

**Effect on red blood cell membrane fatty acids of diets enriched with different sources of n-3 fatty acids in healthy adults**

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**Background:** Consumption of n-3 fatty acids from algal-oil supplements and plant sources produce health benefits, which may be dependent on the incorporation of eicosapentaenoic acid (EPA) and docosahexanoic acid (DHA) into cell membranes.

**Aim and Methods:** To determine if plant sources (flaxseed oil and walnuts) of  $\alpha$ -linolenic acid (ALA) produce similar change in red blood cell (RBC) membrane fatty acids as algal-oil (EPA/DHA) supplements, we performed a randomized cross-over study (3 8-week study periods) in 24 healthy adults (15 women, 9 men; mean $\pm$ SE age 42 $\pm$ 2.7 years; BMI 25.4 $\pm$ 0.9 kg/m<sup>2</sup>). Under controlled feeding conditions, subjects consumed eucaloric lacto-ovo vegetarian diets [Control, ALA (6-7g/2400 kcal/d), EPA/DHA (0.20/0.72g EPA/DHA per 2400 kcal/d), and Combination (ALA + EPA/DHA)]. Fasting EPA and DHA levels were measured at baseline and at week 8 for the 3 study periods. Mixed model analyses were performed.

**Results:** Increased EPA levels were observed in the RBC membrane with consumption of the EPA/DHA (41%, p<0.0001), ALA (54%, p=0.0064) and Combination (101%, p<0.0001) diets. DHA levels increased with consumption of the EPA/DHA (49%, p<0.0001) and Combination (36%, p=0.0025) diets.

**Conclusion:** N-3 fatty acids from algal-oil and plant sources produce similar increases in RBC membrane EPA levels; however DHA levels increased only in the algal-oil containing diets.