



AN ASSESSMENT OF THE ORGANOLEPTIC
CHARACTERISTICS OF PROCESSED SHEA FAT

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S U M M A R Y

The organoleptic characteristics of refined shea have been studied using refined de-odourised coconut oil as reference sample.

The study used untrained panelists to assess the quality of the oils as judged from the quality of fish and akla fried in them.

The results obtained indicated that whereas virgin shea fat was most unacceptable, the refined and de-odourised shea fat compared favourably with the control of refined de-odourised coconut oil.

I N T R O D U C T I O N

Shea fat is one of the vegetable fats that has long been used as cooking fat in Ghana. Less than two decades ago, it formed the main source of fat for frying in both Northern and Southern Ghana; and it was also used extensively as pomade. Whitby in 1960 calculated the consumption of virgin shea fat in the North as 18g/head/day.

With the introduction of refined and de-odourised coconut and groundnut oils, produced in the newly established oil processing mills, in addition to imported oils, the consumption of virgin shea fat has drastically declined. Although there are no definite figures for comparison, this observation has been made by the local traders who have observed a definite decline in the demand and consumption of virgin shea fat.

The substitution of virgin shea fat with better quality refined and de-odourised samples is an indication of the lower quality of shea fat into virgin form. The shea fat can also be passed through refining and de-odourising stages for vegetable oil, in general, in order to improve its quality. This has been done on laboratory level and this study has been made to compare the organoleptic characteristics of the refined and de-odourised shea fat with a well accepted coconut oil.

EXPERIMENTAL DESIGN

The frying of fish is very popular among Ghanaians. Housewives and traditional processors of fish, fry fish and serve with kenkey and hot pepper. The quality of fried fish is determined by freshness of the fish and the oil used for frying. Fresh fish purchased from landing sites at the Beach was used to assess the oils.

Akla, a popular vendor food prepared from cowpea flour was also selected as another experimental raw material. The cowpea is dehulled, dried and ground into flour. Water is added to flour to make a paste. The paste is whipped until light, seasoned and fried in oil.

The quality of oil for frying affects the taste of akla balls.

(1) Herring and cowpea flour were the raw materials used to test the three oils. The oils are refined de-odourised coconut oil as reference sample, refined de-odourised shea fat as test sample and virgin shea fat as another test sample.

Fresh herrings bought from landing sites at the beach were quickly transported under the ice to the laboratory and cleaned, salted to taste and divided into 3 groups. One group was fried in virgin shea fat, the second group was fried in refined de-odourised shea fat and the third group was fried in refined de-odourised coconut oil.

The samples were coded and served to 16 untrained panelists. The taste panel method used was the ranking method described by Larmond, 1977 and modified to suit the purpose.

The tasters were asked to taste and smell the fried products and to rank the coded samples according to choice. The tasters were also asked to detect differences due to the oil used in frying. The ranks were given numerical values and analysed statistically to find differences between the samples due to oils used in frying.

At another taste session, akla was used in assessing the oils. A standard akla recipe devised by Consumption section of Food Research Institute and indicated below was used.

AKLA RECIPE

Ingredients

250g cowpea flour
1 teaspoon salt
1 medium onion or 3 shallots
1 teaspoon freshly ground ginger
250ml water
 $\frac{1}{2}$ bottle cooking oil (for deep frying)

Method

1. Add half of the water to the cowpea flour in a bowl.
2. Beat the mixture vigorously using either an electric beater or the hand
3. Add the remaining water a little at time and continue beating until bubbles appear. (takes 15-20 minutes)
4. Add the ground onions, ginger and mix well
5. Add salt
6. Deep frying in spoonfuls in hot oil until golden brown.

The cowpea batter prepared using the above recipe was divided into 3 portions. One portion was fried in coconut oil, a second portion was fried in refined shea fat and the third in virgin shea fat.

The akla was served to 16 panelists at another taste session using the same ranking questionnaire. The data collected was analysed statistically.

Results and Discussions:

TABLE I
Ranks of Judges for Fried Fish

| Judges | Refined Shea Fat coded as 444 | Virgin Shea Fat coded as 888 | Refined coconut oil coded as 333 |
|----------|-------------------------------------|------------------------------------|--|
| 1 | 2 | 3 | 1 |
| 2 | 1 | 2 | 3 |
| 3 | 2 | 3 | 1 |
| 4 | 1 | 3 | 2 |
| 5 | 3 | 1 | 2 |
| 6 | 1 | 3 | 2 |
| 7 | 2 | 3 | 1 |
| 8 | 3 | 2 | 1 |
| 9 | 2 | 3 | 1 |
| 10 | 1 | 3 | 2 |
| 11 | 1 | 2 | 3 |
| 12 | 1 | 2 | 3 |
| 13 | 2 | 3 | 1 |
| 14 | 1 | 3 | 2 |
| 15 | 1 | 3 | 2 |
| 16 | 2 | 3 | 1 |
| Rank Sum | 26 | 52 | 28 |

Numerical Value:- 1st choice = 1 2nd choice = 2 3rd choice = 3

The rank sums were compared with statistical chart prepared by Kramer et al (1974). On the Kramer chart, the tabular entries are 25-39 for three samples judged by 16 panelists. The lowest insignificant rank sum is 25 and the highest insignificant rank sum is 39 at 5% level of significance. Comparing the rank sums of table 1 to the range of 25-39 if the Kramer chart, the virgin shea fat is significantly an unacceptable fat.

The rank sum of 26 for refined shea fat compares favourably with rank sum of 28 of the reference oil.

TABLE 2

Ranks of Judges for Akla

| Judges | Refined shea fat coded as 444 | virgin shea fat coded as 888 | Refined coconut oil coded as 333 |
|----------|----------------------------------|---------------------------------|-------------------------------------|
| 1 | 2 | 3 | 1 |
| 2 | 1 | 3 | 2 |
| 3 | 1 | 3 | 2 |
| 4 | 2 | 3 | 1 |
| 5 | 1 | 3 | 2 |
| 6 | 2 | 3 | 1 |
| 7 | 2 | 3 | 1 |
| 8 | 2 | 3 | 1 |
| 9 | 2 | 3 | 1 |
| 10 | 2 | 3 | 1 |
| 11 | 1 | 2 | 3 |
| 12 | 1 | 3 | 2 |
| 13 | 3 | 2 | 1 |
| 14 | 1 | 3 | 2 |
| 15 | 1 | 3 | 2 |
| 16 | 1 | 3 | 2 |
| Rank Sum | 25 | 46 | 25 |

Using akla to assess the quality of the oils, the reference oil with rank sum of 25 compares favourably with the refined shea fat with rank of 25. The virgin shea fat with rank sum of 46 was highly unacceptable.

When the panelists were asked to detect any difference in the smell and taste of samples due to oil used for frying, 87.5% of panelist were able to detect a difference and 12.5% of panelists did not detect any difference. The 14 panelists who correctly detected a difference claimed that the refined shea fat tasted and had an odour like the reference oil but the virgin shea fat has unpleasant odour and coating effect on the tongue. The refined and virgin shea fat foamed when used for frying.

CONCLUSION

The results obtained indicate that the refined and de-odourised shea fat compares favourably with refined and de-odourised coconut oil when used in frying fish and akla. From this point of view, it is deduced that it would be an acceptable product to consumers. It was observed however that the refined shea fat foams during frying. As foaming is only undesirable during deep-frying but does not influence the taste of the fried product, it is believed that when it is overcome, the product would then have attained an optimum quality level.

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