

Effects of long term polyunsaturated fatty acids supplementation on membrane lipid composition and growth characteristics in rats.

Abstract

This study was conducted to investigate the effects of modifying the n-6:n-3 Fatty Acid Ratio (FAR) of diets using fish oil, soybean oil and butter on growth performance and the fatty acid profile of rat fed with commercial concentrate diet. Fifty individually housed Sprague-Dawley rats (average of 130 ± 2 g of body weight) were fed concentrates at 5% of body weight daily. The treatments consisted of dietary n-6:n-3 FAR of 1.94:1, 5.67:1, 51.82:1 and 61.69:1. After feeding for 20 weeks in individual cages, rats were sacrificed 15 h after feeding and samples of blood were collected. Increasing dietary saturated fatty acid increased the body weight significantly in compared to other treatment groups. Concentrations of n-6:n-3 FAR in plasma increased linearly ($p<0.05$) with increasing dietary n-6:n-3 FAR. Concentrations of CI 8:3 n-3 decreased ($p<0.001$) in the diet with high level of soybean oil whereas that of CI 8:2n-6 did not change in all treatment groups ($p>0.05$) in rat plasma with different n-6:n-3 FAR. Proportions of oleic acid in plasma were unchanged by diet. The proportion of Arachidonic Acid (AA) decreased ($p<0.05$) in plasma of rat that fed with low level of n-6:n-3 FAR in compare to the diet with higher level. Proportions of all measured long chain n-3 fatty acids were greater in plasma when diets contained more C22:5 n-3 and 22:6 n-3 from fish oil. By decreasing the dietary n-6:n-3 FAR, the proportions of long chain n-3 fatty acids in plasma increased dramatically; specifically, 22:6 n-3 and 22:5 n-3.

Keyword: n-6:n-3 ratio; Dietary fatty acid; LC-PUFA; Soyeabn oil; Rats; Plasma.