

STUDY ON COCONUT MILK EMULSION STABILITY

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ABSTRACT

The study was conducted to determine some factors which affect the stability of coconut milk.

The milk stability from desiccated coconuts decreased with increase in drying temperature due to the denaturation of protein. However, milk stability increased with decrease in moisture, sugar and protein contents and with increase in total solids, NFE and phospholipid content.

By using stepwise regression analysis, a statistical model was established, defining the stability of coconut milk from desiccated nuts.

INTRODUCTION

The fruit of the coconut palm (*Cocos nucifera* L.) is the most commercially useful component of the coconut. In turn, the meat or white kernel is the most economically important part of the fruit. The meat is mostly dried into copra from which coconut oil is extracted. The fresh meat of mature coconuts yields coconut milk, which is used as food ingredient in all coconut producing countries or in the manufacture of jams like "coco honey" (Ignacio, 1976). Currently, there is a wide spread interest in the development of commercial methods of preparation yielding products of extended shelf life, such as canned coconut milk and creams (Timmins and Kramer, 1977).

Although fresh coconut meat contain only about 4% protein, they are nevertheless a potential source of protein because of the great world production of coconut, primarily in regions deficient in high protein foods. The world's coconut yield in terms of copra has been estimated to be 5.6 million metric tons annually (Orr and Adair, 1967). The coconut oil has been well characterized (Child, 1974), while amino acid composition and nutritional value of the coconut protein have been studied by some researchers, such as Srinivasan *et al.* (1964), Krishnamurthy *et al.* (1958), Phung-Le-Anh and Lugay (1967), Luis (1969), Melo (1969), Samson *et al.* (1971), Hagenmaier *et al.* (1972), Wu and Ingle (1974), Velasco (1978), Baptist (1963) and Lachance and Molina (1974). However, insufficient data has been obtained on the physico-chemical properties of coconut milk.

Little has been known of the nature of the coconut emulsion systems. Anyhow, parallels can be reasonably drawn with similar emulsions containing oil and water, stabilized by proteins like the cow milk emulsion which has been

studied extensively (Dendy and Timmins, 1973). The oil content of coconut milk differs markedly from that of cow's milk, which has about ten times as much oil as protein. The inherent instability of the coconut milk emulsion system could be attributed to its high fat content, which is 26.4% (Tejada, 1973). The difference in density of fat compared to the aqueous skim milk portion, together with the inherent immiscibility of the two phases, would cause the fat to rise to the surface of the aqueous phase resulting in creaming. Clemente and Villacorte (1933) claimed that the coconut milk emulsion is stabilized by protein. Furthermore, it was found out that phospholipids and galactomannan found in coconut milk may also affect its stability (Balasubramaniam, 1976; Balasubramaniam and Sihotang, 1979; Payawan, 1974).

Thus, it is important to study the physical and the chemical properties of coconut milk in relation to its emulsion stability and other factors which may affect the resulting processed coconut milk products. It is envisioned that this study will contribute to the improvement of the quality of preserved coconut milk, separation of proteins and oils in aqueous process, and the isolation of coconut protein.

Objectives of the Study

This study aims to determine the stability of coconut milk from fresh and desiccated coconuts and to determine the effect of heat on coconut milk stability and other factors which influence the stability of the coconut milk.

MATERIALS AND METHODS

Materials

12-month old nuts of Gading coconut (yellow dwarf variety) were used in this study. The nuts were obtained from the Lembaga Penelitian Tanaman Industri (Industrial Crop Research Institute), Bogor, Indonesia.

Methods

Chemical Composition, Physical Properties and Stability of Milk from Nuts of Varying Maturity.

Preparation of fresh coconut milk. The nuts were dehusked by using a bolo (a big knife), then broken into 2 parts, and followed by the removal of the meat from coconut shell. Measurement of the meat thickness was done at proximal, middle and distal with at least 3 measurement for each part.

The testa of coconut meat was removed by paring carefully with a knife and the meat comminuted with the use of stainless steel "parutan" (Indonesian term for manual grater).

