

Results: Lipid content was 36% of seed weight and rich in TAG (86% of total lipid), 31% lipid was extracted by hexane, providing 96% TAG. Chloroform-methanol extraction of meal recovered a further 4.8% polar lipid (PL) rich extract. The PL were: phosphatidyl choline (69%) and phosphatidyl ethanolamine (13%). DHA composition was 6.8% in TAG, 3.0% in glycolipid and 1.6% in PL. Relative levels of α -linolenic acid (ALA, 18:3n-3) in all fractions were higher in transformed seed than in unmodified seed (39–54% versus 12–32%, respectively). The phytosterol profile was similar to unmodified seed.

Conclusions: Camelina could be grown as a new and renewable source of DHA-rich oil for use in animal and aquaculture feeds. Inclusion of this oil in foods may increase dietary intake of DHA and lead to improved n-3:n-6 status and health outcomes in humans.

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REQUIREMENTS OF PHYTOCHEMICAL FOOD COMPOSITION DATABASES: COMPARING CURRENT USE IN FOOD INDUSTRY AND BIOMEDICAL RESEARCH

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Background/Aims: Phytochemicals found in plant foods may be linked to disease prevention. Internationally, the recognition of the role of phytochemicals on human health has prompted development of phytochemical FCDs to explore dietary intake data. However such a database is not currently available for Australia. This study aimed to examine requirements of stakeholders surrounding phytochemical food composition databases, comparing to their current use in biomedical research and the food industry sectors.

Methods: A systematic literature review was undertaken to extract English language articles, which used phytochemical food composition databases for their data analysis. Web of Science, Scopus and Medline databases were searched using the time-frame 1999–2014 and keyword combinations; food, nutrient, composition, phytochemical, phytonutrient, flavonoid, alkaloid, phenol, and database.

Results: Thirty four articles met the specified criteria. The majority (56%, $n = 19$) of the studies utilised phytochemical databases for assessing a diet-disease relationship. One or more of the USDA databases (e.g. flavonoid) was used in 38% ($n = 13$) of the studies. Missing values, geographically inappropriate data, and lack of consideration of bioavailability, food processing and cooking methods were limitations to use in the research sector. No literature was available specifically on food industry use of phytochemical databases.

Conclusions: An ideal FCD would comprise of a complete, up to date dataset, which accounts for food analysis, processing, bioavailability and geographical diversity. Further research into the needs and practical use of databases would be beneficial to clarify the findings of this review and aid in future database development.

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BAOBAB (*ADANSONIA DIGITATA* L.) REDUCES THE GLYCAEMIC AND INSULIN RESPONSE IN HEALTHY VOLUNTEERS

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Background/Aims: Polyphenols have been shown to be able to attenuate disturbances in the postprandial glycaemic response and thus may have important implications for prevention and/or management of T2DM. Baobab (*Adansonia digitata* L.) fruit extract has received attention in the scientific literature recently due to its soluble fibre content. However, we have previously demonstrated that baobab also contains a number of bioactive compounds including polyphenols. The aim of this study was to elucidate the postprandial glycaemic profile following consumption of 50 g available carbohydrate from a functional drink with added baobab extract.

Methods: Seventeen healthy subjects consumed one of three beverages: reference drink glucose-monohydrate (GLU), matched control milk drink

(MCON, matched for soluble fibre content), or baobab-enriched milk drink (BAO), in a randomised crossover design and measurements of blood glucose and blood insulin were collected over a 2.5 hour postprandial period.

Results: Incremental area under the curve analysis revealed significant differences between the BAO and MCON drinks for glucose response (20.4 ± 4.2 vs. 30.9 ± 2.4 mmol/L/min respectively; $p < 0.05$) and insulin response ($1,745.1 \pm 268.1$ vs. $2,205.7 \pm 400.9$ μ U/mL/min respectively; $p < 0.05$) using repeated measures ANOVA. Both were also significantly ($p < 0.05$) lower than GLU.

Conclusions: We hypothesise that the phytochemicals within baobab may be responsible for reducing the glycaemic and insulin response. These data add to a growing body of literature to support the potential of baobab as a functional food ingredient.

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THE LOW FODMAP DIET AND GUT-DIRECTED HYPNOTHERAPY ARE EQUALLY EFFICACIOUS IN PATIENTS WITH IRRITABLE BOWEL SYNDROME

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Background/Aims: Gut-directed hypnotherapy (GDH) is increasingly recommended to IBS patients. Nevertheless, it is difficult to attain high-quality evidence for its efficacy given the constraints of psychologically-based trials i.e. difficulty designing a placebo. An alternative is to compare GDH to a therapy with proven efficacy. This study aimed to determine if GDH is non-inferior in efficacy to the low FODMAP diet (LFD) and to assess whether they have additive effects.

Methods: A randomized controlled trial was performed in IBS patients (Rome-III) comparing (a) LFD (education in week 1, review at week 6); (b) GDH (six one-hour hypnosis sessions for 6 weeks); (c) a combination of both. The primary endpoint was change in overall gastrointestinal symptoms evaluated using a 100 mm visual-analogue-scale (VAS) at 6 weeks and 6 months post-treatment.

Results: Of 74 participants (mean age 40, SD 14; 14 male), 24 received LFD, 25 GDH and 25 combination therapy. The groups were well matched. A significant change in overall gastrointestinal symptoms was observed at week 6, mean VAS = 33.10 mm, 95%CI: 27.78, 38.41, $p < 0.0001$; and 6 months post-treatment, mean VAS = 29.87 mm, 95%CI: 23.20, 36.53, $p < 0.0001$. Improvement of ≥ 20 mm at week 6 was seen in 72% of participants. No difference was observed between treatment groups at week 6 ($p = 0.67$; one-way-between-groups ANOVA) or 6 months post-treatment ($p = 0.16$).

Conclusions: The efficacy for GDH is similar to that of LFD for relief of gastrointestinal symptoms in IBS patients. The benefit of both therapies is maintained long-term. There was no additive effect of combining treatments. GDH is an effective alternative to the LFD.

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IN VITRO AMYLASE DIGESTION OF EXTRUDED MAIZE AND HIGH AMYLOSE MAIZE STARCHES AND EVOLUTION OF STARCH STRUCTURE

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Background/Aims: Starch digestibility influences the calorie intake as well as gastro-intestinal health. High amylose maize starches (HAMS) are known to have greater enzyme resistance than those with lower amylose levels. So far, structural features responsible for the slow digestion of extrudate are not fully understood. The current work is aimed to compare

the molecular, mesoscopic and microscopic structures of partially digested extruded maize starches varying in amylose content and digestion rate.

Methods: Three maize starches with 27, 50 and 80% amylose levels were extruded at different moisture feed rates. Extrudates with varying moisture contents were digested (*in vitro*) at various times and undigested residues were freeze-dried. Raw, extrudate and partially digested starches were analysed for %starch digestibility, resistant starch, amylopectin branch length profile, helices, crystallinity, lamellar periodicity etc.

Results: Digestibility data showed the normal starch was close to 100% digested, whereas HAMS were ~30% digestible as granules and ~75% in extrudates. There was a significant decrease in long amylopectin chains due to shear during extrusion, resulting in shorter chains influencing starch digestibility. NMR and crystallinity data showed that extended digestion of extrudate results in a significant increase in molecular order or helical content. Mechanism of enzyme resistance of granular high-amylose starches is qualitatively different to that for processed starches.

Conclusions: Incorporation of HAMS to enhance resistant starch in foods can be achieved from either cooked or uncooked forms, but that the consequences may not be the same based on the different mechanisms involved in amylose digestion.

Funding source(s): ARC.

NEW STRAWBERRY BREEDING LINES – ENHANCED PHYTOCHEMICAL COMPOSITION AND BIOACCESSIBILITY

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Background/Aims: Screening of phytochemicals has been of interest in strawberry genotypes as there is emerging evidence from epidemiological and clinical studies that consumption of phytochemical-rich strawberry cultivars may provide health benefits. The aim of the present study was (1) to quantify selected phytochemicals in new strawberry breeding lines (BL) and (2) to assess the *in vitro* bioaccessibility of phytochemicals as an initial measure to predict their bioavailability.

Methods: Extracts of six strawberry breeding lines (BL) and two commercial varieties were analysed for anthocyanins, bound phenolics and ascorbic acid by HPLC-photodiode array detection-MS. Festival (commercial variety) and BL2006-221 (dark fruit colour) were blended and subjected to simulated gastric and small intestinal digestion. Differences between genotypes were tested using one-way ANOVA.

Results: BL2006-221 had the highest ($p < 0.05$) anthocyanin content (123 mg/100 g fresh weight, FW), whereas BL2011-210 was found to have the highest ($p < 0.05$) amount of ascorbic acid (53.5 mg/100 g FW) and bound phenolics (78 mg/100 g FW). The relative anthocyanin release, following gastric and small intestinal digestion procedure, was similar ($p > 0.05$) for BL2006-221 (36%) and Festival (47%). However the total anthocyanin released from BL2006-221 was 45% greater ($p < 0.05$) than from Festival.

Conclusions: Breeding lines BL2006-221 and BL2011-210 showed promising results in terms of elevated concentrations of anthocyanins, bound phenolics ("substrate" for the colonic microbiota) and ascorbic acid. However, the *in vivo* relevance of these results as well as the consumer acceptance of dark (anthocyanin-rich) strawberry genotypes need to be investigated in future studies.

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UTILISING COOKING METHODS CAN REDUCE THE FODMAP CONTENT OF LEGUMES TO ASSIST IN INCREASING FIBRE INTAKE

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Background/Aims: While legumes are an important source of dietary fibre, they may be avoided due to their potential to provoke functional gut

symptoms (bloating, abdominal pain and change in bowel habits) due to their high content of FODMAPs. The solubility of FODMAPs offered an opportunity to specifically reduce their content by appropriate cooking techniques. The aim was to investigate the effect of cooking times and straining on the FODMAP content of legumes.

Methods: As a prototype, red lentils were simmered in water for variable lengths time. Seven variations were made including raw; simmered for 5, 10, 20 and 30 minutes and subsequently strained; simmered for 30 minutes without straining; and the strained liquid. Samples were analysed for their FODMAP content by enzymatic and HPLC techniques.

Results: The main FODMAPs present were fructans and galactooligosaccharides. Simmering reduced total oligosaccharide content from 1.78 to 0.44-0.53 g/serve, with no differences across different simmering times. The strained liquid after 30 min cooking contained 0.49 g/serve total oligosaccharide. Fructan content reduced from 0.50 g in raw to 0.13 (0.12-0.14) g in cooked and strained lentils, whilst unstrained lentils were higher (0.18g). The galactooligosaccharide content followed a similar pattern.

Conclusions: Due to rapid leaching of oligosaccharides, cooking legumes for a short duration with removal of the strained liquid reduces the FODMAP content by three-quarters. This strategy may facilitate the use of legumes to increase fibre intake in those attempting to reduce FODMAP intake because of functional gut symptoms.

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EFFECTS OF OAT β -GLUCAN ON BILE SALTS DIFFUSION ACROSS INTESTINAL MUCOSA USING THE USSING CHAMBER SYSTEM

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Background/Aims: The aim of this study was to investigate the effect of oat β -glucan (β G) on bile salts (BS) diffusion across the intestinal mucosa.

Methods: Pigs used as a human model were fed a control diet ($n = 6$) or a diet containing 10% oat β G ($n = 6$) for 28 days. Sections from the proximal, mid jejunum and terminal ileum were mounted into Ussing chambers. Glyco-deoxycholate (GDC) with or without addition of oat β G to the mucosal side, was sampled from the serosal side every 20 minutes for 80 minutes. Fresh tissue samples and tissues after diffusion experiments were fixed for microscopy.

Results: GDC diffuses slower across the terminal ileum from pigs fed the β G diet. Added β G to the mucosal side reduces the diffusion of GDC across terminal ileal tissue from pigs fed the control diet but has no significant effect for tissues from the β G diet.

Conclusions: Oat β G reduces BS diffusion across terminal ileal tissue, consistent with a potential mechanism underlying plasma cholesterol reduction.

Funding source(s): ARC.

GINGER – MECHANISM OF ACTION IN CHEMOTHERAPY-INDUCED NAUSEA AND VOMITING: A REVIEW

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Background/Aims: Despite advances in anti-emetic therapy, chemotherapy-induced nausea and vomiting (CINV) still poses a significant burden to patients undergoing cancer treatment. Nausea, in particular, is still highly prevalent in this population. While there is a large body of research that has investigated the potential mechanisms of action of ginger anti-nausea effect, this is the first review to evaluate the evidence-base for these proposed mechanisms.