

Palmolein And Groundnut Oil Have Comparable Effects On Blood Lipids And Platelet Aggregation In Healthy Indian Subjects

Ghafoorunissa, V. Reddy, et al. (1995). "Palmolein and groundnut oil have comparable effects on blood lipids and platelet aggregation in healthy Indian subjects." Lipids 30(12): 1163-9.

ABSTRACT: Substitution of palmolein (POL) for groundnut oil (GNO) doubles saturated fatty acids and decreases by half the linoleic acid (18:2n-6) content of Indian diets. The effects of this substitution on selected parameters of cardiovascular risk and membrane functions were studied in middle-aged subjects. Both metabolic (short-term) and "in-home" (long-term) studies were conducted, and the subjects were crossed over from GNO to POL or vice versa. During both studies and in both sexes, blood pressure, plasma levels of total cholesterol and triglycerides and their distributions in various lipoprotein fractions were not altered. The lower 18:2n-6 and higher 16:0 intakes were reflected in fatty acid compositions of cholesteryl esters and triglycerides. However, the plasma and platelet phospholipid fatty acid patterns did not shift toward saturation. The observation that the levels of long-chain polyunsaturated fatty acids in phospholipids were similar at the end of GNO and POL regimens indicates that 18:2n-6 furnished during POL regimen may be sufficient to maintain the levels of arachidonic acid in cell membranes. Platelet aggregation, erythrocyte membrane fluidity, and activity of Na⁺, K⁺ ATPase, a membrane-bound enzyme, were essentially similar at the end of the two oil regimens. These results indicate that POL is comparable to GNO and may not induce hypercholesterolemia in Indian subjects consuming cereal-based diets containing 30% total fat calories and low cholesterol.

Subjects' Characteristics at Entry into Studies

	Study 1		Study 2			
	Mean	Range	Mean	Range	Mean	Range
Age (years)	35	29-39	43	30-52	38	33
BMI (kg/m ²)	21	18-27	23	17-26	24	16
Systolic Blood pressure(mm Hg)	112	100-120	111	110-150	116	102
Diastolic Blood pressure (mm Hg)	79	70-84	83	70-102	83	72
Total Cholesterol (mg/dL)	152	120-185	179	120-260	162	140
Triglycerides (mg/dL)	88	35-170	90	36-125	68	43

Study 1: Short-term (metabolic study), n = 12 men

Study 2: Long-term (in-house study), n = 12 men & 12 women

Average Daily Intake (g/day) Of Fatty Acids From Total Diet Consumed by Volunteers

Fatty acids	Study 1		Study 2	
	GNO (n=12)	POL (n=12)	GNO (n=12)	POL (n=12)
Total SFA	8.2	12.2	11.4	15.0
16:0	4.0	9.0	6.0	12.0
18:0	1.2	1.0	2.0	2.0
Other	3.0	2.2	3.4	1.0
Total MUFA	9.9	9.7	11.4	11.7
18:2n-6	6.9	3.2	7.1	3.4
18:3n-3	0.2	0.2	0.3	0.2
PUFA/SFA	0.8	0.3	0.6	0.2
18:2n-6/ 18:3n-3	33.0	15.0	30.0	16.0

GNO: groundnut oil; POL: palm olein

Average Daily Intake of Macronutrients

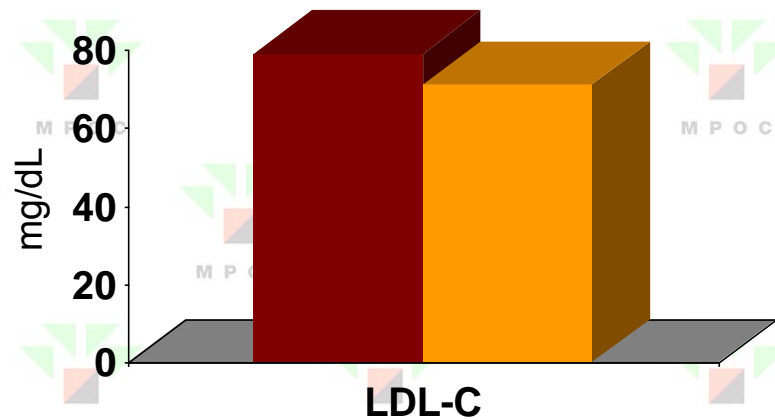
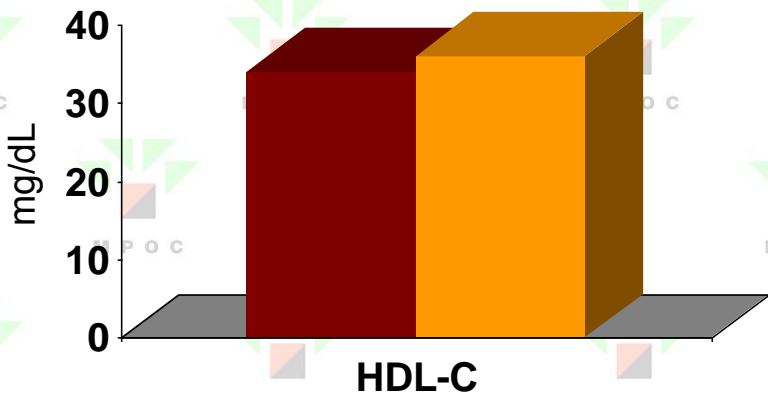
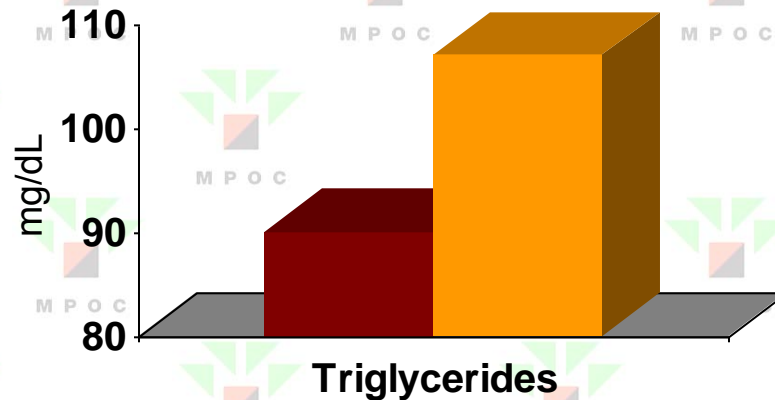
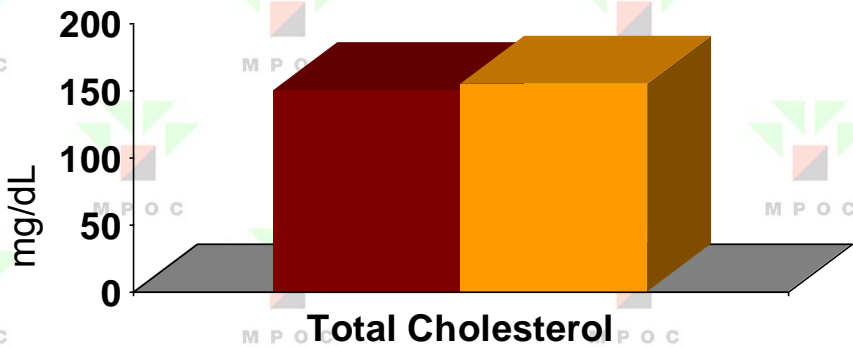
	Study 1		Study 2	
	Before experiment (GNO)	After Experiment (POL)	Men (n=12)	Women (n=12)
Total energy (kcal)	2080	2565	2120	1770
Protein (en%)	13	12	12	13
Total fat (en%)	27	27	32	32
Fat from all the food items (en%)	11.2	9.5	11.5	11.5
Cooking oil (added) (en%)	15.6	17.5	20.0	20.3
Cholesterol (mg)	85	50	80	71

Values are mean \pm SE

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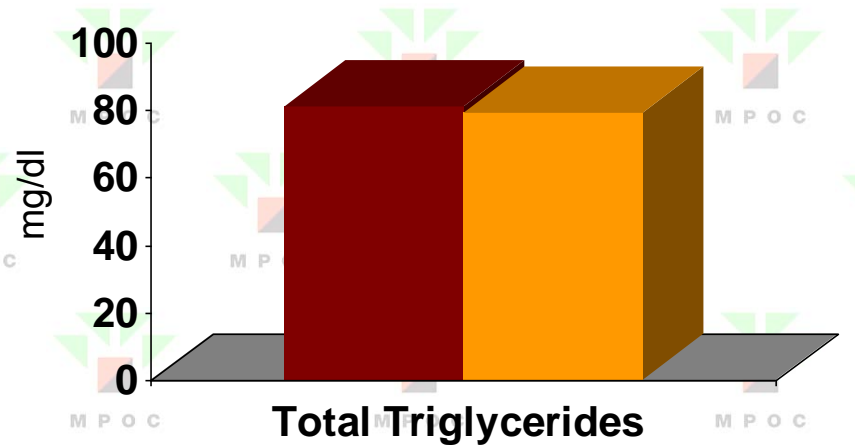
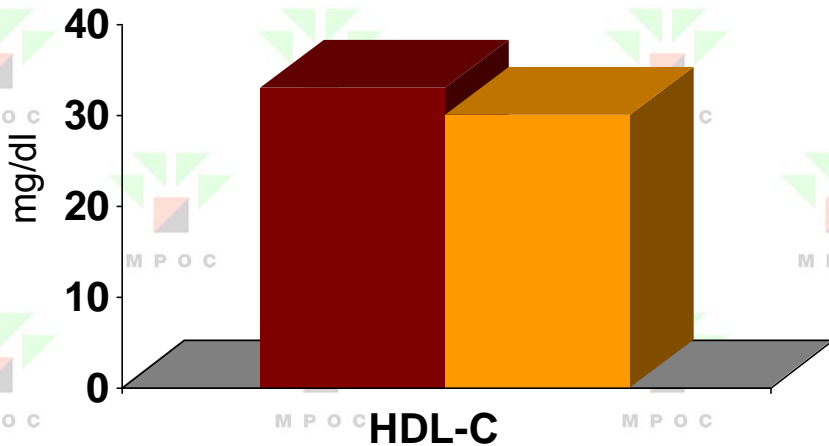
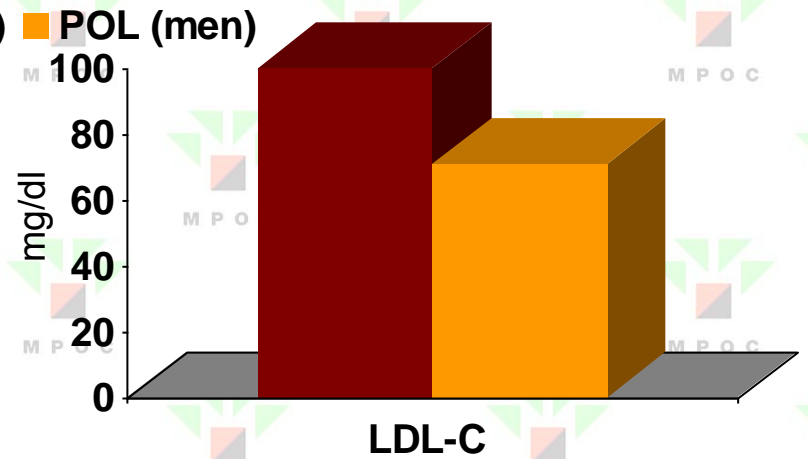
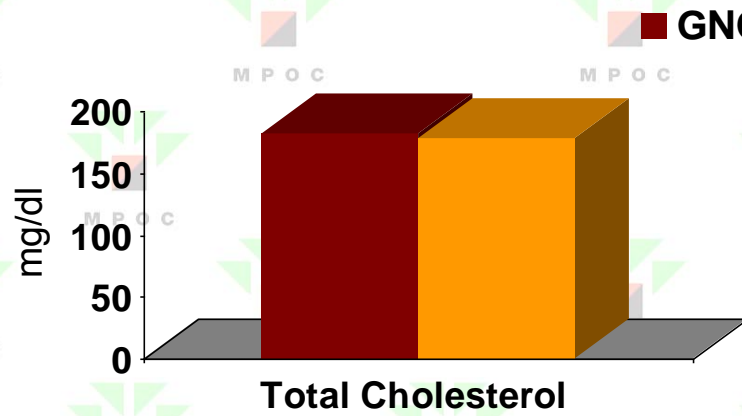
Blood Lipids Changes: Study 1

■ GNO ■ POL



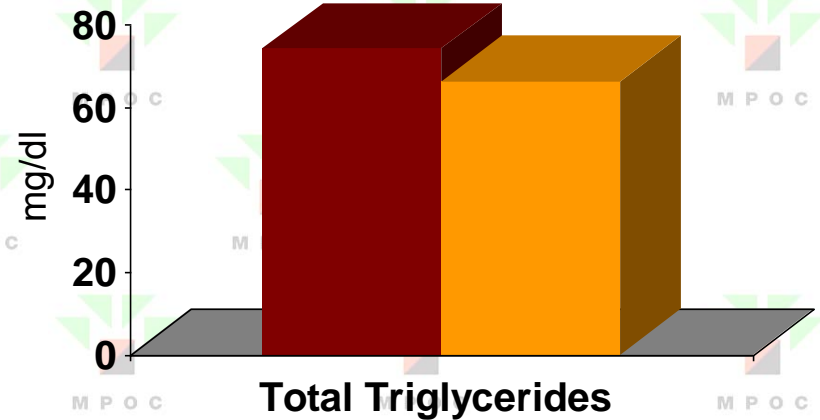
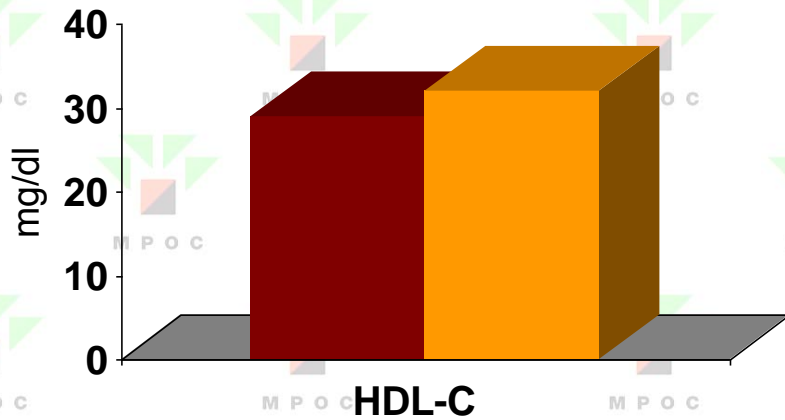
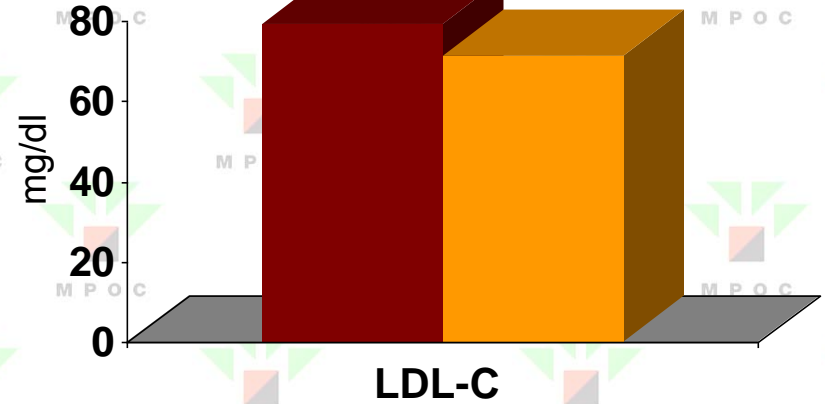
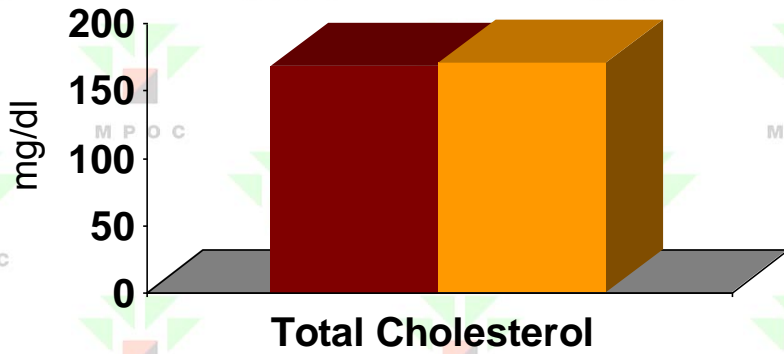
POL is comparable to GNO

Blood Lipids Changes: Study 2 (Men)



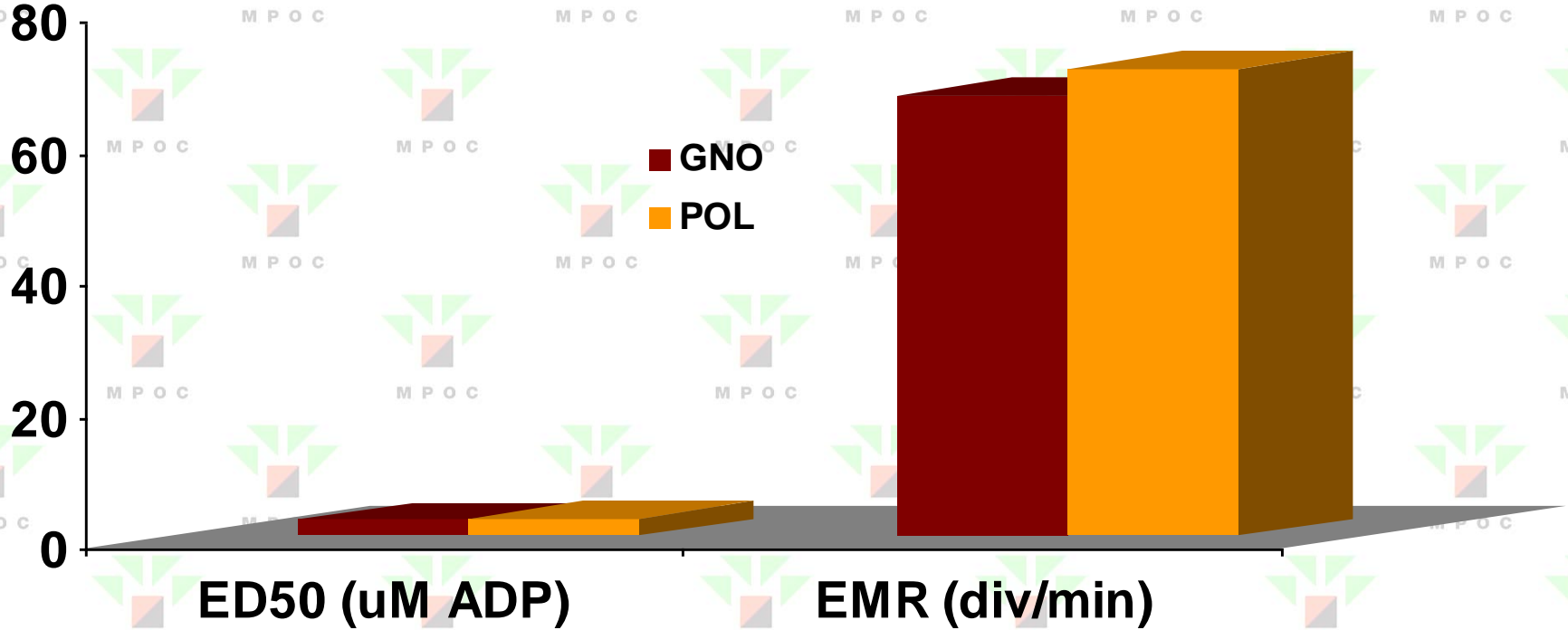
Blood Lipids Changes: Study 2 (Women)

■ GNO (women) ■ POL (women)



Platelet aggregation: Study 1

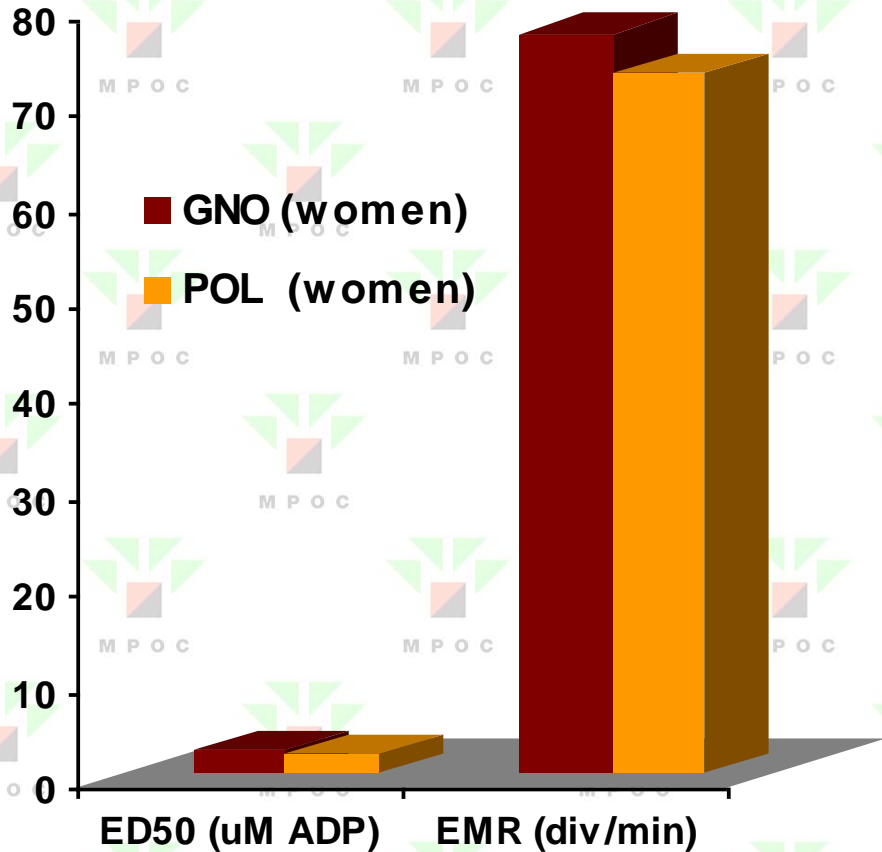
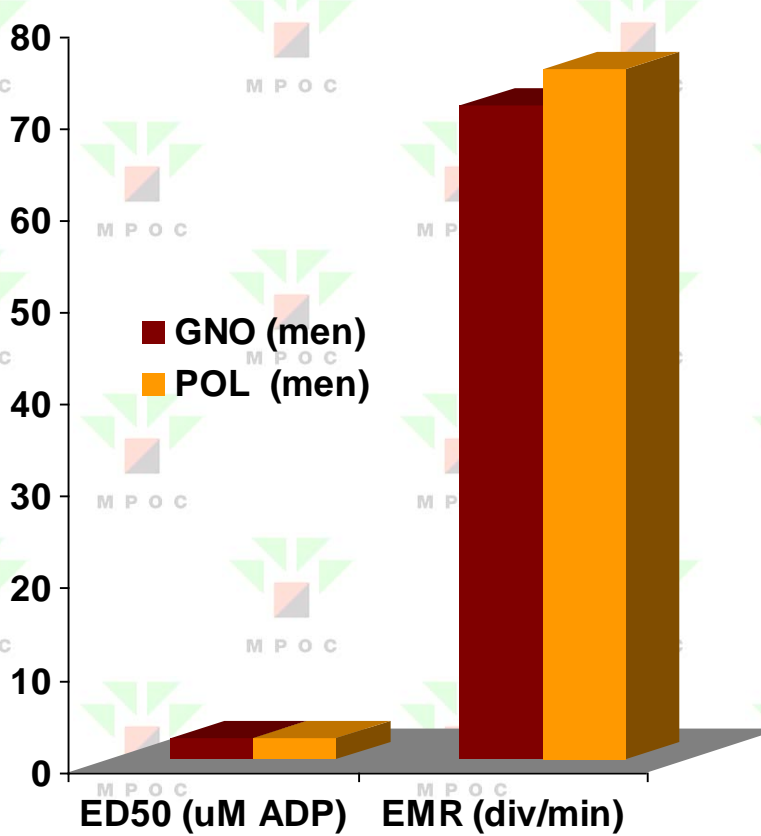
Platelet-rich Plasma



Substitution of GNO with POL does not affect platelet aggregation

Platelet aggregation: Study 2

Platelet-rich Plasma



Substitution of GNO with POL does not affect platelet aggregation

Erythrocyte Membrane Functionality: Study 2

Na⁺, K⁺ ATPase

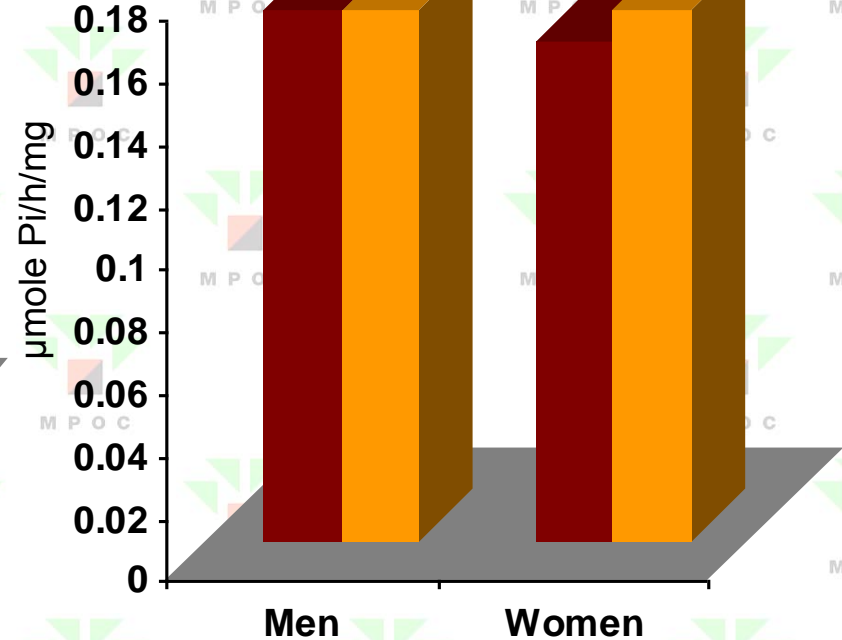
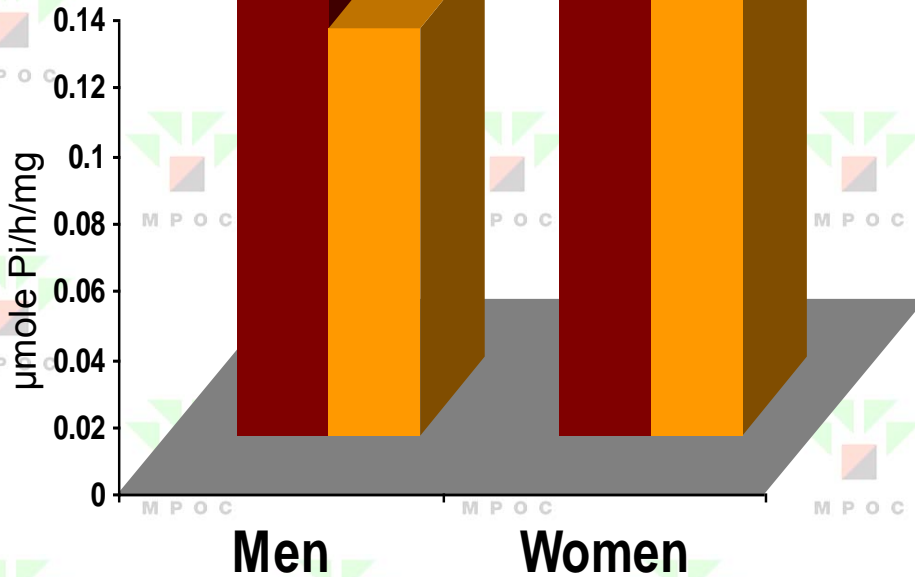
Membrane fluidity (rs)

GNO

POL

GNO

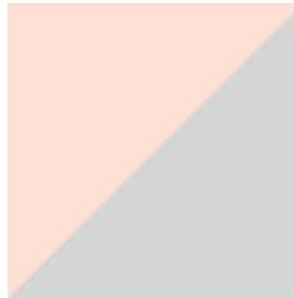
POL



Substitution of GNO with POL does not altered these membrane functions

Conclusion

POL is comparable to GNO and does not appear to induce hypercholesterolemia in Indian subjects consuming a palm olein based diet .



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