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Knowledge assessment, training and consumer acceptability on cassava – pigeon pea processing at Akufo, Oyo state

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ABSTRACT

The study aims to determine the knowledge of Akufo community in cassava flour processing, to disseminate, processing of cassava–pigeon pea fortified products and assess the consumer acceptability of the products. A pre-test was conducted for the women; they were assessed for socio-economic status and previous knowledge in cassava processing. Six (6) cassava products were processed in participation with the trainees and the trainees women were used as panelists to sensory analysis. A post-test was also conducted after the training to assess knowledge after training. The result showed that most of the participants were in the age range of 51-60 (50%) and with farming as the dominant work (28.6%). The majority of the participants' education status was secondary school (50%). Post-test results showed that the participants increased food processing understanding and 85.7% showed interest in processing the products disseminated for income generation.

INTRODUCTION

Food consumption patterns among rural families in Nigeria have been reported to be dominantly local staple food (Maxiya-Dixon *et al.*, 2004). Cassava has been known to play vital roles in the food security of Nigeria (Sanni, 2002). Cassava has been consumed in diverse forms in Nigeria, as traditional foods in the form of gari, fufu, tapioca and has also been processed into non-traditional products (Sanni, 2005). Consumption of local staples without adequate sources of animal proteins has been responsible for malnutrition among children which was reported to account for about 40% stunted growth amongst children in Nigeria (Maxiya-Dixon *et al.*, 2004). Animal proteins have been found to be non-affordable especially by the poor hence, food fortification of high carbohydrate foods with legumes has been reported to improve the nutritional density of most foods (Potter and Hotchkiss, 1998). Pigeon pea with local names *fiofio* (Igbo), *aduwa* (Hausa), and *otili* (Yoruba) is an underutilized tropical legume in Nigeria. It is one of the most drought tolerant legumes with the potential of mitigating the impacts of climate change in the tropics (Odeny, 2007). It is described as the only crop that yield some grains during dry spells when other legumes such as field beans have wilted and dried up (Odeny, 2007). Pigeon pea offers the benefits of soil quality and fertility in replenishing nutrient depleted soils.

Pigeon pea seed is a cheap, nutritious and healthy legume of various uses with healing and medicinal value. It is a rich source of protein, fibre, minerals and vitamins (Fasoyiro *et al*, 2006). Fibre has been known to aid digestion and to be good for colon health in preventing haemorrhoid. It is being reported to be low in lipoprotein cholesterol (Mayilvaganan *et al*, 2004). Its anti-antioxidant and inflammatory properties have also been reported (Lai *et al,* 2012), also its hypocholesterolmic effect by Manzo and Vitor (2017). It has been developed at IAR&T into a number of food products with cassava and maize to improve the nutritional quality of these staples (Fasoyiro and Arowora, 2013, Fasoyiro *et al,* 2013). There is the need for smallholder rural cassava growing communities to improve their diets with locally available legumes and to be encouraged in planting. Akufo Farm Settlement, Iddo, Ibadan is known for predominantly growing cassava. The farmers also previously grew pigeon pea which they are no more growing. The objective of the study was to assess the current knowledge of Akufo women in cassava processing, training in cassava fortified pigeon pea processing, and evaluate the participants' sensory acceptability of the products.

MATERIALS AND METHOD

Cassava flour was obtained from College of Agricultural Production, Moor Plantation, Ibadan and the pigeon pea seeds were obtained from Bodija market.

Pre-test for current knowledge

pretest was conducted for fourteen (14) women at Akufo Farm settlement, Iddo, Ibadan, a predominant cassava growing area. Information was collected on age, work type, education status, previous training in food processing and products, previous training in cassava processing, using previous training for income generation

Dissemination and demonstration of cassava-pigeon pea technologies

The processing technologies for the products were demonstrated during a training organized for encouraging the use of pigeon pea. Fourteen (14) women were present as participants. They were trained to process whole cassava flour, whole pigeon pea flour, and whole cassava chinchin, cassava-pigeon pea chinch in, whole cassava puff puff, cassava-pigeon pea puffpuff, whole cassava meal, and cassava-pigeon pea meal.

Whole pigeon pea flour:

this was prepared using Fasoyiro *et al* (2006) method in which pigeon pea seeds were soaked in warm water for 15 min and then dehulled by hand. The dehulled seeds are then spread on thin aluminium containers and allowed to dry.

Whole cassava puffpuff:

cassava flour of about 400 grams of mixed flour, one tea spoon of yeast and 50 gram of sugar were added and mixed with the flour. About 250 ml of water was used to mix the flour, and left to proof for 30 minutes before frying in hot oil for 3 min.

Cassava pigeon pea puffpuff:

cassava flour was mixed with pigeon pea flour at ratio 7:3 to form about 400 grams of mixed flour. One tea spoon of yeast and 50 gram of sugar were added and mixed with the flour. About 250 ml of water was used to mix the flour, and left to proof for 30 minutes before frying in hot oil for 3 min.

Whole cassava chinchin:

cassava flour of about 400 grams of mixed flour. One tea spoon of baking powder and 50 grams of sugar were added and mixed with the flour. About 250 ml of water was used to mix the flour, and left to proof for 30 minutes before frying in hot oil for 3 min.

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Whole cassava meal:

Two cups (about 200 gram) of cassava flour was added to boiling water (200 ml) and stirred till set.

Cassava-pigeon pea meal:

Two cups of mixed cassava flour and pigeon pea flour at ratio 7:3 (a 100 gram) cassava flour was added to boiling water (200 ml) and stirred till set.

Testing of sensory acceptability processed products by trained participants

Farmers' community sensory acceptability testing: Sensory evaluation of the prepared cassava products forms whole cassava or fortified cassava; puffpuff, chinchin and meal were done. Sensory evaluation was carried out to assess the acceptability of the products using the method of Iwe (2002). The product was analyzed for appearance, colour, flavor, texture, taste and overall acceptability by fourteen (14) participants. Products were presented as random coded samples. Whole samples were used as the reference sample. The samples were independently evaluated using a nine-point hedonic scale to determine the preference of each panelist. Ratings were: 1 = "extremely dislike", 2= "dislike very much", 3= "dislike moderately", 4= "dislike slightly", 5= "neither like or dislike", 6= "like slightly", 7= "like moderately", 8= "like very much" and 9 = "extremely like" (Iwe, 2003). The data were statistically analyzed mean analyzed by T-test by SPSS version 20.

Post test evaluation

The participants were evaluated after the training for the following; understanding of food processing after training, understanding of cassava processing, mentioning cassava improved products, processing improved cassava products for income generation.

RESULTS AND DISCUSSION

Table 1 shows that women farmers in Akufo assessed has the age range of 21-30, 31-40, 41- 50, and 51-50 with age range of 51-60 being the majority of 50%. The women had work type ranging from farming, tailoring to trading while 7.1% was a student and 28.6% were unemployed. The majority of the women had secondary school education (50%) and up to postgraduate (7.1%).

Table 1: Information on participants

Participants	Frequency	Percentage (%)
Age		
21-30	1	7.1
31-40	1	7.1
41-50	5	35.7
51-60	7	50.0
Work type		
Farmers	5	47.1
Student	1	7.1
Tailor	1	7.1
Trader	1	7.1
Unemployed	4	28.6
Education		
No education	3	24.3
Secondary	7	50.0
Tertiary	3	24.3
Postgraduate	1	7.1

Table 2 shows the previous knowledge in food processing through training. Nine (64.3%) had previous training in food processing and (42.9%) had previous training in cassava processing. Previous cassava training showed were in traditional and non-traditional products processing; flour, *gari*, tapioca and *fufu* in which 28.9% of participants used previous knowledge in generating income.

Table 2: Pre –test results of participants before training

Previous training in food processing	Frequency	Percentage
Yes	9	64.3
No	4	28.6
No answer	1	7.1
Previous processing in cassava processing		
Yes	7	50.0
No	6	42.6
No answer	1	7.1
Previous income generation using training		
Yes	4	42.9
No	6	28.9
No answer	4	28.9

Table 3 shows the consumer acceptability of the processed products. The parameters assessed were appearance, colour, flavor, texture and overall acceptability compared to cassava-pigeon pea products. Whole cassava puffpuff had higher mean score in the range of 7.29-8.38 for quality parameters assessed while cassava pigeon pea was in the range of 5.30-6.21.

Whole cassava puffpuff had the highest overall acceptability of 8.38. Whole cassava chinchin also had the highest score of 8.31. It is also noted that generally whole cassava chinchin scored higher values when compared with cassava-pigeon pea chinchin which scored within 7.21-8.31 compared to whole cassava chinchin; 7.50-8.31. Cassava-pigeon meal however had higher acceptability than whole cassava meal with mean score within 7.08 to 7.36 while whole cassava meal was 6.23-6.93.

Training in food processing will not only strengthen the current knowledge of participant, but will also avail them with the necessary skills to boost their household nutrition and the potential for increased income and livelihood.

Table 4 shows the post test result. More than eighty percent women farmers (85.7%) had better understanding of food processing, 78.7% had better understanding of cassava processing and nutritionally enhancing, and 85.7% were ready to generate income through the products.

Table 3: Consumer acceptability of whole cassava flour products compared with cassava fortified pigeon pea flour products

Samples	Colour	Appearance	Flavour	Texture	Taste	Overall acceptability
Puffpuff form						
Whole cassava flour	7.93±0.616a	7.50±0.165a	7.29± 0.941a	7.50±0.914a	7.71±1.160a	8.38±1.490a
Cassava-pigeon pea flour	6.14±1.703b	6.00±0.455b	5.71±0.311b	5.30±0.308b	6.21±0.464b	6.00±0.459b
Chinchin form						
Whole cassava flour	8.21±0.2893a	7.86±0.804a	7.50±1.557a	7.64±1.277a	8.29±1.326a	8.31±1.653a
Cassava-pigeon pea flour	7.79±1.311b	7.43±1.284b	7.29±1.570b	7.21±1.251b	7.71±0.354b	8.17±0.458b
Meal form						
Whole cassava flour	6.93±1.542b	6.64±1.588b	6.23±1.301b	6.50±1.557b	6.62±1.710b	6.69±0.1.601a
Cassava-pigeon pea flour	7.57±1.222a	7.29±1.267a	7.50±1.214a	7.35±0.034a	7.08±0.474a	7.31±0.444a

Table 4: Post test results of participants

Understanding better food processing	**Frequency**	**Percentage**
Yes	12	85.7
No	2	14.3
No answer	-	-
Understanding better cassava processing		
Yes	11	78.7
No	3	21.3
No answer	-	-
Ready for income generation using training		
Yes	12	85.7
No	2	14.3
No answer	-	-

CONCLUSION

Pre-test result showed that the women in Akufo community were trained in traditional cassava processing. The result of consumer acceptability test shows that the products were acceptable among the participants. Post test result also showed that the participants gained better understanding and were willing to generate income in cassava-pigeon pea processing. Products of improved cassava flour processing with pigeon peas were disseminated to encourage improved nutrition and livelihood among cassava growing communities. These value added products have been shown to be nutritionally better in terms of protein to help address malnutrition especially among children when consumed in form of snacks. Also to the women, selling of the products will help to boost household income and self-reliance as a business among the trained unemployed women.

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CONFLICTS OF INTERESTS

There is no conflict of interest.

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