

ONLINE SNOWBALLING: AN EFFECTIVE METHOD OF DATA COLLECTION IN AUSTRALIAN YOUNG ADULTS

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Background/Aims: Recruiting participants to health research is time consuming, expensive, and further limited when coupled with sensitive research topics (for example, obesity). Utilising friendship networks to distribute surveys through social media (online snowballing) has been considered an effective method of sourcing participants. This paper reports online recruitment processes and outcomes used for a study of relationships between food addiction and obesity in Australian young adults.

Methods: A snowball sampling procedure (without financial incentives) was used to distribute links to an online survey through individual friendship networks including: Facebook pages, organizational websites; newsletters; and university course websites.

Results: A total of 237 people were recruited between 19th May and 10th August 2013 and 111 (46.83%) were eligible for inclusion in the study. Of these eligible participants, the majority were female (82%), Australian born (85%), university students (45%) and classified as healthy weight (55%). A small proportion of respondents (12%) provided incomplete data and 41% were ineligible due to age (39% were outside 18–24 years range); pregnancy (1%); or living outside Australia (1%).

Conclusions: We aimed to collect data from 400 young adults to allow for detailed analysis of associations between food addiction and obesity, however recruitment outcomes dictated re-consideration of data analysis methods. Further research is required to explore factors which impact recruitment outcomes with online snowballing, such as including financial incentives and the impact of eligibility criteria. Identifying the source of the responses may also assist in identifying potential bias and developing more efficient research design.

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Poster session 4: plant foods

WHEAT ENERGY VALUES: BIRD VARIATION

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Background/Aims: Poultry diets usually contain more than 60% wheat. The apparent metabolisable energy (AME) values of wheat are very variable. There is limited information on variation of individual bird in coping with anti-nutritive factors in wheat. The aim of the study was to determine the AME responses of individual bird to wheat based and commercial diets.

Methods: Wheat based and commercial diets, were each fed to 24 birds in single bird cages from days 28 to 35. Feed intake was recorded and excreta collected for the last three days. Gross energy was determined for feed and excreta and AME calculated.

Results: There were larger variations in AME values between birds fed on wheat based diet (11.26 to 15.6 MJ/kg dry matter) than those fed on commercial diet (12.85 to 15.79 MJ/kg dry matter). The average AME value of wheat based diet was 14.01 ± 1.12 MJ/kg compared to 13.57 ± 0.62 MJ/kg for commercial diet and their CVs were 8.0 and 4.6%, respectively.

Conclusions: This study clearly demonstrated highly variable responses of birds to the same diet, which poses the question of the role of between-bird variability in estimation of AME value of grains. Further studies are required.

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GLUCOSE TOLERANCE IS IMPROVED BY SUPPLEMENTATION WITH CARPOBROTUS ROSSII FLAVONOIDS IN INSULIN RESISTANT MICE

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Background/Aims: To investigate whether flavonoids from the native Australian plant, *Carpobrotus rossii*, improves glucose tolerance in insulin resistant mice.

Methods: Glucose tolerance was assessed in six week old insulin resistant male C57BL/6 mice fed either a normal (Norm, 9% fat w/w), or high fat (HFD 22% fat w/w) diet, with or without crude (HFD + Crude) or a refined flavonoid-rich extract (HFD + FLAV) for 28 days. Supplementation was via drinking water. Glucose responses to intraperitoneal injection of 2 g glucose/kg body weight were measured at regular intervals over 2 hours and were compared using two way ANOVA followed by Fischer's post-hoc test.

Results: Flavonoid (HFD + FLAV) supplemented mice had significantly lower blood glucose 45, 60 and 90 min post glucose challenge (all $p < 0.05$), compared with HFD controls.

Conclusions: *Carpobrotus Rossii* flavonoids improve glucose tolerance in insulin-resistant animals.

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NATURALLY OCCURRING DIETARY SALICYLATES IN COMMON AUSTRALIAN FOODS

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Background/Aims: Salicylic acid (SA) is a phytohormone involved in plant immunity. Aspirin, a commercially available SA, might play beneficial role in cardiovascular health and colon cancer. It may also cause urticaria, angioedema, asthma, gastrointestinal symptoms in SA-sensitive individuals. Dietary SA might exert similar beneficial effects and/or may induce similar symptoms in sensitive individuals. To develop dietary strategies, data on SA content of food is essential, but the available literature is limited and somewhat controversial. Hence the aims of this study were to apply and validate state-of-the-art methodology to accurately determine the SA content of common foods, and to compare the results with currently published data.

Methods: GC-MS was used to analyse 113 food items including common Australian fruits, vegetables, herbs, spices, sugars, cereals, oils and beverages. Each sample was pooled from five areas. SA-d6 was used as an internal standard and *N*-Methyl-*N*-(trimethylsilyl) trifluoroacetamide as derivatizing agent.

Results: Technical sextuplicates showed a coefficient of variation of 3.03%. SA content was measurable in all foods analysed except oils, sugars and cereals, and ranged from 0.05–6 (vegetables), 0.04–2.67 (fruits), 0.10–1.21 (herbs/spices) and 0.51–1.18 mg/serve (beverages). Considerable differences with published data were noted for, for example, pumpkin and pears while eggplants and dates were similar.

Conclusions: GC-MS is a valid way of determining SA content of food. The results reveal gaps and inconsistencies within the extant literature. There is a pressing need for further research extending the analysis to a wider range of food items.

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SUPPRESSION OF INTESTINAL CARCINOGENESIS IN APC-MUTANT MICE BY THE CITRUS LIMONOID LIMONIN

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Background/Aims: Limonoids in citrus fruits are known to possess multiple biological functions. Therefore, we aimed to investigate the

suppressive effect of limonin, one of the citrus limonoids, on intestinal polyp development in *Apc*-mutant Min mice.

Methods: Five-week-old female *Apc*^{M9n/+} (Min) mice were fed a basal diet (untreated control group; $n = 10$) or a diet containing 500 ppm limonin for 8 weeks (limonin-treated group; $n = 10$). The intestinal tracts were removed and the polyp numbers, sizes and distributions assessed under a stereoscopic microscope. The number of polyps per mouse in each size class is given as mean \pm SD values, with statistical analysis using the Student *t*-test.

Results: Administration of 500 ppm limonin to Min mice for 8 weeks did not affect body weight, food intake or clinical signs throughout the experimental period. The total number of polyps decreased in the limonin-treated group compared to those of the untreated control group (34.0 ± 10.5 vs 25.6 ± 5.2 ; $p < 0.05$). Strong reduction of polyps was observed in the distal part (18.6 ± 7.2 vs 13.2 ± 3.3 ; $p < 0.05$). Administration of limonin significantly reduced the numbers of polyps sized < 0.5 mm and 1.0 to 1.5 mm in diameter ($p < 0.05$ vs. 0 ppm). Moreover, expression levels of *c-Myc* mRNA in the polyp part tended to be reduced by administration of limonin.

Conclusions: Our results suggest that limonin might be useful chemopreventive agent against intestinal carcinogenesis.

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THE EFFECT OF *CARALLUMA FIMBRIATA* EXTRACT ON METABOLIC PARAMETERS IN HIGH-FAT FED WISTAR RATS

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Background/Aims: The aim of this study was to investigate the effect of an Indian herb, *Caralluma fimbriata* extract on metabolic parameters in Wistar rats fed a high-fat diet.

Methods: Male Wistar rats ($n = 20$) were randomly divided into two groups. After inducing obesity, group two was supplemented with *C. fimbriata* extract for eight weeks, while group one received placebo. The following metabolic parameters were assessed at baseline and post intervention: food intake, body composition, blood pressure, glucose tolerance, insulin sensitivity, urine volume, and sodium excretion. Post intervention organ weights, abdominal circumference, total cholesterol, triglycerides and liver lipid content were measured. Delta change and differences between groups was analysed using Student's *t*-test.

Results: The major findings were a significant reduction in food intake (-0.22 g/day) and abdominal circumference (-1.8 cm) in the *C. fimbriata* supplemented group compared to control ($p < 0.05$). Systolic & diastolic blood pressure was also significantly reduced in the *C. fimbriata* supplemented group compared to baseline (systolic -7.67 mmHg; diastolic -12.41 mmHg).

Conclusions: This study suggests that *C. fimbriata* extract shows potential appetite suppressing, antiobesity and antihypertensive effects on high-fat fed rats. It may play a role in the treatment and management of obesity and metabolic syndrome.

Funding source(s): Victoria University.

FRUIT AND VEGETABLE INTAKE AND BODY MASS INDEX IN A LARGE SAMPLE OF MIDDLE-AGED AUSTRALIAN MEN AND WOMEN

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Background/Aims: Globally, dietary guidelines recommend increased intakes of fruits and non-starchy vegetables for the prevention of chronic diseases.

Methods: Secondary analysis was performed in 246,995 Australian adults aged 45+ years recruited for the "45 and Up" cohort study. The association between BMI and habitual fruit and vegetable (F&V) consumption, assessed using validated short questions was determined using multinomial logistic regression modelling, by sex.

Results: Compared to the referent normal weight category (BMI 18.5 - 24.9 kg/m²), the odds ratio (OR) of being in the highest vegetable intake quartile was 1.09 (95%CI: 1.04, 1.14) for overweight and 1.18 (95%CI: 1.12, 1.24) for obese women. For fruit, the association was in the opposite direction for overweight (OR 0.85; 95%CI: 0.80, 0.90) and obese (OR 0.75; 95%CI: 0.69, 0.80) women. Obese and overweight women were more likely to meet the "Go for 2&5" targets. In contrast, overweight men were less likely to be in highest intake quartiles for vegetables (OR 0.92; 95%CI: 0.89, 0.96) and fruit (OR 0.94; 95%CI: 0.90, 0.98) but this was not found for obese men.

Conclusions: These data suggest that public health approaches to increase fruit and vegetable intake may be beneficial strategies for weight management in men but further investigation of the positioning of F&V within overall diets is warranted in the case of middle-aged women.

Funding source(s): Sax Institute; Cancer Council NSW, National Heart Foundation; NSW Ministry of Health; *beyondblue*; Department of Family and Community Services; Australian Red Cross Blood Service; UnitingCare Ageing.

DEVELOPMENT OF AN *IN VITRO* ASSAY TO ADEQUATELY ASSESS PLANT PROTEIN DIGESTIBILITY

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Background/Aims: Plant protein digestibility is affected by the presence of starch and the plant cell wall (PCW) as well as physiological changes during upper gastrointestinal (GI) digestion. Hsu's (1977) multi-enzyme method is commonly used to assess plant protein digestibility. However, it does not take into consideration the physiological changes that occur during oral and upper GI digestion phases, and therefore may simplify plant protein digestibility. This study aims to develop an *in vitro* plant protein digestibility assay that represents human digestion adequately by taking into consideration the presence of starch and the physiological changes that occur in the oral cavity to the small intestine (SI).

Methods: Sorghum was used to assess differences in protein digestion between the multi-enzyme method and the proposed enhanced *in vitro* assay. Released protein and peptides were characterised by protein content determination and sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) analysis.

Results: Taking into account the changes that occur with oral and SI digestion improved sorghum protein digestibility to ~25%. Polymeric proteins were able to be further hydrolysed to oligomers and monomers during SI digestion, demonstrating improved digestion.

Conclusions: The increased protein digestibility by including an oral processing indicates that physical breakdown of the PCW and starch is important in enhancing protein digestibility and absorption in the SI. This new enhanced method may be more accurate in determining plant protein digestibility than the commonly used multi-enzyme assay as it takes into consideration bioaccessibility and physiological considerations.

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TRANSFORMED OILSEED LAND PLANT PRODUCING LONG-CHAIN N-3 OIL: CHARACTERISATION OF LIPIDS FROM *DHA-CAMELINA SATIVA*

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Background/Aims: A need exists for new and renewable sources of the nutritionally important long-chain (≥ 20 carbons) omega-3 PUFA to supplement those from wild fisheries, in particular DHA (22:6n-3) used in foods fortified with DHA: infant formula and nutraceuticals, and aquafeeds. We characterised the lipid class and fatty acid (FA) composition and content of a new DHA producing oilseed from the transformed land plant, *Camelina sativa*.

Methods: Lipids were solvent extracted, analysed by Tb-Layer Chromatography with Flame Ionization Detection, fractionated using silica and FA analysed by GC/GC-MS.