

Influence of protein intake associated with coconut or salmon oils on lipid fatty acid composition of liver and VLDL in the rat. MN Bouziane, J Prost, J Belleville (*Université de Bourgogne, Faculté des Sciences Mirande, Unité de Recherche de Nutrition Cellulaire et Métabolique, BP 138, 21004 Dijon Cedex, France*)

Protein depletion involves hepatic steatosis associated with a decrease in plasma VLDL. Triacylglycerols (TG) and cholesterol ester contents in liver are greatly enhanced by steatosis. Accumulation of hepatic lipids is attributable to modification of liver TG exportation by VLDL. Moreover, linoleic acid contents of TG-VLDL are negatively correlated with protein depletion duration. It is hypothesized that bioavailability of essential fatty acids (EFA) might be diminished by protein malnutrition. In this study, the effects of a protein-depleted diet associated with salmon (rich in n-3 polyunsaturated fatty acids: PUFA) or coconut oil (poor in AGE), on fatty acid composition of lipids in liver and VLDL were studied in young rats.

Over a 28-d period, 4 groups of 6 male Wistar rats were fed 4 different diets: SAC (20% casein + 5% salmon oil), SAd (2% casein + 5% salmon oil), COC (20% casein + 5% coconut oil), COd (2% casein + 5% coconut oil). Blood and liver were removed, plasma VLDL fractions were obtained by a single-spin discontinuous gradient. Triacylglycerol (TG) and phospholipid

(PL) fatty acid compositions of VLDL and livers were determined by gas liquid chromatography.

Liver TG. 18:2 ω 6 was diminished in the COd group and 18:3 ω 3, 20:5 ω 3 in group SAd compared with groups COC and SAC. An increase in 22:6 ω 3 was observed in group SAd compared with SAC values.

VLDL-TG. 18:3 ω 3, 20:5 ω 3 and 22:5 ω 3 were lowered and 22:6 ω 6 increased in group SAd. In group COC, 18:2 ω 6 and 20:4 ω 6 were increased compared with SAC.

Liver PL. A decrease in 20:4 ω 6/18:2 ω 6 ratio values and a rise in 20:5 ω 3 and 22:6 ω 3 appeared in SAd. Protein depletion decreased 18:2 ω 6 and 20:4 ω 6 in group COd.

VLDL-PL. 18:3 ω 3 and 20:5 ω 3 decreased and 22:6 ω 3 increased in group SAd compared with SAC. Values of ω 6 fatty acids fell in COd group compared with COC (fig 1).

Coconut oil strongly decreased unsaturation of FA in lipids of liver and VLDL compared with salmon oil. Protein depletion amplified this phenomenon. Protein depletion accelerated elongation of 20:5 ω 3 in 22:5 ω 3 with salmon oil. Protein depletion lowered the amounts of linoleic and arachidonic acids in TG liver and VLDL. It is concluded that protein depletion might therefore increase EFA requirements.

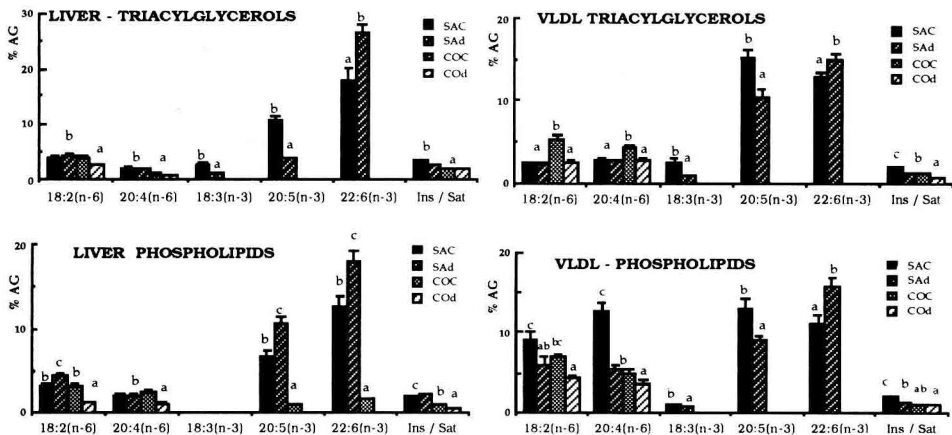


Fig 1. Values are means \pm SE for 6 rats. Classification of the means are performed using Duncan new multiple range test. Means are significantly different if letters are different ($P < 0.05$).