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ORGANOLEPTIC ASSESSMENT OF PROCESSED FRESH WATER CLAM (*Galatea paradoxa*)

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ABSTRACT

Organoleptic characteristics and eating acceptability of different processed fresh water clam (*Galatea paradoxa*) from Bayelsa State, Nigeria was evaluated. A hundred and fourteen (144) samples of clams (*Galatea paradoxa*) used for the processing experiment were obtained from Amassoma market. All samples were processed traditionally viz: smoke-dried, cooked, cooked with banga sludge and fried respectively. Thirty six (36) member taste panel were randomly selected to evaluate the organoleptic characteristics of sample. Acceptability of product was scored on a 6-point hedonic scale. The highest ratings of organoleptic characteristics were recorded for fresh water clam samples prepared by frying (5.24±0.54) while the least (4.47±0.27) was recorded for samples that were prepared by cooking with water (P < 0.05). The results revealed that males had a preference for fried clam products while females had equal preference for clams fried and cooked in palm kernel sludge. The highest acceptability (88.89%) was observed in the samples that were subjected to frying method while the least (80.56%) was recorded for samples that were smoked-dried. More research should be geared towards packaging these products for export.

Key words: Acceptability, Clams, Eating, Organoleptic, Processing

INTRODUCTION

The clams, *Galatea paradoxa* (Born, 1778), *Egeria radiata* (Larmark, 1814), is restricted to the lower reaches of a few large rivers in West Africa such as the Volta (Ghana), Cross and Nun (Nigeria), and Sanaga (Cameroun) (Etim and Brey,1994). This clam has high nutritional value and constitutes an important protein source to the riparian human community where it occurs (King, 2000). The soft tissue is consumed after frying, smoking, roasting, steaming or cooking. The Clam *Galatea paradoxa* is widely consumed in Southern Nigeria and serve as a means of livelihood to young men and women in these communities who fish and process this clam. Little or no study has been carried out to evaluate the organoleptic characteristics and acceptability of the fresh water clam (*Galatea paradoxa*). This study, therefore, is aimed at assessing the organoleptic characteristics (taste, flavour, odour, texture and appearance) of fresh water clam (*Galatea paradoxa*) exposed to four techniques of processing viz: Smoke-dried, cooked in water, frying and cooked with palm kernel sludge.

MATERIALS AND METHODS

One hundred and forty four newly caught fresh water clams (*Galatea paradoxa*) were obtained from a fish seller in Amassoma market, a village situated along Oguobiri River, in Wilberforce Island, Southern Ijaw Local Government Area, Yenagoa Bayelsa State. The processed clams (*Galatea paradoxa*) were transported to the Fisheries Laboratory of the Niger Delta University where the palatability taste of fresh water clam was carried out. Processed clam products of different preparation techniques viz: smoke-dried, cooked with water, fried and cooked with palm kernel sludge were displayed for tasting.

Shells were opened up and the edible soft tissues of the clams were eviscerated. Clams were exposed to four processing treatments: Clam was cooked by boiling clam in salt water to make the shell limpy or soft. For frying, the soft tissues of clams were first cooked before frying in vegetable oil. The fresh soft tissue was also cooked in palm kernel sludge (*banga*) and finally, soft tissues of clam were also smoked - dried.

Eating quality acceptance was assessed and evaluated by thirty six (36) member taste panel invited from the Niger Delta University community. The tasting panelists (comprising 19 females and 17 males, between 20 to 50 years) were sensitized before tasting and a drafted questionnaire as in Eyo (1985) was given to a thirty six - member panel to fill. Water was given to the tasters to enable each taster appropriately differentiate the different taste of the processed fresh water clam. After every taste of each sample, the taste panel were asked to note (rank) their preference of the four variants of the samples and to score them. The panelists scored each sample for taste, flavor, texture, odour and appearance on a 6- point hedonic scale as described by Afolabi *et al* (1984) with the following scores:

- 1 = Dislike
- 2 = Dislike moderately
- 3 = Dislike slightly
- 4 = Like slightly
- 5 = like moderately
- 6 = like very much

Rating scores were tabulated, means calculated and subjected to the one – way Analysis of Variance (ANOVA) test to determine if any significant differences existed on organoleptic characteristics (Steel and Torrie, 1960) among the four treatments. Duncan Multiple Range Test was used to separate the means. Eating quality acceptability was taken as percent of total response rank of last three ranks following Afolabi *et al* (1984).

RESULTS

Summary of organoleptic characteristics scored by 36 - member taste panel is shown in Table 1. Results showed that fried sample was significantly preferred to sample processed by smoke - drying ($P < 0.05$). The highest ratings of organoleptic characteristics were recorded for fresh water clam samples prepared by frying (5.24 ± 0.54) while the least (4.47 ± 0.27) was recorded for samples that were prepared by cooking with water. Also, the mean ratings of processed clam products based on gender and age are shown in Table 2. The results revealed that males had a preference for fried clam products while females had equal preference for clams fried and cooked in palm kernel sludge. The results further revealed that the age group 20 – 30 years also had a preference for fried clam products with a mean rating of 5.32 ± 0.31 while the age group 31 – 40 years had the least ratings for clams cooked in palm kernel sludge ($P < 0.05$). Summary of eating quality (acceptability) of processed fresh water clam (*Galatea paradoxa*) by 36 – member Taste Panel is shown in Table 3. The highest acceptability (88.89%) was observed in the samples that were subjected to frying method while the least (80.56%) was recorded for samples that were smoked-dried.

Table 1: Summary of organoleptic characteristics scored by 36 - member taste panel

Organoleptic Characters	Smoked dried	Cooked in water	Cooked in palm kernel sludge	Fried
Taste	4.86	4.83	4.89	5.19
Flavour	4.75	4.63	4.86	5.33
Texture	4.75	4.44	4.83	5.25
Odour	5	4.33	4.94	5.22
Appearance	4.61	4.14	4.89	5.22
Mean rating \pm S.D	4.79 ± 0.15^b	4.47 ± 0.27^d	4.88 ± 0.41^b	5.24 ± 0.54^a

Means with the same alphabets are not statistically different

Table 2: Mean ratings (\pm S.D) of processed clam products based on gender and age

Characteristics	Smoked	Cooked in water	Cooked in palm kernel sludge	Fried
Sex				
Male	4.78 ± 0.18^b	4.47 ± 0.39^b	4.48 ± 0.15^b	5.24 ± 0.11^a
Female	4.89 ± 0.20^b	4.41 ± 0.33^c	5.22 ± 0.12^a	5.32 ± 0.16^a
Age				
20 - 30	4.79 ± 0.13^b	4.40 ± 0.29^c	4.88 ± 0.06^b	5.32 ± 0.31^a
31 - 40	5.90 ± 0.22^a	5.70 ± 0.27^a	4.90 ± 0.22^b	5.90 ± 0.22^a
41 - 50	4.67 ± 0.24^b	4.47 ± 0.38^b	4.93 ± 0.60^{ab}	5.40 ± 0.44^a

Means (on the same row) with the same alphabets are not statistically different $P > 0.05$

Table 3: Summary of eating quality (acceptability) of processed fresh water clam (*Galatea paradoxa*) by 36 – member taste panel

Rating	Smoked dried	Cooked in water	Cooked in palm kernel sludge	Fried
1	1	0	2	1
2	3	3	2	1
3	3	2	2	2
4	1	6	4	2
5	13	12	8	6
6	15	13	18	24
%ACCEPTABILITY	80.56	86.11	83.33	88.89

DISCUSSION

A driver of liking can be defined as a product characteristic (sensory attribute) which, when changed, affects liking (Moskowitz and Krieger, 1998). There was no significant difference observed between smoked and cooked samples. The fried clam had the highest score in all organoleptic parameters evaluated, while the sample cooked with palm kernel sludge, smoked dried and cooked were scored lower ($P < 0.05$). The overall organoleptic rating is in the following order: fried > cooked in palm kernel juice > smoked - dried > cooked in water. The low score received by the clam that were cooked in water could be attributed to the less condiments in the samples and this could have led to poor flavor. The highest rating of fried clam is at variance with the findings of Alfred-Ockiya (1987) which reported that the most popular and acceptable fishery product in the old Rivers state was smoked-dried fishes. The study unexpectedly gave low rating of smoke-dried fresh water clam. The low acceptability of the traditionally smoked sample may be due to the poor taste and dark smoky colour. Flavour is a combination of odour and taste and is considered an important factor in consumer acceptance of smoked fish (Eyo, 2001). Despite the seasonings that were added to increase the flavor and palatability of the clam cooked with palm kernel sludge, the appearance was not attractive and taste panelist specifically complained about the appearance before tasting this sample. Appearance and smell are important drivers of palatability (Lyo, 2001). The odour was not attractive and pleasing to the taste panelists. this may account for the rating that was accorded to it as the least palatable. When the mean scores were subjected to ANOVA at 5%, the result showed that samples that were fried were significantly preferred to sample smoke-dried, cooked in water and cooked with palm kernel juice ($P < 0.05$), while the one processed with palm kernel sludge was preferred to (smoked-dried) and (cooked with water) which had no significant difference in acceptability. This observation indicates that organoleptic characteristics are the important factors in determining consumer preference. Furthermore, sex and age were seen to influence the eating quality of the clams. Schiffman (2000) had already showed that when the smell of food was enhanced, natural intake increased with older people.

CONCLUSION

This study shows that the fried clam is the most acceptable of the clam products evaluated and that eating quality of clam is influenced by the organoleptic characteristics. Also, that age and sex of consumers influenced eating quality. More research should be geared towards packaging these products for export.

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