

## Modified GC temperature program method for analysis of fatty acid profiles in ready-to-eat composite diets in Sri Lanka using correction factors

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The official methods (AOCS Ce1j-07 and Ce1h-05), describe the methods for analyses of fatty acids in specific fat sources and consists of several steps including GC temperature program to resolve all fatty acids and the use of either theoretical correction factor (TCF) or empirical correction factors (ECF) for flame ionization detector response of each fatty acid. Determination of fatty acids in ready-to-eat diets using these GC temperature programs have not consistently resolved the chromatographic peaks due to complexity of the matrix and due to chromatographic conditions. This study aims to develop a temperature programme specific to laboratory GC conditions to resolve the long chain fatty acids in ready-to-eat diets. The laboratory optimized new programme (initial temperature of 90 °C increased to 140 °C with 5 °C min<sup>-1</sup> and then to 175 °C with 0.5 °C min<sup>-1</sup> rate in turn increased to 220 °C at 20 °C min<sup>-1</sup> and held for 20 min ) has separated all 44 fatty acids in the reference standard mixture (GLC 714, Nu-check prep, USA) with improved resolution and sensitivity, including co-eluted polyunsaturated fatty acid pairs (C20:3n3, C20:4n6), (C20:4n6, C23:0), (C20:5n3, C24:0) and (C24:1, C22:4) compared to AOCS conditions. Two types of diets, fried rice and rice and curry (n=18), were randomly sampled from the Colombo municipal area and analyzed for fatty acid composition using ECF and TCF separately, in the modified GC temperature program. The NIST certified secondary reference material was used as a quality control sample. The test data of fatty acids composition were revealed, that use of laboratory specific ECFs for determine some of the saturated and monounsaturated fatty acids (between C4:0 to C18:0) including C16:0, C17:0, are more accurate and reliable and also the modified temperature program is able to analyse both saturated and higher chain polyunsaturated fatty acids with better accuracy and sensitivity in the food matrix of ready-to-eat diets.

**Keywords:** Empirical correction factors, fatty acids, GC temperature program, theoretical correction factors

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