Effects of isoflavonoid phytoestrogens on serum lipid and lipoprotein (a) concentrations: a randomised controlled trial in humans

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Isoflavonoids are a class of flavonoids derived in the human diet mainly from soybean based foods. The major dietary isoflavonoids, genistein and daidzein, possess oestrogenic activity and are classed as phytoestrogens. Oestrogens can lower serum LDL cholesterol concentrations and raise HDL cholesterol concentrations. The objective of this study was to determine if isoflavonoid phytoestrogens could improve the serum lipid and lipoprotein profile in a group of healthy, largely normolipidaemic, subjects.

Forty-six men and 13 postmenopausal women not on hormone replacement therapy, without history of hyperlipidaemia, completed a randomised, double-blind, placebo-controlled trial of two way parallel design and eight weeks duration. One tablet containing 55mg of isoflavonoids (derived from subterranean clover, and predominantly in the form of genistein), or one placebo tablet, was taken daily with the evening meal. Subjects maintained their usual diet and physical activity, which were unchanged throughout the intervention. Measurement of isoflavonoids and their metabolites in 24 hour urine samples provided an assessment of compliance and of isoflavonoid metabolism. Serum total, LDL and HDL cholesterol, HDL subclasses, triglycerides and lipoprotein (a) were assessed at baseline and during the last week of intervention.

Lipid/Lipoprotein	Placebo		Isoflavonoid	
Measurement	Baseline[1]	Post[1]	Baseline[1]	Post[1]
Total Cholesterol (mmol/L)	5.07 ± 0.15	5.07 ± 0.15	5.41 ± 0.23	5.35 ± 0.23
LDL Cholesterol (mmol/L)	3.24 ± 0.12	3.34 ± 0.13	3.52 ± 0.18	3.51 ± 0.20
HDL Cholesterol (mmol/L)	1.21 ± 0.05	1.20 ± 0.05	1.07 ± 0.04	1.05 ± 0.04
HDL_2 Cholesterol (mmol/L)	0.53 ± 0.04	0.46 ± 0.03	0.47 ± 0.03	0.39 ± 0.03
HDL_3 Cholesterol (mmol/L)	0.68 ± 0.03	0.74 ± 0.03	0.60 ± 0.03	0.66 ± 0.03
Triglycerides (mmol/L)	1.26 ± 0.11	1.18 ± 0.10	1.84 ± 0.21	1.82 ± 0.21
Lp(a) (mg/L)	163 ± 46	163 ± 44	280 ± 45	264 ± 44

1. means ± SEM

Baseline and post intervention lipid and lipoprotein concentrations are presented in the table. After adjustment for baseline values, no significant differences in post intervention serum lipid and lipoprotein (a) concentrations between groups were identified. Further adjustment for age, gender and weight change did not alter the result. In addition, changes in urinary isoflavonoids were not significantly correlated with changes in serum lipids and lipoprotein (a). Therefore this study does not support the hypothesis that isoflavonoid phytoestrogens can improve the serum lipid and lipoprotein profile, at least in normolipidaemic humans.