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In Vitro digestibility of Cyclopropane Fatty Acids in Grana Padano cheese: a study combining ^{1}H NMR and GC-MS techniques

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Abstract

Cyclopropane fatty acids (CPFA), like dihydrosterculic and lactobacillic acid, are unusual fatty acids found in microorganisms, seed oils of some sub-tropical plants, and protozoa. Recently, these molecules were detected in milk and dairy products, as well as in meat and fish. To the best of our knowledge, only a few studies have documented their presence and relevance in animals and humans. In the present work, the digestibility of CPFA from Grana Padano cheese was evaluated through an in *vitro* digestion model. Two different complementary analytical techniques (^{1}HNMR and GC-MS) were applied for better evaluating the presence of CPFA in raw and digested matrices. Results showed that CPFA were released from tri-O-acylglycerols, and that the cyclopropane ring was not degraded, indicating their stability and potential bioaccessibility after digestion in the present model. ^{1}H NMR and GC-MS analysis of the digested samples also provided comprehensive and complementary information for studying qualitatively and quantitatively the hydrolysis level of these fatty acids in complex lipid matrices.

Key words: Cyclopropane fatty acids, in *vitro* digestion, Grana Padano cheese, digestibility, ^{1}HNMR, GC-MS.