yet to be clarified. Two groups of six Friesian × Holstein male calves, aged 15 d, were given a conventional milk replacer containing 22.4 % dry matter as beef tallow (T) or coconut oil (CO) for 19 d. At the end of the experiment, 500 mL of peripheral blood and 10 g of liver tissue were sampled under total anesthesia. Plasma lipoproteins were separated by sequential ultracentrifugal flotation. The major lipid classes of lipoproteins and of the liver were analysed by enzymatic methods. They were separated by thin-layer chromatography and their fatty acids were analysed by gas–liquid chromatography. Hepatic concentrations of apoproteins (apo) A-I and B100, and of albumin were evaluated by western blot analysis using rabbit antisera to bovine apo A-I, apo B100 and albumin. Compared with the T diet, the CO diet induced a TG infiltration in the liver (40.1 versus 3.3 mg/g fresh liver, $P < 0.01$) but did not modify the hepatic concentrations of the other lipid classes. TG of chylomicrons and of very low density lipoproteins (VLDL) in calves fed the CO diet were rich in C12:0 (36.2 and 28.9 % of total fatty acids) and, to a lesser extent, in C14:0 (16.8 and 20.1 %) and C16:0 (15.2 and 19.0 %). In contrast, liver TG weakly incorporated C12:0 (10.4 %) for the benefit of C14:0 (38.1 %) and C16:0 (29.0 %). These results are probably explained by the preferential elongation of C12:0 into higher saturated fatty acids. TG infiltration of the liver in the CO diet is not explained by a possible alteration of VLDL and high density lipoprotein secretion by the liver since the hepatic levels (AU/10^3 cells) of their major apolipoproteins were not significantly modified by the source of dietary lipids (CO versus T) (apo B100: 15.4 versus 10.0; apo A-I:58.7 versus 42.3) as in the case of albumin (46.4 versus 49.7) which is known to be expressed constitutively.

Oleate oxidation by liver slices taken from preruminant calves fed a milk replacer containing beef tallow or coconut oil. B. Graulet, D. Gruffat, D. Durand, D. Bauchart (Inra-LCMH, 63122 St-Genès-Champanelle, France).

The preruminant calf is usually given a milk replacer rich in lipids (22.4 % of diet DM). A coconut oil (CO) based diet (rich in medium-chain fatty acids) favoured muscle proteinogenesis but induced a triglyceride (TG) accumulation (×12) in the calf liver. Modifications of the fatty acid partition between esterification and oxidation in hepatocytes could explain this lipid storage. Two groups of five 2-week-old calves were fed for 19 days a milk diet containing beef tallow (T) or CO. Liver slices obtained from biopsies were incubated for 24 h (37 °C, 95 % O_2–5 % CO_2 water saturated atmosphere) in a medium containing [^{14}C]-oleate. [^{14}C]-CO_2, generated by the slices and released in the atmosphere, was trapped in hyamine hydroxyde. [^{14}C]-acid soluble products (mainly ketone bodies) were purified following the method of Williamson (1973). Results were analysed according to the multivariate repeated measure analysis.

Oleate uptake by hepatocytes was similar between liver slices of the CO and T groups (111.4 ± 10.4 versus 91.3 ± 9.6 nmol per g fresh liver and per h, respectively). Oxidation of oleate into CO_2 in the CO group was four times lower than in the T group (0.33 versus 1.34 nmol/g/h, $P < 0.05$). Production of ketone bodies by slices was twice lower in the CO group than in the T group (9.85 versus 19.60 nmol/g/h, $P < 0.05$). Ketone bodies were the major oxidative form of oleate (95 to 97 % of the total oxidated products). Therefore, the oxidation rate of oleate in liver slices was 2.5 times lower in the CO group than in the T group (8.95 versus 21.70 % of oleate uptake, $P < 0.01$).

Under our experimental conditions, the CO diet reduced net oleate oxidation in calf liver. Liver accumulation of TG, previously observed in vivo in the CO diet, could be partly explained by an increase of fatty acid esterification in response to the reduction of the oxidative pathway.

OTHER METABOLISMS

Effects of dietary coconut oil on the density distribution and the chemical composition of plasma lipoproteins in the preruminant calf. D. Durand, D. Bauchart, C. Picherit, D. Gruffat, B. Graulet (Inra, LCMH, Theix, 63122 St-Genès-Champanelle, France.

Soybean oil added to milk replacers for preruminant calves induced hypercholesterolemia by specifically increasing the plasma concentration of high density lipoproteins (HDL). In contrast, the metabolic effects of coconut oil, rich in medium-chain fatty acids (MCFA, C8-C14: 64.9 % of total fatty acids) and presently recommended for high growth performances, are still unknown. Therefore, two groups of seven H × F male calves, aged 15 d, were given a basal milk replacer as the sole diet containing beef tallow (T) or coconut oil (CO) for 19 days. At the end of the experiment, blood samples were collected during the lipid post-absorptive period. Plasma lipoproteins were separated by sequential ultracentrifugal flotation or by density gradient ultracentrifugation. Compositions of their lipids and fatty acids were determined by enzymatic methods and by gas–liquid chromatography, respectively. Plasma contents of apolipoproteins B and A-I were determined by radial immunodiffusion. Compared with the T diet, the CO diet increased plasma-free cholesterol (30 versus 14 mg/dL, $P < 0.05$), cholesteryl esters (CE) (258 versus 127 mg/dL, $P < 0.01$), and apo A-I (129 versus 87 mg/dL, $P < 0.01$) because of specific increases in light HDL (density 1.060 to 1.091 g/mL; 285 versus 131 mg/dL, $P < 0.01$) and very light (type 1) HDL (density 1.026 to 1.091 g/mL; 65 versus 8 mg/dL, $P < 0.01$). MCFA provided by the CO diet were transported in triglycerides of chylomicrons (density < 0.950 g/mL; 23.6 % of total MCFA) and of very low density lipoproteins (density 0.950 to 1.006 g/mL; 15.0 %) and mainly in CE of HDL (44.1 %). Plasma accumulation of light HDL rich in cholesterol in calves given the CO diet can be explained by 1) a higher rate of cholesterol synthesis in hepatocytes resulting from the conversion of MCFA into acetyl CoA, 2) a higher efflux of cholesterol from tissues into plasma, subsequently incorporated in HDL as CE via the lecithin:cholesterol acyltransferase reaction, and 3) a limited uptake of HDL particles by the liver and the steroidogenic tissues.

Comparison of two saturated fatty acid intakes with steady intakes in unsaturated fatty acids on plasma lipids and fatty acids in a monk collectivity study. H. Dabadie[a,c], E. Peuchant[b], M.C. Delmas-Beauvieux[b], A. Cazanave[a], M. Bernard[a], V. Rigalleau[c], H. Gin[c], F. Mendy[a], M. Clerc[b], J. Paccalin[a] ([a]Laboratoire de thérapeutique, [b]Laboratoire de biochimie, Université Victor Ségalen Bordeaux 2; [c]Service de nutrition, Hôpital Haut-Lévêque, 33600 Pessac, France).

If oleate, linoleate and linolenate intakes are actually defined, recommended saturated fatty acid (SFA) intakes are not well known. The aim of our study was to clarify the most beneficial rate in SFA.

Twenty-five male monks without dyslipidemia (mean age: 61 years, weight: 72 kg, and BMI: 25) were provided two isocaloric (2 200 kcal) diets for 5 weeks