

SEPARATION OF ISOMERS OF TRIENOIC CONJUGATED FATTY ACIDS BY MULTIDIMENSIONAL GAS CHROMATOGRAPHY

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Fevillea trilobata L. (Cucurbitaceae) is a dioecious, perennial and oleaginous plant found in different areas of Brazil. Its kernel oil is used in folk medicine and has a high content of conjugated C18:3 fatty acids. Separation of these isomers by high resolution gas chromatography is performed with polar columns, but co-elution of isomers is regularly observed [1]. To try to overcome this problem, the use of multidimensional gas chromatography was evaluated. This work was conducted in an Agilent 7890A gas chromatograph fitted with a Deans-Switch system (option G2855B) and two flame ionization detectors, operated at 280°C. Samples (1.0 L) of fatty acid methyl esters (FAME) from *F. trilobata* were injected at 250°C in split mode (1:20). The set of columns tested was a HP-5MS (Agilent, 5%-phenyl 95%-methylsiloxane, 30 m x 0.25 mm x 0.25 μm) as column 1, and a SLB-IL111 (Supelco, ionic liquid, 30 m x 0.25 mm x 0.2 μm) as column 2. Hydrogen was the carrier gas, at 1.5 mL/min and 3.0 mL/min for columns 1 and 2, respectively. Oven temperature was programmed from 150°C to 250°C at 5°C/min. The Deans-Switch device was programmed using the Agilent Chemstation software (valve#1) to cut-off only the tri-conjugated FAME region. During former analyses of *F. trilobata* FAME, using a single cyanopropyl-aryl-siloxane capillary column, it was observed that circa 33% of total fatty acids corresponded to C18:3 conjugated isomers, with only one major peak. According to NMR studies (Tulloch & Bergter, 1979), it is known the existence of two major isomers, namely *cis, trans, cis* 9,11,13-octadecatrienoic acid and *cis, trans, trans* -9,11,13-octadecatrienoic acid, in a 3 to 1 proportion. The use of the 2D set of columns led to the resolution of these two isomers, which were observed in a 3 to 2 ratio (18% and 12%, respectively). At least 14 peaks were detected in this fraction, indicating that other than the tri-conjugated FAME are eluting in the same area.

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Reference:

[1] A.P. Tulloch *et al.* Lipids (1979) 14 996