




Abstract

Effects of Long-Term Sunflower Oil vs. Linseed Oil Diets on Fatty Acids Phospholipids and Desaturases in Hepatocytes [†]

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Abstract: Background and Objectives: The liver plays a central role in the biosynthesis and metabolism of fatty acids. The liver's phospholipids fatty acids composition depends on the dietary intake of lipids and the efficiency of enzymatic activity in the liver. Our study aimed to simultaneously investigate the liver's phospholipids fatty acids composition and desaturase activity in response to long-term linseed or sunflower oil diets. Methods: We used adult female C57/BL6 mice and randomly divided them into a control and two other groups treated with 25% linseed or sunflower oils in isocaloric diet conditions. Before treatment, we analyzed the fatty acid profiles in dietary oils and hepatocytes. After 100 days of oil diet, we analyzed the fatty acids composition in the liver through GC-chromatography. Results: Sunflower oil elevated total monounsaturated fatty acids (MUFA) due to the increase in palmitoleic, oleic, and vaccenic acids. Linseed oil elevated linolenic (ALA), eicosapentaenoic (EPA), and docosapentaenoic (DPA) acids and reduced arachidonic (AA) and docosatetraenoic (DTA) acids, reducing the n-6/n-3 ratio. The estimated activity of desaturase 9 was significantly elevated in the sunflower oil group. The estimated activity of desaturase 5 was the highest, while the estimated activity of desaturase 6 was the lowest in the mice treated with linseed oil. Discussion: We showed that long-term linseed or sunflower oil consumption affects the liver's phospholipids fatty acids composition in different ways. Sunflower oil could have beneficial effects on the liver tissue due to the increase in the total MUFA. Based on this and other studies, we conclude that the metabolism of n-3 PUFAs after linseed oil consumption is not sex-specific in the C57/BL6 mice model.

Keywords: phospholipids; fatty acids; long-term high-fat diet; linseed oil; sunflower oil



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