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Infant formula and adult nutritionals — Determination of total folate content by trienzyme extraction and ultra high performance liquid chromatography tandem mass spectrometry (UHPLC-MS/MS)

Préparations pour nourrissons et produits nutritionnels pour adultes — Détermination de la teneur en folates totaux par extraction trienzymatique et chromatographie liquide à ultra performance (CLUHP) couplée à une spectrométrie de masse en tandem (SM/SM)

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Foreword

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This document was prepared by Technical Committee ISO/TC 34, *Food products*, in collaboration with AOAC INTERNATIONAL. It is being published by ISO and separately by AOAC INTERNATIONAL. The method described in this document is equivalent to the AOAC Official Method 2011.06 Total Folate in Infant Formula and Adult Nutritionals by Trienzyme Extraction and LC-MS/MS Quantitation.

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Infant formula and adult nutritionals — Determination of total folate content by trienzyme extraction and ultra high performance liquid chromatography tandem mass spectrometry (UHPLC-MS/MS)

1 Scope

This document specifies a method for the analysis of total folate in infant formula and adult nutritionals using trienzyme extraction and ultra high performance liquid chromatography tandem mass spectrometry (UHPLC-MS/MS).

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
adult nutritional
nutritionally complete, specially formulated food, consumed in liquid form, which may constitute the sole source of nourishment, made from any combination of milk, soy, rice, whey, hydrolysed protein, starch and amino acids, with and without intact protein

3.2
infant formula
breast-milk substitute specially manufactured to satisfy, by itself, the nutritional requirements of infants during the first month of life up to the introduction of appropriate complementary feeding

[SOURCE: Codex Standard 72-1981]

4 Principle

Folates in a sample are extracted in a buffer (pH = 6,0) containing internal standards by treatments with protease, amylase and rat plasma conjugase (trienzyme digestion). The extract is purified and concentrated using a weak anion exchange (WAX) solid phase extraction (SPE). Polyglutamate forms of folates in the sample are deconjugated to monoglutamates during the extraction and are analysed by UHPLC-MS/MS. Folic acid, 5-methyl-tetrahydrofolate (5-CH_3-THF) and, 5-formyl-tetrahydrofolate (5-CHO-THF) are quantified, and total folate is estimated and expressed as folic acid. Isotopically labelled folic acid (^{13}C-folic acid), 5-CH_3-THF (^{13}C-5-CH_3-THF) and 5-CHO-THF (^{13}C-5-CHO-THF) are used as the internal standards (IS).

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