

**LOW FAT DIETS RICH IN LEAN MEAT : THE EFFECTS OF ADDITION OF SAFFLOWER  
AND OLIVE OIL**

S.A. MORGAN, A.J. SINCLAIR and K. O'DEA

The risk of coronary heart disease is influenced by dietary factors such as type of fat, amount of fat and P:S ratio. The effects of these different factors on the various plasma lipoproteins is still unclear. Previous studies have shown that the cholesterol-lowering effect of low fat diets enriched with large amounts (500g/day) of lean beef is reversed with the addition of beef fat (O'Dea et al. in press). The aim of this study was to determine the effect of the addition of two common dietary fats, one polyunsaturated and one monounsaturated on the cholesterol lowering effect of low fat diets rich in lean beef.

Twenty two healthy, weight stable subjects participated. Each study lasted five weeks; in the first week the subjects consumed their usual diet; in weeks 2 and 3 they consumed a very low fat diet (9%) containing 500g/day of fully fat-trimmed lean beef, and in weeks 4 and 5 they continued with the lean beef but added either safflower oil or olive oil in a stepwise manner, 10% and 20% energy respectively.

Neither mean body weight nor total energy intake changed significantly during the study. Changes in lipoprotein lipid composition over the 5 week dietary intervention are presented below (mean $\pm$ SEM, mmol/l).

Safflower oil	Week 1	Week 2	Week 3	Week 4	Week 5
Total cholesterol	5.59 $\pm$ 0.22	5.07 $\pm$ 0.27	4.89 $\pm$ 0.36	4.79 $\pm$ 0.29	4.83 $\pm$ 0.31
LDL-cholesterol	4.10 $\pm$ 0.24	3.64 $\pm$ 0.28	3.64 $\pm$ 0.35	3.50 $\pm$ 0.29	3.43 $\pm$ 0.31
HDL-cholesterol	1.28 $\pm$ 0.09	1.13 $\pm$ 0.06	0.96 $\pm$ 0.05	1.06 $\pm$ 0.53	1.18 $\pm$ 0.06
Triglycerides	1.05 $\pm$ 0.11	1.49 $\pm$ 0.26	1.44 $\pm$ 0.31	1.13 $\pm$ 0.13	1.09 $\pm$ 0.18
<b>Olive oil</b>					
Total cholesterol	5.45 $\pm$ 0.19	4.99 $\pm$ 0.19	4.90 $\pm$ 0.22	4.94 $\pm$ 0.23	4.76 $\pm$ 0.21
LDL-cholesterol	3.89 $\pm$ 0.18	3.56 $\pm$ 0.17	3.55 $\pm$ 0.20	3.57 $\pm$ 0.18	3.33 $\pm$ 0.17
HDL-cholesterol	1.38 $\pm$ 0.11	1.18 $\pm$ 0.06	1.10 $\pm$ 0.07	1.19 $\pm$ 0.08	1.24 $\pm$ 0.08
Triglycerides	0.92 $\pm$ 0.06	1.26 $\pm$ 0.10	1.25 $\pm$ 0.14	0.91 $\pm$ 0.11	0.91 $\pm$ 0.09

Total cholesterol level fell on the low fat diet rich in lean beef. This effect was significant at the end of week 3 ( $p < 0.05$ ). This level remained below baseline value when both safflower and olive oil were added back to the diet, in contrast to the effect of the addition of beef fat (O'Dea et al. in press). The fall in total cholesterol levels appears to be due to a decrease in both the LDL-cholesterol and HDL-cholesterol fractions. HDL-cholesterol rises again with the introduction of oil in weeks 4 and 5, whereas LDL-cholesterol remains lowered. Diets similarly low in fats (fish or kangaroo supplemented low fat diets) have shown a similar drop in the HDL fraction (Sinclair et al. 1987). This decrease could be due to the extremely low fat content of these diets.

In conclusion, this research suggests that lean beef can be included in cholesterol lowering diets provided the saturated fat content of the diet is low. Increasing total fat by the addition of safflower or olive oil will not only maintain the beneficial effect of a low saturated fat diet, but will improve palatability.

O'DEA, K., TRAIANEDES, K., CHISOLM, K., LEYDEN, H. and SINCLAIR, A. *Am J Clin Nutr* (in press)  
SINCLAIR, A.J., O'DEA, K., DUNSTAN, G., IRELAND P.D. and NIALL, M. (1987). *Lipids*, 22:523.

Department of Human Nutrition, Deakin University, Victoria 3217