

Improvement in plasma lipid levels (including lipoprotein (a)) after chronic soy consumption may be linked to equol

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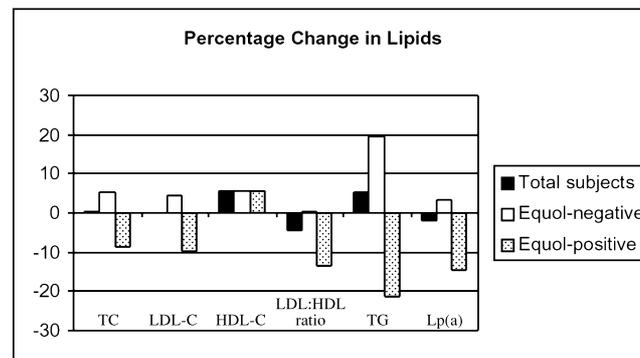
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Dietary interventions with soy have been inconsistent, with some studies demonstrating a hypocholesterolaemic action while others have not. We examined the effect of the consumption of soy milk and soy yoghurt produced from whole soy beans (containing soy protein, isoflavones and polyunsaturated fatty acids) on lipid and cardiovascular characteristics in men and women having moderate cardiovascular risks.

The study design was a placebo controlled randomised, crossover diet intervention trial that compared the regular consumption of soy-based with a dairy-based (control) intervention. Twenty-six mildly hypercholesterolaemic (average total plasma cholesterol of 6.0 mmol/L) or mildly hypertensive volunteers were randomly assigned to one of two groups consuming a regular diet incorporating 4 serves per day of either soy or dairy foods for 5 weeks, after which the diets were reversed for a further 5 weeks. The soy diet provided at least 25 g of soy protein and 80mg of isoflavones per day. Clinical assessments included dietary interviews, height, body mass, clinic and 24 hour ambulatory blood pressure, arterial compliance and a fasting blood sample. Plasma lipids, fatty acids, and isoflavones, and 24 hour urinary isoflavone excretion were measured initially and after each 5 week period.

Following the soy intervention, plasma and urinary isoflavone levels increased 23 and 6 fold, respectively, for the 23 subjects completing the study. Polyunsaturated fat intake doubled with the consumption of the soy diet. The total amount of dietary fat consumed did not change. However, the plasma P:S ratio increased significantly with consumption of the soy diet but not with the dairy diet. Despite the large increases in isoflavone levels the consumption of the soy products had no significant effect on plasma lipids, blood pressure or arterial compliance compared with consumption of dairy products.

However, when subjects were retrospectively grouped as equol positive ($n = 8$) or equol negative ($n = 15$) based on whether equol was detected in their plasma or urine, we observed highly significant reductions in total cholesterol (8.5%), LDL-cholesterol (10%), LDL:HDL ratio (13.5%), plasma triglyceride (21%) and lipoprotein (a) (14%) after the 5 weeks of soy consumption in the equol positive group ($P < 0.05$). This effect in equol positive subjects appeared independent of any macronutrient changes.



In conclusion regular consumption of whole soy bean milk and yoghurt products resulting in raised circulating levels of isoflavones and PUFAs. However, this resulted in improved plasma lipids only in the equol-positive subjects.

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Key words: soy isoflavones, cholesterol, equol.