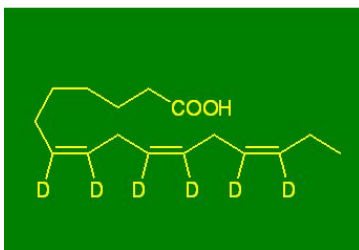


Lipid of the Month: May 2009

**D<sub>6</sub>-7,10,13-Hexadecatrienoic acid**



The history of 7(Z),10(Z),13(Z)-hexadecatrienoic acid as a natural product dates back to 1945 when Shorland obtained this new sixteen-carbon polyunsaturated acid from glycerides of leaves from rape (*Brassica napus* L.) (1-2). Jamieson and Reid (3) recorded the occurrence of 7,10,13-hexadecatrienoic acid in leaves from a selection of angiosperms (110 species) and found levels ranging from 2-20% in 37 species, trace-1% levels in 36 species, and zero levels in 37 species. Studies of glycerolipid synthesis in leaves from higher plants have revealed the existence of two discrete pathways, one of which results in the formation of galactolipids containing 16:3. This so called prokaryotic pathway leads to diacylglycerols containing 16:0 at the *sn*-2 position and 18:1 at the *sn*-1 position, and these molecules are further converted by stepwise desaturations to afford galactolipids containing 16:3 and 18:3. Plants belonging to the families *Solanaceae* (including potato, tomato and tobacco), *Brassicaceae* (including *Arabidopsis thaliana*), and *Ranunculaceae* are capable of synthesis of 16:3.

Oxygenation of leaf polyunsaturated fatty acids by lipoxygenases or  $\alpha$ -dioxygenases produces hydroperoxide derivatives which are further converted to various oxylipins by secondary enzymes (4). Studies in this area of plant lipid metabolism are focussed on linoleic (18:2) and linolenic (18:3) acid-derived compounds, the so-called "octadecanoid" subfamily of oxylipins. However, Weber *et al.* (5) in 1997 reported the presence of a hexadecanoid oxylipin, *i.e.* 2,3-dinor-12-oxo-10,15(Z)-phytodienoic acid (dinor-12-oxo-PDA), in leaves from *Arabidopsis* and potato (*cf.* "Lipid of the Month": November). It was later found

that this oxylipin mainly exists in esterified form, *i.e.* as arabinosides A and E (6,7). Another hexadecatrienoic acid-derived oxylipin is the divinyl ether fatty acid 2,3-dinor- $\omega$ 5(Z)-etherolenic acid, which is formed in many *Ranunculaceae* plants by lipoxygenase and divinyl ether synthase activities (8).

[7,8,10,11,13,14-hexadeuterio]7(Z),10(Z),13(Z)-hexadecatrienoic acid (Lipidox cat. no. A-1606) finds use in metabolic studies and as a standard for oxylipin profiling by GC-MS or LC-MS. Also available is [17,17,18,18,18-pentadeuterio]linolenic acid (cat. no. A-1853).

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