

Quality profile determination of palm olein: potential markers for the detection of recycled cooking oils

ABSTRACT

In this study, the safety and quality of commercial cooking oils were evaluated. The emphasis of this evaluation was on the presence of oxidation and polymerization products in fresh oils, although the analyses were often conducted on used frying fats and oils. This was because polymerized triacylglycerols (PTGs) and monomeric oxidized triacylglycerols (oxTAGs) have been proposed as potential indicators of the adulteration of palm olein. The oil quality was evaluated based on PTG content, the presence of epoxy, keto, and hydroxy acids, fatty acid composition, and smoke point. Principal component analysis (PCA) was conducted to identify the relationships among the analytical parameters. The total polar compound content of all fresh oil samples was within the safety limit for human consumption (< 25% polar compounds). TAG oligomers or epoxy, keto, or hydroxy acids were not detected in any of the fresh oil samples. Most of the packet oils had lower smoke point (< 200 °C) and linoleic acid content than the bottled oils. The pure palm olein samples were found to be better in terms of overall oil quality, as indicated by the PCA biplots of all analytical parameters. Abbreviations: ANOVA: analysis of variance; BPO: blended palm olein; DAG: diacylglycerol; FAME: fatty acid methyl ester; FFA: free fatty acid; HPLC: high-performance liquid chromatography; HPSEC: high-performance size exclusion chromatography; PC: principal component; PO: packet pure palm olein; PPO: pure palm olein; PCA: principal component analysis; SPE: solid-phase extraction; TAG: triacylglycerol; TPC: total polar compound

Keyword: Polymerized triacylglycerol; Monomeric oxidized triacylglycerol; Total polar compound; Fatty acid composition; Smoke point; Oil safety