MODULATION OF PUFA BIOSYNTHESIS BY DIETARY PETROSELINIC ACID
(ω12-Octadecenoic acid) from coriander oil

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Petroselinic acid is an unusual monoenoic C18 fatty acid with a cis C=C double bond in Δ6 position; it is a positional isomer of the more common oleic acid (ω9-octadecenoic acid). The seed oils of parsley, coriander and other plants of the family Umbelliferae which are commonly used as kitchen spices contain high proportions of petroselinic acid. We have fed coriander oil over a period of ten weeks to rats and studied the physiological and metabolic effects of this petroselinic acid-rich seed oil. Our results are as follows: 1. Feeding of high doses of coriander oil leads to degenerative alterations (fatty cysts) in rat liver. 2. High amounts of petroselinic acid are incorporated into triacylglycerols and phospholipids of various organs and tissues of rats during the feeding period. 3. In the livers of animals petroselinic acid is elongated to Δ8-eicosenoic acid as well as catabolized by β-oxidation to Δ4-hexadecenoic acid. The formation of PUFA from petroselinic acid, however, was not observed. 4. Δ6-desaturation and elongation reactions of linoleic acid (ω6) are inhibited in the livers of rats in the presence of petroselinic acid leading to reduced levels of arachidonic acid (ω6) particularly in phospholipids of liver and heart.

It is envisaged that petroselinic acid having a Δ6 double bond mimics a product of Δ6-desaturase and thus induces 'pseude-product' mediated inhibition of desaturase which finally lowers arachidonic acid concentration in membrane phospholipids. It is conceivable that such reduction can be utilized therapeutically, e.g. to modulate the formation of specific eicosanoids in the treatment of certain diseases.

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ABSTRACTS

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