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Occurrence of *trans*-fatty acid positional isomers in commercially available plant oils and oil-based products in Sri Lanka

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As Asians, oils and oil based products hold a significant position in most of our cuisines. In plant oils, there are two types of fatty acids called as saturated fatty acids (contain only single bonds in their carbon chain) and unsaturated fatty acids (contain one or more double bonds in their carbon chain). Unsaturated fatty acids are naturally present as *cis* form (contain same groups in the same side of the double bond), and because of the high temperature processing conditions they can be converted to *trans*-fatty acids (contain the same groups in opposite sides of the double bond). This *trans* fatty acids (TFA) will be produced during the commercially manufacturing steps of plant oils and plant oil based products called as hydrogenation, deodorizing and refining.

Unintentionally, TFA could be a major reason for several adverse health conditions such as cardiovascular diseases, diabetes and weight gain. Therefore, dietary guidelines recommend 0% *trans*-fat intake for humans. For this study, 7 most commonly consumed refined oil samples and 3 plant oil-based products were selected through a consumer survey carried out among 214 participants and a 2 months market survey. Using a series of scientific steps including modified Bligh and Dyer method, formation of fatty acid methyl esters, thin layer chromatography, Ag^+ solid phase extraction, and gas chromatography the *cis*- and *trans*-fatty acids present in all the samples were separated and identified.

Results show that the saturated fatty acid (SFA) content was 2 times higher in hydrogenated vegetable oil products and coconut oil samples than in the refined plant oil samples and *cis*-fatty acids were always prominent than *trans*-fatty acids. The TFA composition was < 0.1% from total fatty acid content in virgin coconut oil, palm oil, corn oil, and margarine 2; therefore, consumption of these varieties will be beneficial. Sunflower oil, RBD coconut oil, sesame oil, olive oil, margarine 1, and vegetable ghee contained TFA > 0.1%. Additionally, cooking methods such as deep frying, which use high temperatures can also give rise to the TFA. Therefore, methods such as air frying and shallow frying would be safe alternatives.

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