PHYSICOCHEMICAL PROPERTIES AND STABILITY STUDY OF VIRGIN COCONUT OIL AND COCONUT OIL

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ABSTRACT

PHYSICOCHEMICAL PROPERTIES AND STABILITY STUDY OF VIRGIN COCONUT OIL AND COCONUT OIL

The physical, chemical and oil stability characteristics of virgin coconut oil (VCO) and coconut oil (CO) were investigated. The physical analysis includes slip melting point, cloud point, dropping point, solid fat content, colour by Lovibond and microstructure. The chemical analysis includes fatty acid composition, triacylglycerol composition, iodine value and acid value. The oils were also analysed for their stability against rancidity that was monitored by using Rancimat. Virgin coconut oil had higher slip melting point (26°C) and cloud point (19.3°C) than CO (21°C and 16.17°C, respectively). The lower slip melting point and cloud point corresponds to the short and medium fatty acids. Both VCO and CO were completely melted at 25°. Hence, these oils are suitable for non-tempered confectionery fats that require a more gentle melting profile which below body temperature for a proper mouthfeel. CO had a distinct yellow colour compared to VCO that is colourless. There is not much different in terms of the crystals structure between CO and VCO. For fatty acid composition VCO had higher amount of medium chain fatty acids such as lauric (49.47%) and myristic (18.22%) acids than coconut oil (46.20%) and (17.36%) respectively. The same trend occurs in triacyglycerol analysis where the most predominant TAG in both oils is trilaurin. Virgin coconut oil also had high lower melting TAG than CO. Coconut oil had higher iodine value (6.32) than VCO (5.06) because it had short and medium chain fatty acids. For acid value, there is no significant different in the acid value between both oils. The acid value in both samples show that the samples are started to rancid when acid value analysis was done. The VCO is more stable against rancidity than CO because it took longer hours (17.05 h) than CO (8.3 h) before became rancid. This might be due to the natural antioxidant in the VCO

CHAPTER 1

INTRODUCTION

1.1 Background

In general, fats and edible oils are long chain compounds that have particular properties of importance in processing and final use (Tan and Che Man, 2002). Coconut oil (CO) is usually used as cooking oil, and as vegetable shortening after undergo the hydrogenation process. The hydrogenation process involves the addition of hydrogen to the double bonds of unsaturated fatty acids in the presence of catalyst. This process not only raise the melting point of the liquid oils, but also harden it into semisolid fats to make them more suitable for specific application such as margarine. Crude coconut oil is produced from copra (dried coconut meat).

Virgin coconut oil is identified as an emerging product of importance from coconut, both in the local and foreign market (Corpuz, 2004). Virgin coconut oil can only be achieved by using fresh coconut meat or non-copra. Non-copra is kernel (coconut meat) that does not undergo any drying process. High heat treatment or chemicals are not used in further refining, since the natural, pure coconut oil is very stable with a shelf life of several years. There are two types of methods in producing virgin coconut oil (VCO). For the first method, the coconut meat is quick dried, and the oil is then pressed out via mechanical