

The Effect of Replacement of Dietary Fat by Palm Oil On in Vitro Cytokine Release

Engelberts, I., K. Sundram, et al. (1993). "The effect of replacement of dietary fat by palm oil on in vitro cytokine release." Br. J. Nutr. **69**(1): 159-67

ABSTRACT: In the present study the effect of replacement of dietary fat by palm oil in the normal Western diet on the in vitro release of the inflammatory cytokines tumour necrosis factor (TNF), interleukin (IL)-6 and IL-8 was examined. A maximal replacement of 700 g/kg dietary fat was achieved for thirty-eight male volunteers who consumed either a palm-oil diet or a control diet in a double-blind, cross-over study with 6-week experimental periods, and 3-week run-in and wash-out periods. At the end of both experimental periods, whole blood was stimulated in vitro with 0.02 (sub-optimal), or 10 ng lipopolysaccharide (LPS)/ml (maximal), whereafter TNF, IL-6, and IL-8 concentrations in the culture supernatant fraction were measured using specific enzyme-linked immunosorbent assays (ELISA). Mean cytokine production with sub-optimal, or maximal LPS stimulation of peripheral whole blood was similar for both the palm oil, and the control group. The relative TNF response, however, was reduced by replacement of dietary fat with palm oil. Separate analysis of the data from the first and second experimental periods strongly suggested that the residual effect of the palm-oil diet on the relative TNF response was longer than 9 weeks. Cytokine homeostasis determines the course of the inflammatory response and the progression of atherosclerosis. The effect of palm-oil consumption on the proneness of the peripheral blood cells to produce TNF may, therefore, alter the prevalence of these common diseases.

Subjects and Study Design

- 38 healthy male volunteers with average age 19-45 years
- The study was design as a doubled-blind cross over trial, consisting of two periods of 6 weeks. The 3 months for run-in period and the other 3 months as wash-out period. Each 3 months consisted of randomized experimental and control groups
- Experimental group received the palm oil products whereas control group received the control products

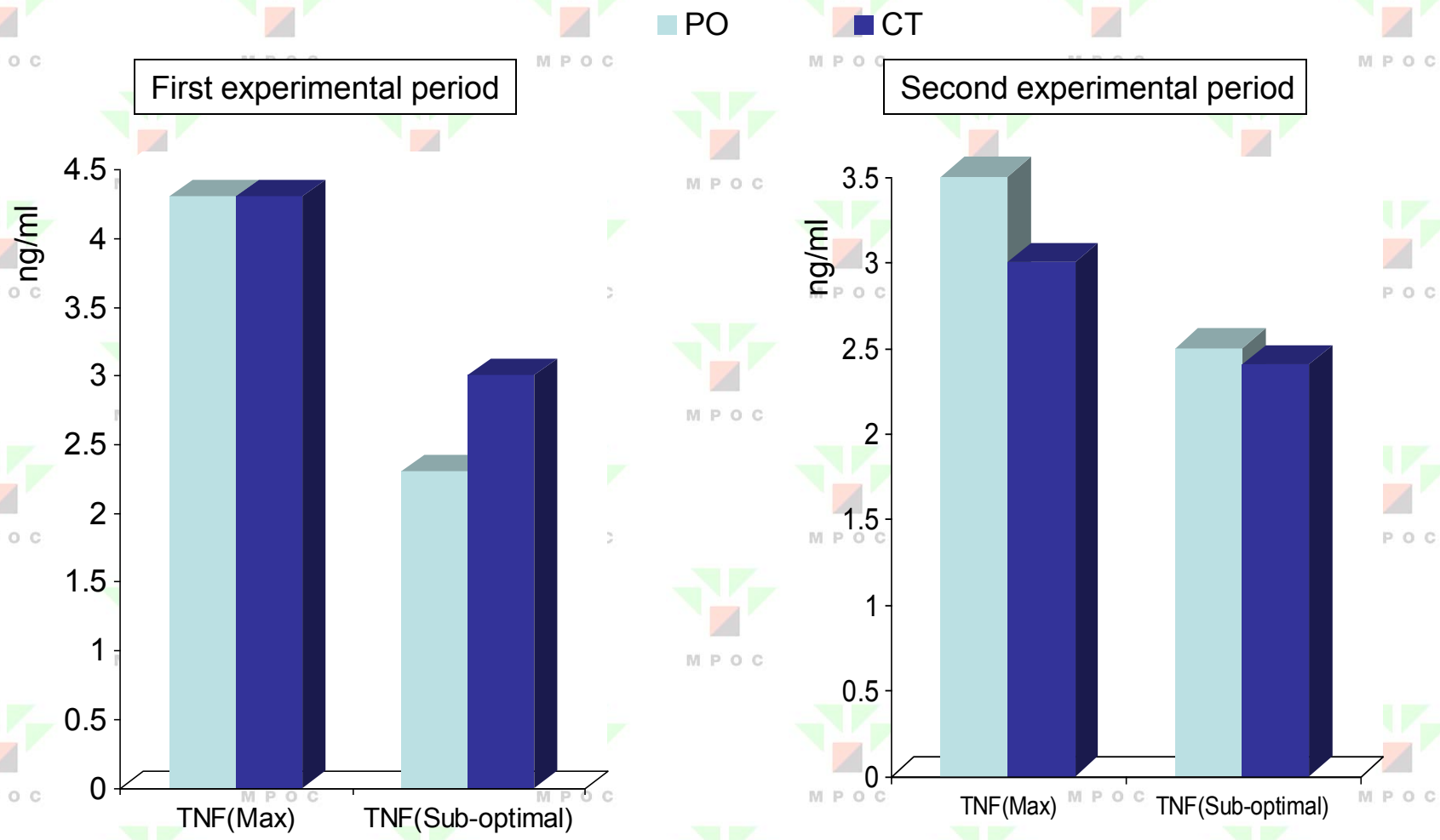
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Diet Composition

	Control Group (CG)	Palm-oil Group (PO)
Energy intake (MJ/d)	14.4	14.6
Fat intake(%)	41	40
Ratio polyunsaturated/saturated	0.01	0.4*

M P O C

Cytokine Production by Lipopolysaccharide (LPS)-stimulated Whole Blood in Vitro in Subjects Consuming a Control Diet (CT) or a Diet in which Palm Oil (PO) Maximally Replaced the Regular fat Consumed

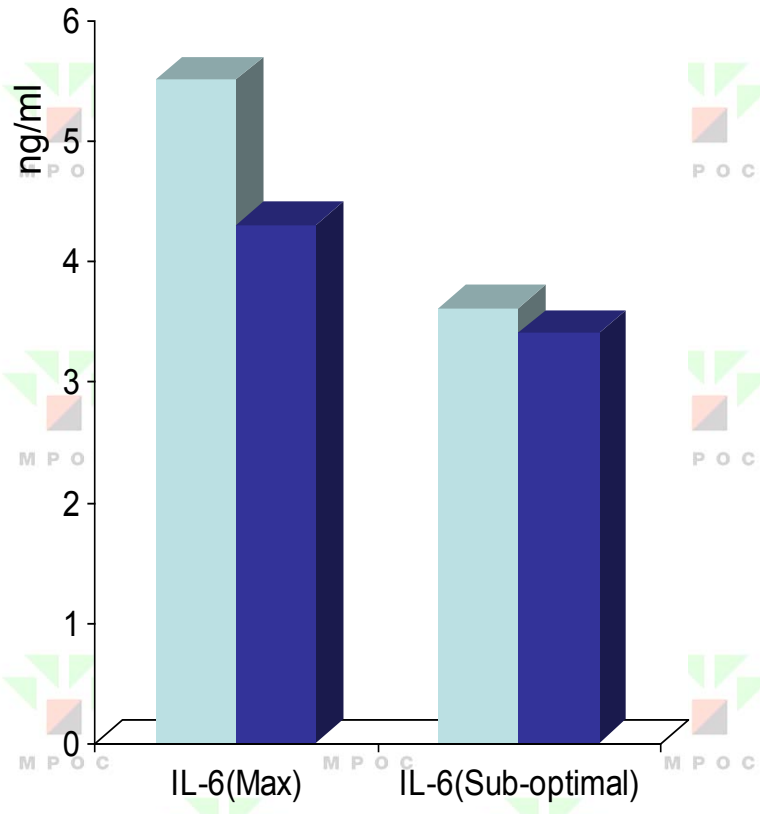
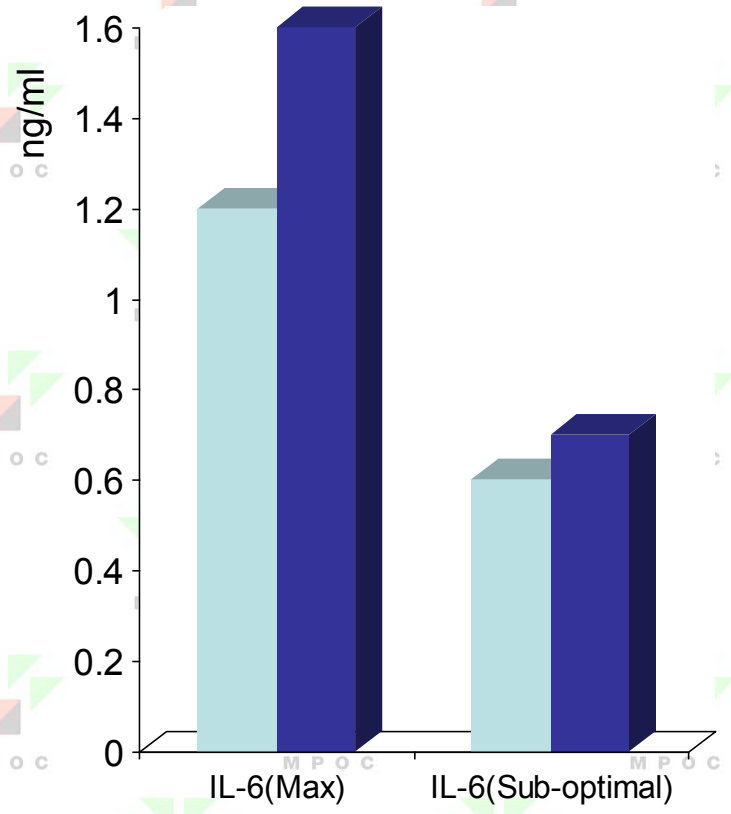


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First experimental period

Second experimental period

PO CT



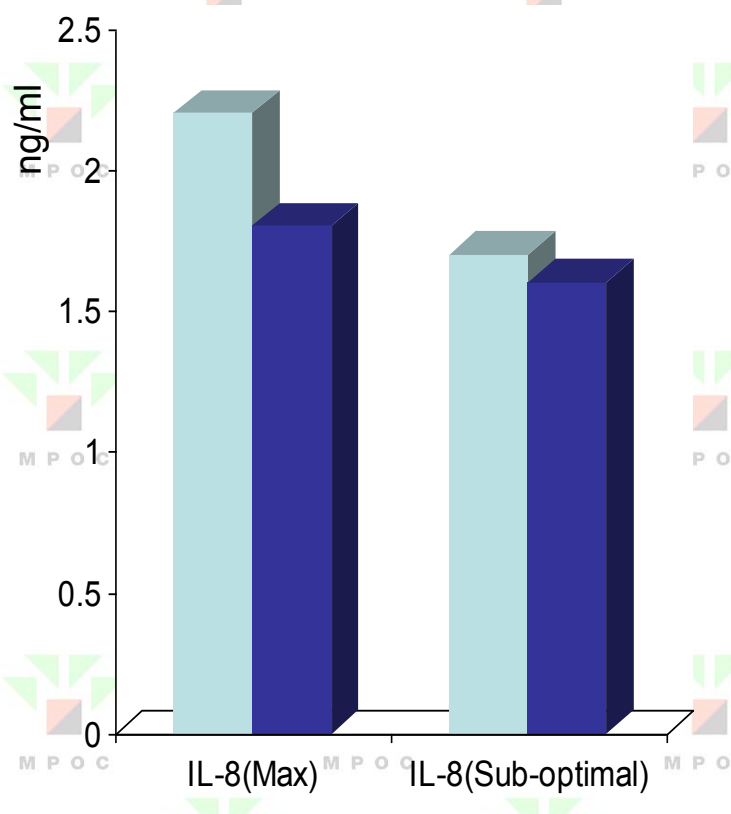
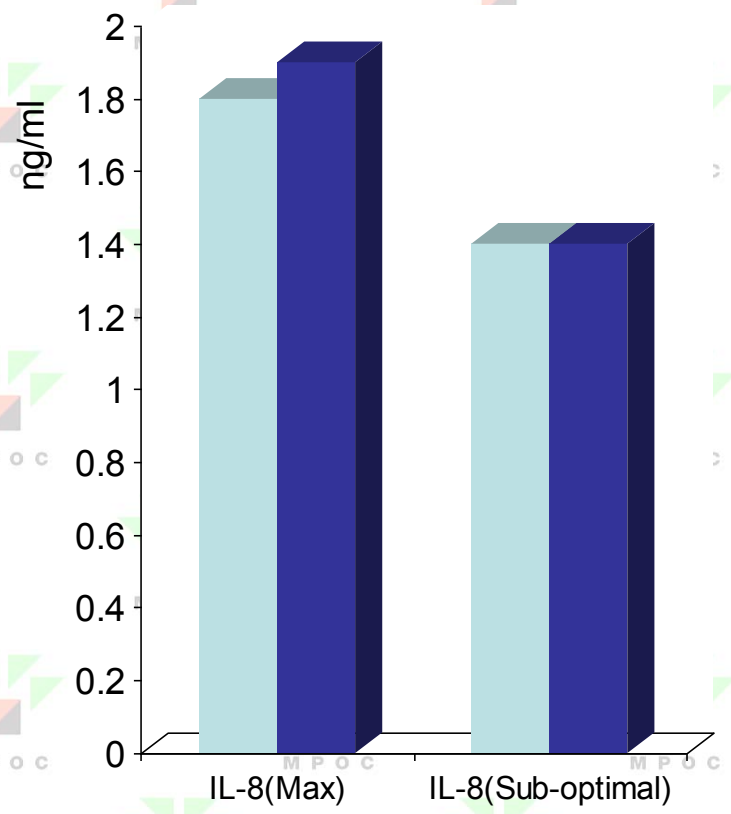
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First experimental period

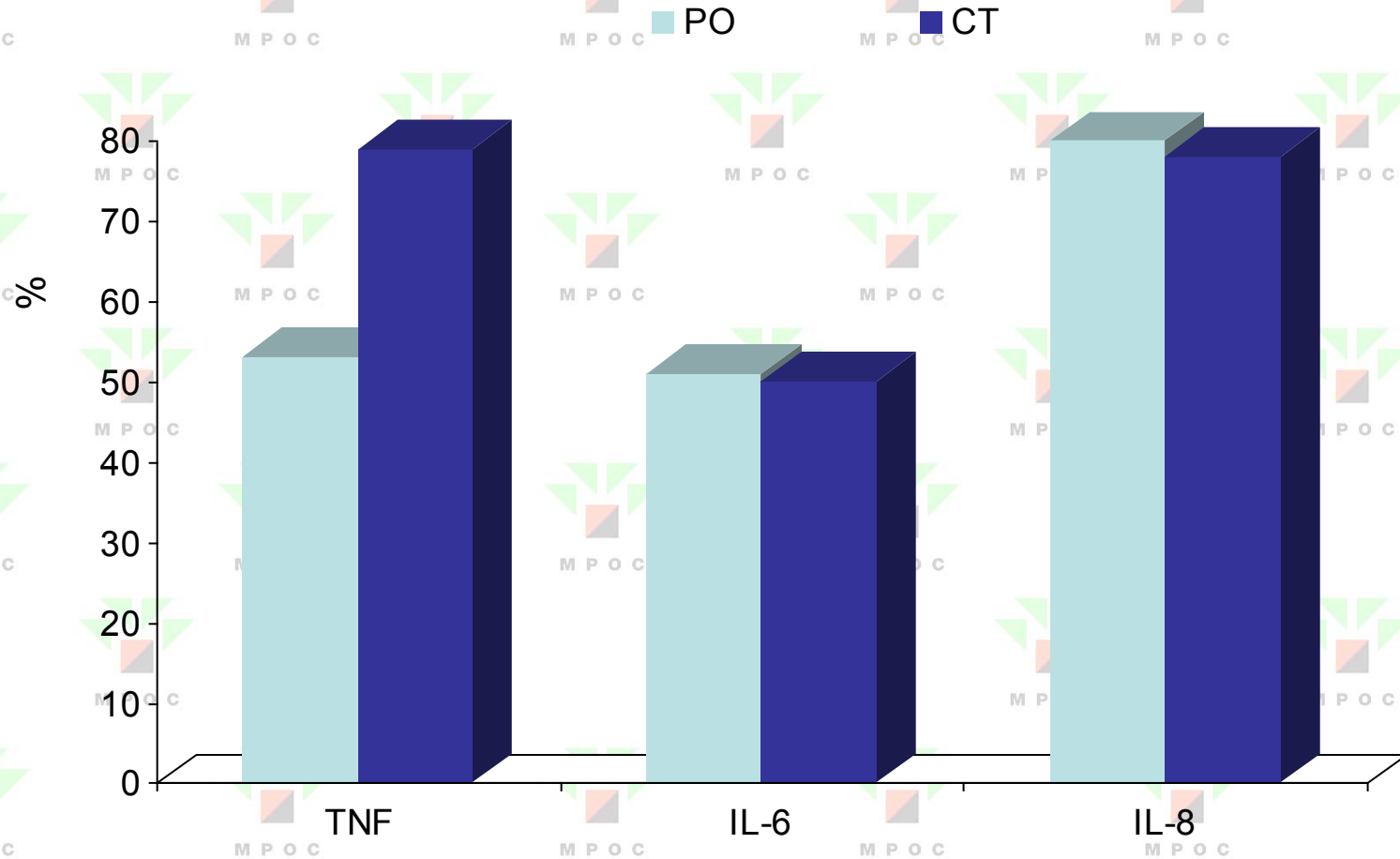
Second experimental period

PO

CT



Relative Cytokine Response By Whole Blood from Subjects Consuming a Control Diet or Diet in which Palm Oil Replaced a Maximum of 700g/kg Dietary Fat to a Stimulus with LPS in Vitro



Relative TNF production reduced for palm oil group

Conclusion

In humans, maximal replacement of the normal fat consumed in a typical Dutch diet with palm oil tended to reduce TNF production and may alter (beneficially) the course of inflammatory response and progression towards atherosclerotic disease. More studies are suggested to elucidate these observations.

M P O C