Nutritional Science-2013

OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference and Exhibition on
Nutritional Science & Therapy

July 15-17, 2013 Courtyard by Marriott Philadelphia Downtown, Philadelphia, USA

A randomised crossover trial investigating the effect of high kilo joule foods and their individual fat and sugar components on postprandial inflammation and oxidative stress

Ross Grant
University of New South Wales, Australia

Abstract

Background: Recent studies indicate that high fat, high sugar foods can increase postprandial inflammation and oxidative stress which play a key role in the development of vascular disease. This study investigated the inflammatory and oxidative response after a high fat, high sugar, simple food (ice cream), compared to a high fat, kilojoule-equivalent whole food (avocado). The individual contributions of the fat and sugar components of the ice cream meal, to postprandial inflammation and oxidative stress were also quantified.

Methods: Using a randomized, crossover design, 11 healthy participants ingested four test meals: ice cream (500 g), avocado (489 g), the fat component in ice cream (101 ml thickened cream), and the sugar equivalent component in ice cream (95 g glucose). Plasma glucose, cholesterol, triglycerides, and inflammatory markers, IL-6, hsCRP, CD11b, CD66b, and oxidative stress markers, MDA, protein carbonyls, NAD(H), and antioxidant capacity were measured at baseline and 1, 2 and 4 hrs after ingestion. ANOVA and the post hoc Tukey's test or Dunn's test were used to test for statistical significance between time points and between meals. For comparison between two data sets, one- or two-way unpaired t-tests were used. Multiple regression analysis was conducted to identify relationships between each metabolic marker and the inflammatory and oxidative stress markers.

Results: Plasma glucose increased after sugar ($p<0.001$) only. Triglycerides increased after ice cream ($p<0.05$), cream ($p<0.05$) and avocado ($p<0.05$). Cream (t0-t2, $p<0.05$) and sugar (t1-t2, $p<0.05$; t1-t4, $p<0.05$) increased lipid peroxidation. Ice cream (t0-t4, $p<0.01$) and sugar (t0-t4, $p<0.01$) reduced antioxidant capacity. Unlike ice cream, ingestion of the kilojoule equivalent avocado test meal did not result in a change in either inflammatory or oxidative stress markers. No significant changes were observed in cholesterol, protein carbonyls, NAD(H) and inflammatory markers for any of the test meals.

Conclusions: This study shows that ingestion of a high kilojoule meal of either sugar alone, fat alone, or sugar and fat together (i.e. ice cream) increases plasma oxidative activity. However ingestion of a high fat, kilojoule matched quantity of the nutritionally complex food avocado does not. An additive or synergistic effect of cream and sugar on inflammation or oxidative stress was not found.