Proceedings of the Nutrition Society (2022), **81 (OCE5)**, E229 doi:10.1017/S0029665122002622

Summer Conference 2022, 12–15 July 2022, Food and Nutrition: pathways to a sustainable future

The acute effects of meals rich in saturated or unsaturated fatty acids on postprandial lipaemia and satiety responses in healthy men (CocoHeart Study)

G. Wong[1], A. Shafat[2], M. Clegg[1], K.G. Jackson[1] and J.A. Lovegrove[1]
[1]*Hugh Sinclair Unit of Human Nutrition, University of Reading, Reading, UK and*
[2]*Physiology Department, National University of Ireland, Galway, Ireland*

Meal fat composition has been shown to influence the postprandial triacylglycerol response (an independent cardiovascular disease risk marker), with meals rich in saturated fatty acids (SFA) reported showing a greater response than those rich in vegetable oils. Although coconut oil is gaining in popularity in the UK diet, little is known about the effects of this plant-derived oil with a high SFA content on postprandial lipaemia. The aim of this study was to compare the acute effects of test meals rich in SFA (butter or coconut oil) with unsaturated fatty acids (vegetable oil - a blend of safflower and olive oil) on postprandial lipid, glucose, gut hormone and satiety responses, and gastric emptying and satiety in men. A cross-over, single-blind, randomised acute study was conducted in 13 healthy men (mean age 53 ± 3 years; BMI 24 ± 3 kg/m^2). Subjects were assigned to consume sequential high-fat test meals rich in SFA or unsaturated fatty acids (breakfast (0 min) and lunch (330 min) comprising of toast with jam and a warm chocolate drink containing 50 g and 30 g fat, respectively) on three occasions. Fasting and postprandial blood samples were collected at 0, 30, 60, 90, 120, 180, 240, 300, 330, 360, 390, 420 and 480 min. For gastric emptying, 100 mg of ^{13}C octanoic acid was added to the breakfast test meal only, and breath samples were collected every 15 min to measure the excretion rate of labelled CO_2 using isotope ratio mass spectrometry. There were no significant effects of the test fats on the postprandial triacylglycerol response (primary outcome measure). A significant difference was evident between test fats for the incremental area under the curve and peak concentration for the postprandial gastric inhibitory polypeptide (GIP), glucagon-like peptide-1 (GLP- 1) and peptide YY (PYY) responses, with a higher GIP response after the vegetable oil-rich meal compared with butter and coconut oil-rich meals whereas lower GLP-1 and PYY responses were found after the butter than coconut oil and vegetable oil containing meals ($p \leq 0.004$). In contrast, a significant higher postprandial glucose response for the iAUC was observed after the coconut oil-rich meal than butter-rich meal just after the breakfast (0–330 min). For gastric emptying, half-time, lag phase and ascension time were delayed after the coconut oil than vegetable oil-rich meals ($p \leq 0.048$). Although coconut oil was associated with delayed gastric emptying, there was a greater impact on the gut hormone and glucose than lipid response, with coconut oil exhibiting lower GIP than vegetable oil and higher GLP-1, PYY and glucose (post-breakfast) responses than butter.