Post-ischaemic forearm blood flow is affected by the consumption of used oils

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Our preliminary study using 14 healthy individuals failed to show any change in flow mediated dilation after consumption of a fatty meal prepared in unused oil. Williams et al. found that flow mediated dilation (FMD) decreased between fasting and postprandial studies after a used fat meal, but there was no significant change after an unused fat meal. The effects of consumption of different aged cooking oils on peripheral vascular physiology is still unclear.

We aimed to assess endothelial function after the consumption of a meal prepared in unused oil versus used oil. Five healthy volunteers were asked to consume an isocaloric fatty meal on two different occasions (1030 kcal, 61 g fat). The used oil had been repeatedly used for one month in fast food outlets. Biochemical, endocrine and vascular studies were performed fasting and 3 hr and 6 hr after each fatty meal. Arterial endothelial function was assessed as flow-mediated dilatation in the brachial artery using high resolution ultrasound. Resting and post-hyperaemic forearm blood flow (FBF) were recorded using venous occlusion strain-gauge plethysmography before and every 10-15 seconds after 5 min upper arm ischaemia induced by suprasystolic blood pressure cuff occlusion.

FMD did not change at 3 hours, however, there was a trend to a reduced FMD after the ingestion of the used oil (Table). There was a significant difference in post-ischaemic forearm blood flow responses. The smaller magnitude of change in maximal blood flow recorded between the 3 hour and fasting tests following consumption of used oil suggests abolition of a rise in post-ischaemic blood flow. There was no significant difference in the mean change in forearm blood flow at rest from baseline to 3 hours.

	Unused Oil	Used Oil	P value
Mean change FMD[1] (mL/min/100mL tissue)	1.1 ± 1.7	-0.9 ± 3.8	0.2
Mean change FBFpost[1,2] (mL/min/100mL tissue)	5.56 ± 4.4	0.71 ± 2.2	0.01

[1]mean ± SD [2]FBF (post) = post-ischaemic forearm blood flow

Glucose, cholesterol, triglycerides, LDL and HDL cholesterol were not significantly different between the two groups at any corresponding time point. Plasma homocysteine, free fatty acids and insulin were also comparable at the same time points.

From this study, post ischaemic blood flow increases at 3 hours after consumption of a meal cooked in unused oil. Thus, the inclusion of used oils in the diet may alter the blood flow responses postprandially. This reduced response is also reflected in the FMD trends, after eating a meal prepared in used oil. Further studies with more volunteers are required to confirm these results and investigate the trend in reduced FMD after the ingestion of used oil.

1. Williams MJA, Sutherland WHF, McCormick MP, deJong SA, Walker RJ, Wilkins GT. J Am Coll Cardiol 1999;33:1050-5.