

Effect of dietary α -linolenic acid on incorporation of phytosterols into tissues in rats

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Background - Both polyunsaturated fatty acids (PUFA) and phytosterols in vegetables and vegetable oils may contribute to the hypocholesterolemic effect of vegetable oils. However, there has been no data on the interaction between phytosterols and fatty acids, and their effects on tissue levels of cholesterol and phytosterols.

Objective - To investigate the interaction between dietary phytosterols and α -linolenic acid (ALA) on tissue levels of phytosterol and cholesterol.

Design - Ten weaning male 4 wks old Sprague-Dawley rats were on a commercial rat chow diet for four days, and then they were randomized into one of two diet groups. Both diets contained 2000 mg phytosterols/kg. In the diet A, commercial sunflower oil was used as the only added oil (70 g/kg diet), whereas, the diet B contained a mixture of 60 g sunflower oil and 10 g pure ALA/kg diet. Linoleic acid (LA)/ALA was 117:1 for diet A and 3.6:1 for diet B. On day 29, their tissues and blood were collected after injection with lethal pentobarbital sodium. The fatty acids, phytosterols and cholesterol levels in the tissues were analysed by standard methods.

Outcomes – Compared with diet A, in the diet B group, all tissues showed a significant increase in total n-3 PUFA, particularly 22:5n-3 and 22:6n-3 and decreased total n-6 PUFA levels ($P<0.05$). Not all tissues accumulated ALA or 20:5n-3 levels. Diet B group also showed increased phytosterol levels in liver, heart and lung ($P<0.05$), and increased cholesterol levels in lung ($P<0.05$) relative to diet A.

Conclusions – The present study indicated that dietary ALA modulates the incorporation of phytosterols into tissues, and also affects tissue cholesterol levels in rats.