Nigeria, (Ebukiba 2010). Sequel to this consensus view, Gomes, G. and Valdivieso (2005) submitted that cassava will have better yield and quality improved varieties, cultural practise and processing technology.

MATERIALS AND METHODS

The cassava tubers used for this research work was obtained from Rufus Giwa Polytechnic commercial farm, Owo Ondo state, Nigeria. Other materials used are knife, rubber bucket, sieve etc. cassava tubers harvested were transported to the processing shed beside TISCO Company.

Methods--- The cassava tubers were harvested between 8:10am-9:25am at the school farm, they were peeled, washed and grated into cassava mash. The grated cassava mash was divided into four (4) equal portions and the portions were tagged as: first portion as Day 1, second portion as Day 3, third portion as Day 5 and forth portion as Day 7.

Day 1--- The first portion was pressed using manual press the day it was grated to remove its moisture content, it was then sieved and roasted to form garri. The garri was later stored in a bucket after cooling and labelled as "Day 1"

Day 3--- On the third day of grating, the second portion was pressed (dewatered) for 24hours to remove the moisture content. After that it was sieved and roasted. This portion was stored in a bucket and labelled as ''Day 3''

Day 5--- On the fifth day of grating, the third portion was also pressed, sieved and roasted into garri. The garri was stored in a bucket and labelled as "Day 5"

Day 7--- At the seventh day of grating, the fourth portion was also processed into garri and stored in a bucket labelled as ''Day 7''

The Production Chart of Cassava/Garri Processing

Harvest/ Sorting of cassava
↓
(Select fresh mature cassava roots)
↓
Peeling (peeling by hand remove woody tips)
↓
Washing (wash in clean water to pieces of peel & sand)
↓
Granting (use motorized cassava greater)
↓
Fermentation (pack into bag and leave for days at room temperature)
↓
Pressing (fermented mash is filled into sacks and placed into a hydrous jerk press)
↓
Sieving (to remove flours fibrous material and to control size of particles)
↓
Frying (roast in large, shallow cast-iron pan over a fire, with constant steering)
↓
Cooling (allow it cooled down)
↓
Packaging and storing.

Source: Phillips, T.P., (2004)

Laboratory Test--- Chemical analysis and sensory evaluation were carried out on hydro cyanide determination, colour, taste and texture respectively.

Hydro cyanide determination; the method use for this experiment is the one obtained from Association of Official Analytical Chemist AOAC (1990).

About 2g of each sample (gari) was soaked in a mixture containing 2ml of distilled water and 2ml of orthpsphoric acid was added. It was then mixed and stored over night at room temperature to set free bonded hydro cyanic acid.

About 45ml of distillate was collected in the receiving flask containing 0.1g of NaOH pellet 20ml of the distillate was transferred into a conical flask and 1.6ml of 5% potassium iodine (K_2I) solution until a fainted turbidity persist.

The hydro cyanide (CN) content was calculated in milligram per kilogram(mg/kg)

Using the formular below

CN mg/kg=13.5 (v1-v2)

Where, v1= titration value of the sample

V2= titration value of the blank

W1= weight of the sample

Colour Determination--- The colour was determined based on the panel of judges at random. Panel of 5 judges at random. The garri obtained from each sample i.e days of processing was poured into container labelled 1,2,3, and 4. The result show that day 1 garri is white, day2,3 and 4 changed slightly initial light brown garri was obtained on the last day due to the length of fermentation and heat.

Taste Determination--- The taste was determined through evaluation, the different samples of garri was poured into a container labelled 1, 2, 3 and 4 panel of (5) judges were invited for the sensory evaluation and it was presented to the judges at random. This shows that the taste increase order of day 1, 2, 3 and 4day4 which have sour taste.

Texture Determination--- The texture was also determined through sensory evaluation. Different samples of the garri were poured into separate container labelled 1,2,3 and 4 panel of 5 judges was invited for the evaluation and it was presented to the judges at random. The result revealed that the day 1 garri is little coarse, as the number of day of fermentation increase fine grains of garri particles was obtained.

RESULT AND DISCUSSION

The result of the physical analysis carried out on garri processing for the hydro cyanide content were shown in table1. The result gotten after analysis for the different days of processing was: Day 7 (79.25). It implies that cyanide content reduces with length of fermentation and heat applied.

Texture determination for different Day was Day 1(46.6%)Day 3 (75.1%) Day 5(78.8%) Day 7 (79.6%).

The percentages gotten for different days of processing was day 1 (58.7%) day3 (82.6%) day5 (87.1%) day 7(90.3%). It implies that the particles of garri produce reduce in size based on the days of fermentation.

Table 1 Chemical Analysis/Sensory Evaluation

Parameters Determined	Day1	Day 3	Day 5	Day 7
Hydro Cyanid Acid (mg/kg)	7.68	5.71	4.62	3.54
Coiour (%)	74.1	84.6	85.2	79.2
Taste (%)	46.1	75.1	78.8	79.6
Texture (%)	58.7	82.6	87.1	90.3

Source: Science Laboratory Technology (SLT) Department, Rufus Giwa Polytechnic, Owo.

Analysis of Variance

	Sum of Square	DF	Mean Square	F	Sig
Between Groups	798.337	3	266.112	0 .197	0.897
Within Groups	16239.312	12	1353.276		
Total	17037.656	15			

Based on the results obtained from ANOVA analysis, there is no significant different between the lengths of days of fermentation in any of the parameters tested (i.e HCL, Colour, Taste and Texture). But considering the hydro cyanic acid of garri obtained from the cassava fermented for seven days, cassava fermentation should be done at least six days due to the score obtained in colour and texture.

CONCLUSION

The result revealed that hydrocyanic acid reduces in each day of fermentation period and heat applied while roasting the garri also reduces. The colour, texture and taste are all improved in each day of processing.

Okafor and Ejiofor observed slow drop in pH during grating but results confirm rapid drop in pH obtained when the cassava is grated prior to fermentation.

RECOMMENDATION

It is recommended that garri produced on fifth day is most preferred for eating i.e drinking and making Eba while the one produced on the seventh day is only good for drinking because of its sour taste.

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