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Physico-chemical characterisation of the fat from red-skin rambutan (Nephellium lappaceum L.) seed

ABSTRACT

The seeds (6.9±0.2% by weight of fruit) of the red-skin rambutan (Nephelium lappaceum L.) contain a considerable amount of crude fat (38.0±4.36%) and thus, the aim of the study was to determine the physico-chemical properties of this fat for potential applications. The iodine and saponification values, and unsaponifiable matter and free fatty acid contents of the seed fat were 50.27 g I2/100g fat, 182.1 mg KOH/g fat, 0.8% and 2.1%, respectively. The fat is pale yellow with a Lovibond color index of 3.1Y+1.1R. The fatty acid profile indicates an almost equal proportion of saturated (49.1%) and unsaturated (50.9%) fatty acids, where oleic (42.0%) and arachidic (34.3%) acids were the most dominant fatty acids. It also contained small amounts of stearic (8.0%), palmitic (4.6%), gadoleic (5.9%), linoleic (2.2%), behenic (2.1%) palmitoleic (0.7%) myristic (0.1%) and erucic (0.1%) acids. HPLC analysis showed that the fat comprised mainly unknown triacylglycerols (TAG) with high retention times indicating they have higher carbon numbers compared with many vegetable oils. The fat has melting and cooling points of 44.2℃ and ï 42.5°C, respectively, making it a semi-solid at room temperature. The solid content at 0°C was 53.5% and the fat melted completely at 40°C. z-Nose analysis showed that the presence of high levels of volatile compounds in red-skin rambutan seed and seed fat.

Keyword: Fatty acids; Melting and cooling profile; Nephelium lappaceum L.; Proximate analysis; Triacylglycerols; Volatile compounds