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Technical Report

Proximate and Physicochemical Analysis on Coconut Copra Fibre Powder

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Abstract

The objective of this study was to ascertain the physicochemical and proximate values of coconut fibre powder for possible use in formulation of complement flours for baking and fortification of cereals. The CFP was packaged high-density polyethylene bags. Generally, the appearance in colour after drying was appealing with low moisture content. The pH was 6.58 which makes it suitable for food fortification and baking.

Introduction

Coconut (*Cocos nucifera* L.) is a monocotyledonous plant of the Arecaceae family widespread in the tropical areas of Asia, Africa, Latin America, and the Pacific region. Coconut is believed to have been brought to West Africa by Portuguese missionaries over 500 years ago. The early missionaries introduced the crop into the southeastern part of Ghana (Keta area). The then-British colonial government in Ghana showed keen interest in the crop, and in 1910 promoted its large-scale cultivation along the country's coastal strip (Bourdeix et al., 2005).

Coconut fruit is made up of about 38.5 % shell, 51.7 % kernel and 9.8 % water (Vigila, 2008). Coconut meat of 7–8 months' maturity is tender in texture and is a high source of protein and sugar. At this stage, the meat is either consumed as such or with sweet tender coconut water. As the nuts age, the protein, moisture and ash content of the fresh coconut meat gradually decreases, whereas the fat content progressively increases (Manikantan *et al*. 2018). Coconut meat is also high in dietary fibre (60.9 g/ 100 g), which is significantly higher than other fibre sources such as banana, cassava, or wheat (Trinidad *et al*. 2001). The high fibre content of coconut meat with respect to maturity were also reported by many researchers (Chuntarat, Na Jom, and Tongchitpakdee 2013; Santoso *et al*. 1996). Fresh coconut meat ('copra') is 35.2% fat, 3.8% protein and 40% moisture (Kwon et al., 1996).

Coconut milk, a milky white oil-in-water emulsion, is generally obtained from grated coconut meat (Tansakul & Chaisawang, 2006). The fibrous residue obtained after extracting milk from coconut usually goes waste, therefore adding value to coconut fibre will help prevent wastage and improve food security considering the immense nutritional benefit of dietary fibre. There

exists the possibility of developing complementary flours for baking and fortification of cereals using coconut dietary fibre. This study, therefore sought to ascertain some quality and nutritional attributes of coconut dietary fibre which can be added to flour and cereals to supplement nutritional needs.

Plate 1 Matured coconut

Materials and Methods

Matured coconuts were used for this research. Coconuts were sourced from the open local market in Madina, Accra Ghana. Samples were transported under ambient conditions to the Food Research Institute immediately after sampling

Preparation of coconut copra fibre powder

Coconut copra were washed, manually cut open and the meat taken out from the shell and the brown part completely scraped off. The meat was sliced into smaller chunks and then washed twice with potable water and treated with 1% sodium meta-bisulphite solution which is100g per

litre of portable water. The slice coconut meat was weighed and blended with potable water to extract the milk. The amount of water used to blend the coconut meat was twice the weight of coconut. Coconut meat weighed was 700g and potable water used was 1400ml. The mixture obtained was filtered twice using a cheese cloth, the fibre obtained after filtering was spread evenly on a tray and then dried in an oven (Gallenkamp Hotbox Oven) at 70^{o}C overnight The dried coconut fibre were milled in laboratory milling machine (Integas High Performance Commercial Blender) into a fine powder.

Plate. 2 Sliced coconut copra

Plate 3 Technologist sieving milk from mashed coconut flesh

Plate 4 coconut copra fibre ready to be dried

Physicochemical and proximate analysis on coconut fibre powder

Physicochemical analysis carried out CFP were moisture determination, colour and pH. The test methods used were International Organization for Standardization (ISO) methods on Food

Analysis. For proximate, the parameters analysed were Free Fatty Acid, Protein, Fat , Ash and crude fibre and the following standards were used respectively.

Results and Discussion

Table 1 shows the average results obtained from triplicate physicochemical and proximate analysis of the coconut fibre powder.

Tale 1: Physicochemical and proximate analysis on coconut fibre powder

Colour	pH	% moisture	% Fat	% Protein
L 90.74 a 0.26 b 7.44	6.58	0.34	63.51	15.95

The color brightness coordinate L* measures the degree of whiteness, ranging between black (0) and white (100). The chromaticity coordinate a* measures red when positive and green when negative, and b* measures yellow when positive and blue when negative. Consumer acceptability is affected by the pres- ence of color in starch, which is an indication of low quality (Galvez & Resureccion, 1993). The color brightness (L*) of the coconut fibre flour was significantly high and measures 90.74. The pH values for CFP was 6.58, average percentage moisture after drying CFP was 0.34**.**

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