

TECHNICAL INFORMATION ON FOOD PROCESSING

HOW TO INCREASE YIELD IN THE TRADITIONAL
PROCESSING OF SHEA FAT

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Preface

The information contained in this pamphlet forms the basis of the extension service to traditional shea fat processors on how to improve yield of oil. It is the result of experimentation and evaluation of the traditional method of processing as practised by the majority of people in Northern Ghana. The recommendations being made constitute the first major step of injection of science and technology into the traditional practice, and it is acknowledged that there is room for greater improvement.

Introduction

The traditional method of manufacture of shea fat was in existence as far back as one and half centuries ago when Mungo Park visited Africa. The original designer is unknown but since it preceded the modern technological age, it is believed to be the result of the best ingenuity of the living population of those times. Over the years, it has been handed over with very little modification. Although many years ago, it appeared to be an efficient method because supply was greater than demand, it is now seen as a wasteful and expensive method because demand has exceeded supply. Secondly, modern technology has created more efficient methods of handling oil seeds for the extraction of oil which are likely to submerge the traditional technology. However in view of the link between traditional technologies with the economic, political and social events of the inhabitants, it has become practical to inject science and technology into the traditional practice in order not only to sustain it but to upgrade it without necessarily altering the nature of the process.

The Old Traditional Method

The Old Traditional Method of Processing Shea Kernels has the following characteristic feature:-

- (1) Roasting:- of kernels in open pan, stirred with wooden spatula until kernels are well roasted. There was no proper definition of the roasting and it varied from person to person. However the kernels were never allowed to char in the roasting pan.
- (2) Milling:- Milling used to be done on stones and wooden rollers but the advent of the corn mill, immediately took over that aspect which used to be done on stones.
- (3) Kneading:- Kneading is a word borrowed from cereal technology. It refers to the mixing by hand of dough made from a mixture of wheat flour and water and/or other ingredients. As applied to shea fat processing, it refers to the beating and mixing with the hand of mixtures of milled shea kernel and water. The process basically achieves the following:
 - a) it disentangles the fat phase from the non fat phase and consequently allows each of the two components of the associated products to be separated. The water phase is generally a mixture of water and meal and does not allow easy recovery of the meal. Depending upon the temperature of water, the process can be slow, hazardous and time consuming.

RESULT:- The net result of the old method was an oil yield of 35-40% as opposed to 90-95% achieved with modern technological equipment.

RECOMMENDATION

The New Traditional Process

- (1) Roasting:- The recommended process is based on prolonged roasting of the shea kernels till they reach the initial stages of charring in the roasting pot. This according to our trials is equivalent to the optimum roasting heat penetration required to cause a greater disruption of cell structure with its consequent release of a larger volume of oil. The oil yield by this is raised from 40% to 60% i.e. 50% increase in oil yield. The state of charring of the roasted kernels does not result in a decline of the appearance nor edible quality of the extracted oil.
- (2) Milling:- The present milling processes adopted using the corn mills was found to be satisfactory.
- (3) Kneading:- The kneading process has also been modified slightly to make it less time consuming and more standardised by the following:-
 - a) The milled mass must be boiled in an open pot with sufficient quantity of water whilst stirring with a spatula for about 30 mins.
 - b) The warm slurry must be filtered through a wire mesh sieve of $\frac{1}{16}$ inch. square placed over a receptacle. This allows for separation of meal from slurry of oil and water. The meal can then be dried on a platform for further use as animal feed.
 - c) The slurry of oil and water is cooled rapidly and this causes separation of the oil phase from the water phase. The oil phase can then be skimmed off.

Final Processes:- The final processes of boiling the skimmed fat to expel moisture has not been altered.

Results: The result of the recommended procedure in the kneading is the elimination of the use of the hand. It also enables the use of higher temperatures to melt out the fat from the slurry mixture. Thirdly, the meal can be separated with minimum fat adhering to its surfaces and also dried for secondary usage.

Further Advancement

Heat Processing: The theoretical basis of further improvement in the yield to 84% has been provided. This is based on greater heat impact on the shea kernels. It uses steaming of the kernels under pressure (15 lbs/sq. inch. steam pressure or 120°C for about 1-2 hours). The disruption of the cell structure by steam under pressure replaces the roasting processes. The equipment which can be used to achieve this objective in the rural setting is being designed.