

# Effects of a Controlled Diet Supplemented with Chickpeas versus wheat on Serum Lipids, Glucose Tolerance, Satiety & Bowel Function

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**Background:** Chickpeas are a common constituent of many ethnic diets and are rich in polyunsaturated fatty acids (PUFA), dietary fibre and resistant starch. However, little information is available regarding the effects of regular chickpea consumption and their health effects.

**Objective:** To compare the effects of a diet supplemented with chickpeas to a wheat-supplemented diet of similar fibre content and a wheat based diet of low fibre content on serum lipids, glucose tolerance, satiety and bowel function.

**Design:** Twenty-seven free-living adults undertook two randomized, dietary interventions each of five weeks duration, in a cross over trial. The chickpea diet included canned chickpeas (140g/day), bread and biscuits containing 30% chickpea flour. The diets were isoenergetic to the participants' usual diet, matched for macronutrient content and controlled for dietary fibre. Following on from the second intervention, a sub-group of 18 participants undertook a third lower-fibre wheat diet. End of the diet comparisons of serum total cholesterol (TC), low density lipoprotein (LDL-C), glucose and insulin concentrations were made by repeated measures ANOVA. Perceived bowel health and satiety were also measured, using an anchored visual analogue scale, and compared between the dietary periods.

## Outcomes:

**Chickpea versus wheat:** Serum TC was 0.25 mmol/L lower ( $p < 0.01$ ) and LDL-C was 0.20 mmol/L lower ( $p = 0.02$ ) following the chickpea diet compared to the wheat diet (Fig 1). An unintended significant increase in PUFA and corresponding decrease in MUFA consumption occurred during the chickpea diet (Fig 2.) and statistical adjustment for this reduced the effect on serum lipids by about 50%.



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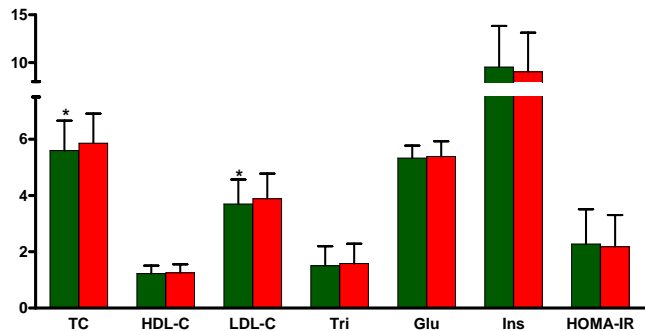


Fig 1. Mean ( $\pm$  SD) concentration of serum lipids (mmol/L), glucose (mmol/L), insulin (IU/ml) and HOMA-IR after chickpea and wheat dietary phases.

\* denote significant difference between the two dietary phases as analysed with Repeated measures ANOVA

There was no significant difference in glucose tolerance. Perceived general bowel health improved significantly during the chickpea diet although there was considerable individual variation. Greater satiety was also reported on the chickpea diet but was not found to be significantly different from the wheat diet.

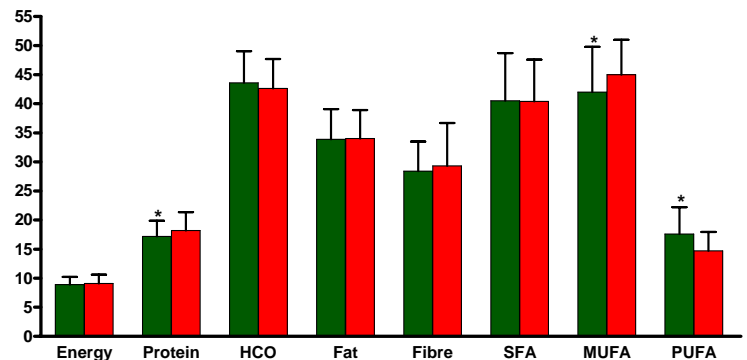


Fig 2. Mean ( $\pm$  SD) daily nutrient intake during chickpea and wheat dietary phases. Energy (MJ), Protein (% E), Carbohydrate (%E), Fat (%E), Fibre (g), Saturated Fatty Acid (% total fat), Monounsaturated Fatty Acid (% total fat), Polyunsaturated Fatty Acid (% total fat)

\* denote significant difference between the two dietary phases as analysed with Repeated measures ANOVA

**Wheat versus low fibre:** Although the study participants noticed less flatulence on low fibre diet compared to the wheat diet, satiety was higher and perceived bowel health was better during the wheat diet.

**Conclusions** – Small but significantly lower serum TC and LDL-C after the chickpea diet compared to the wheat diet was partly due to unintentional changes in macronutrient intake with chickpea ingestion. However, these small unintentional changes may still provide a valuable health benefit.