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Development of Process and Equipment for Recovering Clean Shea Kernels from Raw Shea Fruits

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Abstract

Shea fruit is made up of a green epicarp, a fleshy mesocarp (pulp) and a relatively hard shell (endocarp) which encloses the shea kernel (embryo). The kernel contains about 60 % edible fat (shea butter) and the residual product, from which the butter is extracted (shea cake), is an exellent ingredient for livestock feed production. Shea butter is gaining popularity in soap, cosmetic, pharmaceutical, medical and engineering industries for the production of toilet soaps, pomade, drugs, ointments and metal cutting fluids respectively. These products in Nigeria have a lot of potential for export. Based on information available from literature and laboratory investigations conducted towards obtaining quality shea kernels, an improved process line was developed to process raw shea fruits in the form of clean shea kernels to be used as raw material for shea butter production. The process line consists of parboiling the shea fruits to deactivate contaminating enzymes and micro-organisms and then remove the toxic and antinutritional agents, washing the parboiled shea fruits to produce clean and sterilized shea nuts and drying the shea nuts to a moisture content of about 6 % (wet basis). The process line continues with cracking of the dried shea nuts and separation of clean shea kernels from broken shea shells. Then clean shea kernel is roasted prior to shea butter extraction. Three specific purpose process equipment were developed for the process viz: a shea nut parboiler, a cracking machine with a separating unit and a shea kernel roaster. The parboiler is capable of parboiling 70 kg of raw shea fruits at a batch while the cracking machine has an average efficiency of 89 %. The roaster has a capacity of 20 kg hr^{-1} and average performance efficiency 72 %. The shea kernel produced by this process has about 60 % fat with no urease activity and can be an excellent raw material for shea butter extraction mill. A small scale shea kernel recovery plant based on the process line developed in this study using the above three equipment can provide employment for three rural labourers at the market price of shea kernel.

Keywords: Shea fruit, shea kernel, shea butter, shea nut

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