

Comparison Between the Effects of Dietary Saturated (16:0), Monounsaturated (18:1), and Polyunsaturated (18:2) Fatty Acids on Plasma Lipoprotein Metabolism in Cebus and Rhesus Monkeys Fed Cholesterol-free Diets

Khosla P and Hayes KC (1992). Comparison between the effects of dietary saturated (16:0), monounsaturated (18:1), and polyunsaturated (18:2) fatty acids on plasma lipoprotein metabolism in cebus and rhesus monkeys fed cholesterol-free diets. Am J Clin Nutr. **55**(1):51-62

ABSTRACT: Cebus and rhesus monkeys were fed cholesterol-free diets providing 40% of energy as fat for 6-wk periods. The fats were high-linoleic acid safflower oil (HLSO), high-oleic acid safflower oil (HOSO), or palm oil (PO), rich in polyunsaturated (18:2), monounsaturated (18:1), or saturated (16:0) fatty acids, respectively. In cebus monkeys, plasma cholesterol concentrations during HLSO intake were 17-19% lower than those during HOSO or PO intake, attributed to a decrease in high-density lipoprotein (HDL). Plasma triglyceride (TG) and low-density-lipoprotein (LDL) cholesterol concentrations were comparable during all dietary treatments. Sixty-eight percent of total LDL catabolism was receptor mediated in all dietary groups and this was associated with similar apolipoprotein B pool sizes and fractional catabolic rates. Rhesus monkeys revealed similar cholesterol concentrations (total, LDL, and HDL) during all dietary treatments. TG concentrations during PO intake were 34% and 63% higher than those during HOSO and HLSO intakes, respectively. Hence, dietary 16:0 and 18:1 produce similar effects on LDL and HDL metabolism in normocholesterolemic primates.

Study Design

- Cebus and rhesus monkeys were fed cholesterol-free diets providing 40% of energy as fat for 6-wk periods. The fats were high-linoleic acid safflower oil (HLSO), high-oleic acid safflower oil (HOSO), or palm oil (PO), rich in polyunsaturated (18:2), monounsaturated (18:1), or saturated (16:0) fatty acids, respectively.
- The monkey were randomly assigned to one of three diets of identical composition differing solely in the source of dietary fat, which provided 40% of total calories

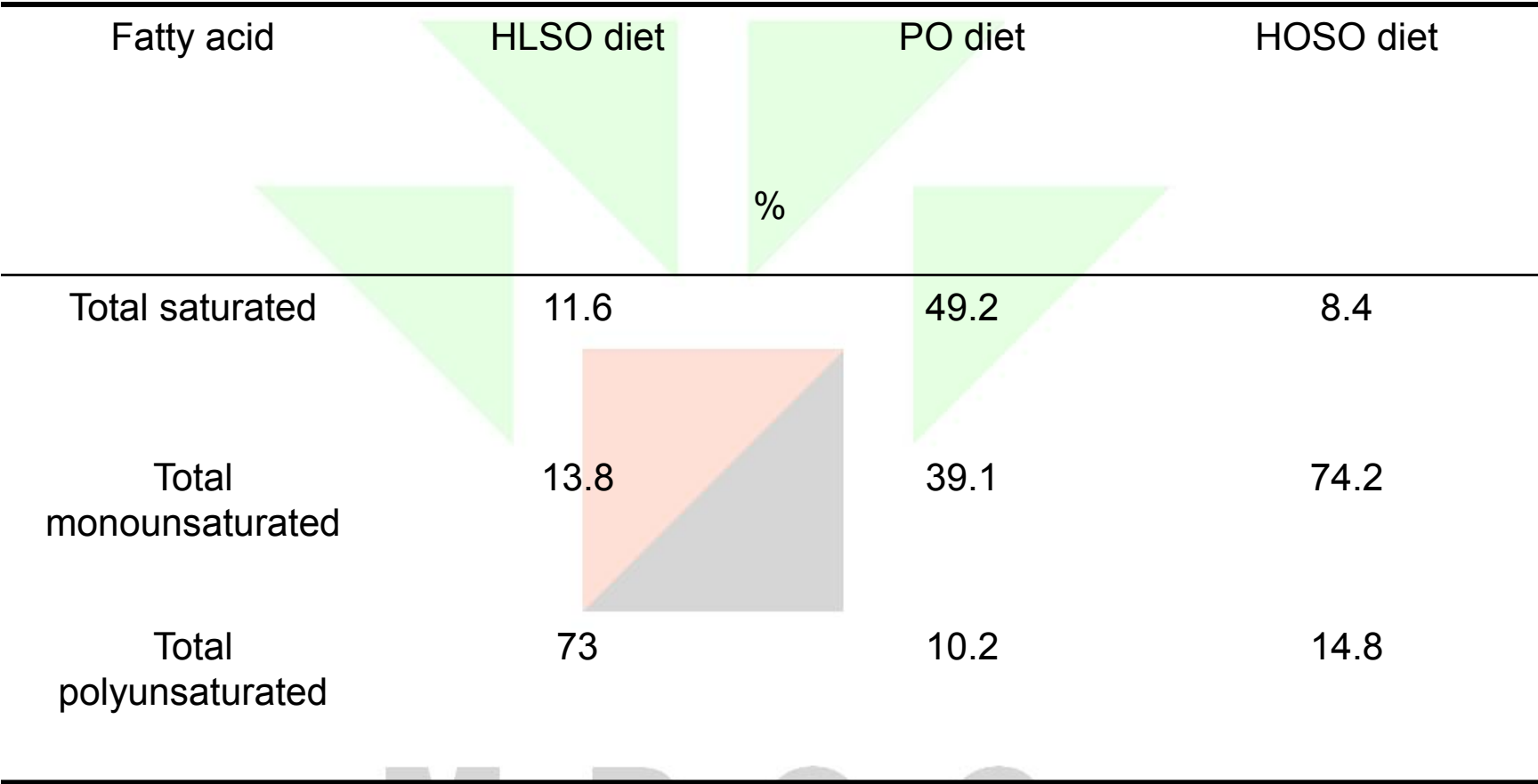
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Composition of Purified Diets*

Ingredient (g/kg)	HLSO diet	PO diet	HOSO diet
Casein	133	133	133
Lactalbumin	57	57	57
Sucrose	232	232	232
Cornstarch	172	172	172
Cellulose	100	100	100
Fat			
High- linoleic safflower oil	190	0	0
Palm oil	0	190	0
High-oleic safflower oil	0	0	190
Salt mix	48	48	48
Vitamin mix	5	5	5
Choline chloride	3	3	3

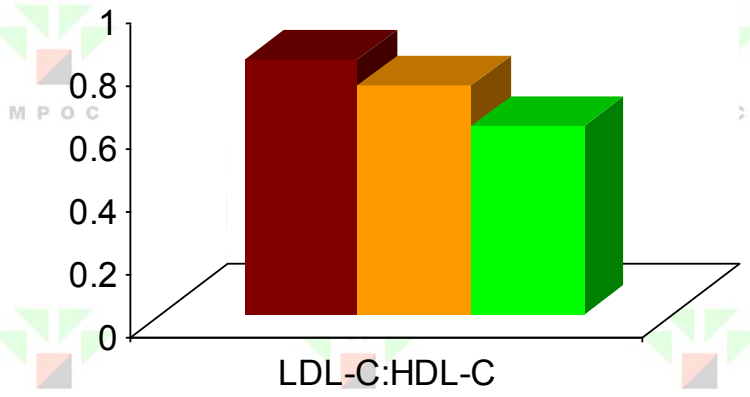
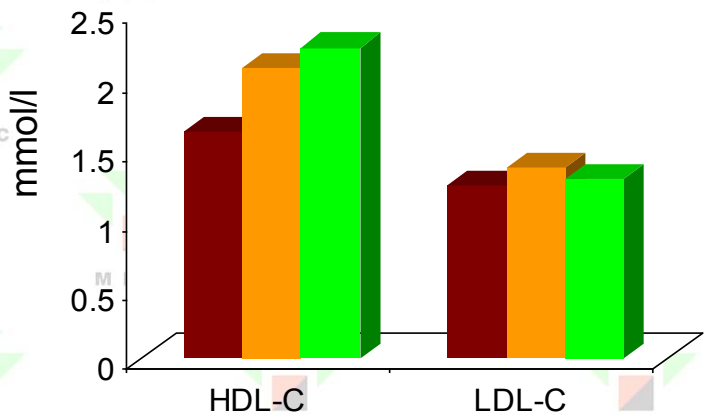
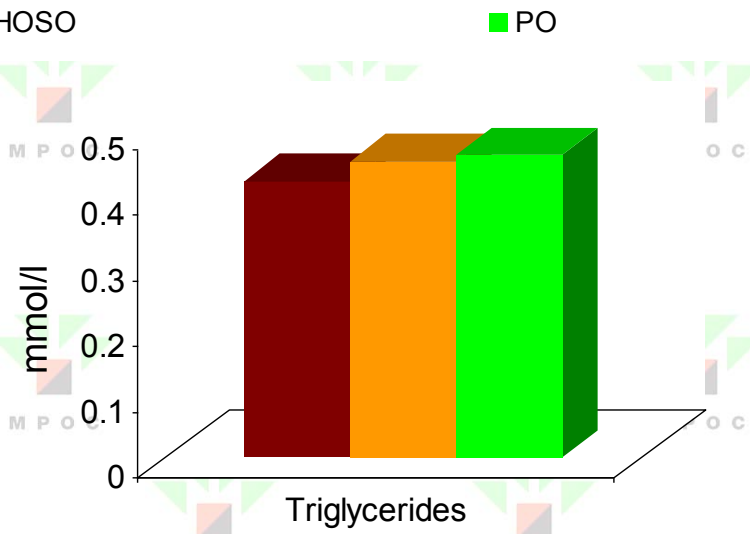
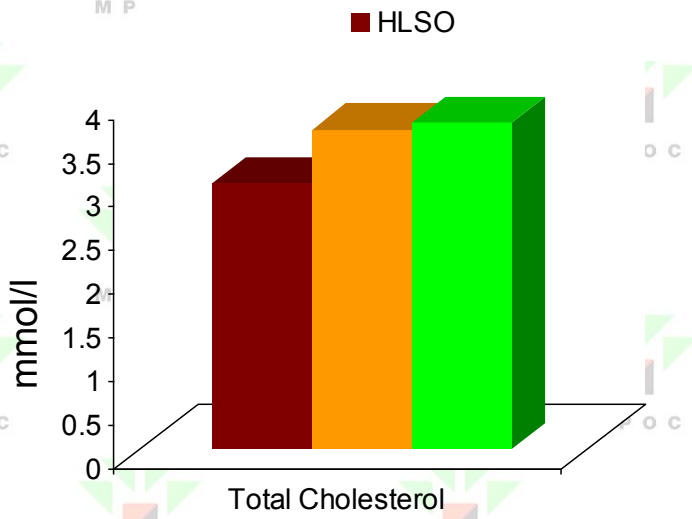
*HLSO ,high-linoleic acid safflower oil; PO ,high-palmitic acid palm oil; HOSO,high-oleic acid safflower oil

Fatty Acid Composition of Purified Diets



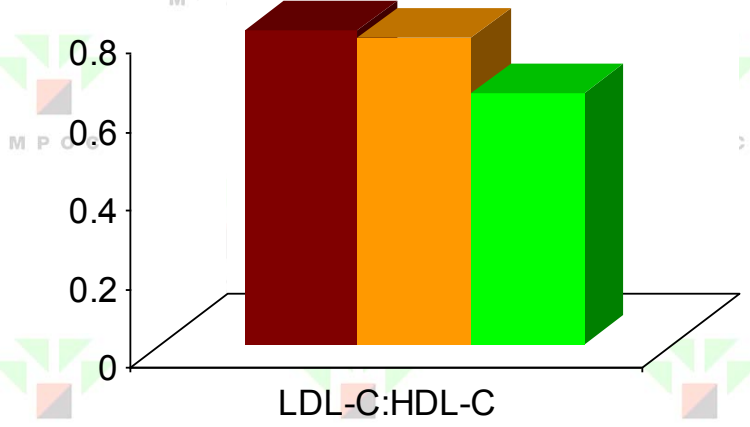
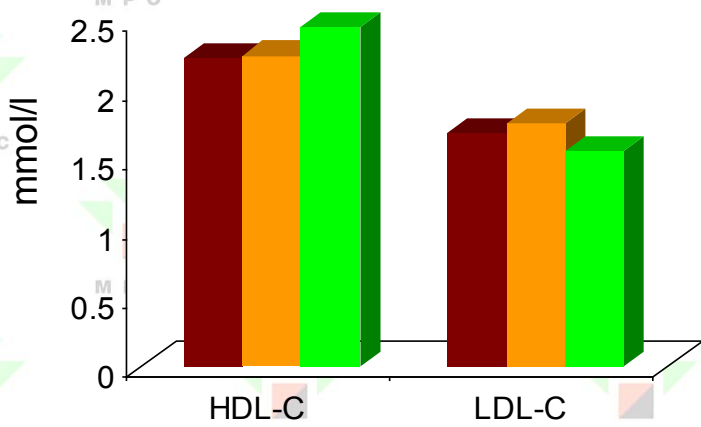
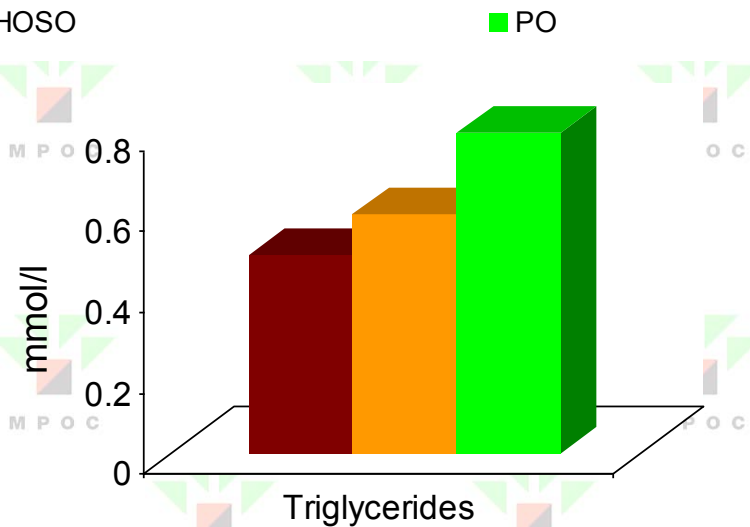
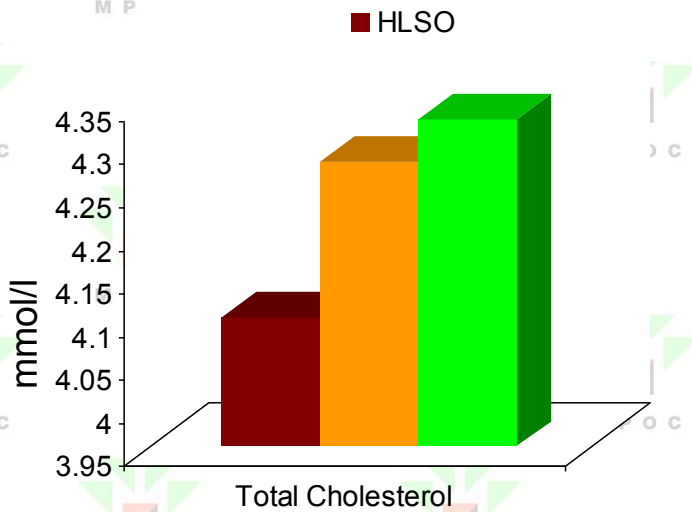
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Plasma Lipid Concentrations in Cebus Monkeys Fed Cholesterol-free HLSO, HOSO, or PO Diets



In Cebus monkeys, Total Cholesterol concentrations during HLSO intake were lower than those during HOSO or PO intake, attributed to a decrease in HDL-C

Plasma Lipid Concentrations in Rhesus Monkeys Fed Cholesterol-free HLSO, HOSO, or PO Diets



Triglycerides concentrations during PO intake were higher than those during HOSO and HLSO intakes and Rhesus monkeys revealed similar cholesterol concentrations during all treatments

Conclusion

Dietary saturated palmitic acid (C16:0) and monounsaturated oleic acid (18:1 n-9) resulted in similar effects on LDL and HDL metabolism in normocholesterolemic primates.

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