

**Margarines containing *trans* fatty acids or zero *trans*: differential effects on plasma lipids***M Noakes and P M Clifton*

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Background: An alternative approach to using partially hydrogenated fats in margarine manufacture is the use of an interesterified hard fraction resulting in zero *trans* margarines. However, there is controversy as to whether interesterification may increase the likelihood of that fat raising plasma LDL concentrations more than the native oil since the structure of the triglyceride may influence cholesterol metabolism (1,2). Hence, we sought to establish whether margarines consisting of polyunsaturated oil from sunflower (PUFA) or monounsaturated oil from canola (MUFA) plus a *trans* free hard fraction achieved through interesterification differ from those containing a partially hydrogenated hard fraction.

Study Design: Two dietary intervention trials each with identical cross-over design in 38 mildly hyperlipidemic, free-living subjects. All subjects ate a low fat diet (25% fat energy) for 2 weeks. They were then allocated into 2 groups and underwent the following 3 dietary interventions for 3 weeks each in randomised cross-over fashion. Diets contained 35% fat energy with 20% energy provided as margarines or butter. Group 1 ( $n=18$ ) Diets: butter, MUFA margarine with *trans*, MUFA margarine without *trans*. Group 2 ( $n=19$ ) Diets: butter, PUFA margarine with *trans*, PUFA margarine without *trans*

Fatty acid composition of margarines % total fatty acids	MUFA + <i>trans</i>	MUFA <i>trans</i> free	PUFA + <i>trans</i>	PUFA <i>trans</i> free
12:0	0.1	6.2	0.1	5.6
14:0	0.3	2.7	0.4	2.3
16:0	7.9	10.0	10.3	9.8
18:0	6.5	10.0	7.9	10.0
18:1 <i>cis+trans</i>	61.1	44.9	37.1	29.6
18:1 <i>trans</i>	10.40	0	10.30	0
18:2	14.4	15.7	40.6	35.4
18:3	6.5	6.5	1.7	2.7

Results: Plasma LDL cholesterol levels after the margarine diets and the low fat diet were similar, but all were 11-15% lower compared to butter ( $P<0.001$ ). Whereas the monounsaturated margarines did not differ from each other, the polyunsaturated margarines without *trans* resulted in a 6% reduction (0.25mmol/L, 95% CI +0.08 to +0.42mmol/L) in LDL cholesterol concentration compared to the blend containing *trans* ( $P=0.006$ ).

Conclusion: When compared to butter, diets containing zero *trans* margarines may be equal or more effective in lowering LDL cholesterol relative to those containing *trans* fatty acids. All margarine diets were as effective in lipid lowering as the low fat diet.

1. Kritchevsky D. Effects of Triglyceride structure on lipid metabolism. *Nutr Rev* 1988;46:177-181.
2. Nestel PJ, Noakes M, Belling GB, McArthur R, Clifton PM et al. Effect on plasma lipids of interesterifying a mix of edible oils. *Am J Clin Nutr* 1995;62:950-5.