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Effects of α-Linolenic Acid in Rapeseed Oil on Serum Lipoproteins

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The effect of α-linolenic acid (C 18:3 ω-3) was studied in a blind cross-over design in 40 apparently healthy, 29±9 years old, adult males and females. The two monounsaturated test diets, 1) a low-erucic-acid rapeseed oil diet (α+) containing approximately 6 g of C18:3 ω-3/day and 16 g linoleic acid (C 18:2 ω-6)/day, and 2)a TRISUN®-sunflower oil diet (α-) containing 0.8 g of C18:3 ω-3/day and 21 g C18:2 ω-6/day were fed for 6 weeks each with a 6 weeks wash out period between the test diets. The proportion of saturated fatty acids (SFA 12 En%), monounsaturated fatty acids (MUFA 18 En%) and polyunsaturated fatty acids (PUFA 8 En%) were kept similar in both diets. The subjects were provided weekly with margarine, oil, sallad dressing, bread, cakes and cookies enriched with the test oils. Fatty fish and fish oil were excluded from the diets.

The proportion of C 18:3 ω-3 in plasma cholesterol ester fatty acids increased from 0.95% to 1.25 % by the α+ diet and decreased from 0.89% to 0.36% by the α- diet ($p<0.001$ at the end of the test periods). The amount of eicosapentaenoic acid (C 22:5 ω-3) decreased by both diets, but less by the α+ diet compared with α- diet (the proportions after 6 weeks were 1.13% and 0.6 % respectively, $p<0.001$).

The starting serum total cholesterol (TC) was reduced in 6 weeks from 4.5 mmol/l to 4.1 mmol/l ($p<.001$) and to 4.2 mmol/l ($p<.001$) by the α+ and the α- diet respectively. This was mainly due to a reduction in LDL cholesterol. The total HDL cholesterol (HDL-C) levels were unaffected by both test diets. The diets did not differ in their effects on TC, LDL-C , HDL-C , VLDL-C, total triglyceride and apoprotein A-I and B levels.

Although the diets changed the plasma fatty acid composition, the C18:3 ω-3 does not seem to have an effect on serum lipoprotein levels different from the effect of C18:2 ω-6, at least under dietary conditions where there are considerable amounts of C18:2 ω-6 present.