Preliminary Studies on the Acidity of Coconut Oil

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ABSTRACT

Edible oils and fats undergo lipid peroxidation when exposed to oxygen and light. The lipid peroxidation results in the formation of oxidized products responsible for rancidity in cooking oils such as coconut oil. Two methods are used in Sri Lanka to extract coconut oil. 'Homemade' coconut oil is prepared by boiling coconut milk and 'commercial' coconut oil is prepared by expression of copra. It is well known and proven in our laboratory that homemade coconut oil is oxidatively more stable than commercial coconut oil. The free acid content (acid value) of coconut oil was examined in this study as one factor that contributes to the faster oxidation of commercial coconut oil. The acid value of commercial coconut oil is significantly higher than that of homemade coconut oil (2.506± 0.34 vs 0.314± 0.10, mg KOH/1g oil; P = 0.0036). The rate of free acid formation was found to be about three times faster in commercial coconut oil compared to homemade coconut oil. Iron concentration in commercial coconut oil is significantly higher than that of homemade coconut oil (5.67±0.96 vs 0.597±0.073, ppm; P = 0.005).

The rancidity occurs as a result of the oxidation of free fatty acids in oils. Lower free fatty acid content in homemade coconut oil should be an important factor that contributes to the higher oxidative stability of homemade coconut oil compared to commercial coconut oil. Higher initial acidity in commercial coconut oil compared to homemade coconut oil suggests that the free acid formation occurs as a result of the hydrolysis of fatty acid esters during the processing of copra in the commercial process. For this study commercial coconut oil samples were collected from small-scale mills where copra is obtained from the nearby producers. However, commercial coconut oil samples obtained from large-scale mills where copra is stored longer times showed higher acidity (3.20±0.45 mg KOH/1g oil), indicating the formation of free fatty acids during storage of copra. Higher iron content in commercial coconut oil may be due to the contamination of oil with iron during crushing and expression of copra. The studies on the effect of iron (Fe^{2+} and Fe^{3+}) on the free acid formation and the peroxidation of coconut oil are underway.
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