

effect between age and HT-AC. Inflammatory foci was observed in HT-AC-fed young mice but not in HT-AC-fed old mice.

Conclusions: These data indicate an interaction between age and HT-AC supplement and suggest a need for caution among young individuals consuming HT-AC for long time.

Funding source(s): N/A

P116

THE EFFECT OF DRYING METHODS ON BIOACTIVE PROPERTIES IN THREE VARIETIES OF PRICKLY PEAR (*OPUNTIA FICUS INDICA*)

C.A. Gouws^{1,2}, N. D'Cunha^{1,2}, E. Georgousopoulou^{1,2}, J. Thomas^{1,2}, D.D. Mellor^{1,2}, P.D. Roach^{1,2,3}, N. Naumovski^{1,2,3}. ¹Collaborative Research in Bioactives and Biomarkers group (CRIBB), Australia; ²Faculty of Health, University of Canberra, ACT, Australia; ³School of Environmental and Life Sciences, University of Newcastle, NSW, Australia
E-mail address: nenad.naumovski@canberra.edu.au (N. Naumovski).

Background/Aims: The prickly pear (PP) cacti (*Opuntia ficus indica*) are commonly utilised as a source of nutraceuticals due to its substantial bioactive composition. However, preservation of bioactivity can present a challenge with considerable losses of these compounds, depending on the type of drying technique used. Therefore, the aim of this study was to determine the optimum drying method to preserve the bioactive content of the commercially grown Australian PP's.

Methods: Three PP varieties (White, Orange, Purple) were dried using four different Methods (freeze dryer, draft oven, microwave and dehydrator). Total Phenolic (Folin-Ciocalteu; Gallic acid equivalent, GAE); Flavonoid (AlCl₃; Catechin equivalent, CE) and Betalain (Betaxanthin and Bethanin equivalent, BBE) content along with antioxidant characteristics (Trolox equivalent, TE), free radical scavenging activity (DPPH), reducing capacity (CUPRAC) and antioxidant capacity (FRAP) were determined spectrophotometrically. Kendall's *tau* test was used to determine the best drying method in comparison to freeze drying.

Results: Microwave drying produced the maximum levels for mean \pm SEM total phenolic content in White (145.0 \pm 15.5 μ g_{GAE}), Purple (129 \pm 17.8 μ g_{GAE}) and Orange (138.7 \pm 25.9 μ g_{GAE}) variety. In addition, in White and Purple variety, flavonoid (74.1 \pm 8 μ g_{CE} and 66.2 \pm 9.2 μ g_{CE}), CUPRAC (3261 \pm 172.9 μ M_{TE} and 2743 \pm 272.8 μ M_{TE}) and FRAP (1458.5 \pm 32.3 μ M_{TE} and 1328 \pm 146.3 μ M_{TE}) were also the highest. Total betalains, were highest in White PP (3.1 \pm 0.5 mg_{BBE}/100 g) following microwave drying, whereas Orange PP maximum was achieved using oven drying (3.2 \pm 0.6 mg_{BEE}/100 g) and Purple PP using dehydrator (2.9 \pm 0.4 mg_{BEE}/100 g); all $p < 0.05$.

Conclusions: The method that preserved the highest amounts and activity of bioactives, during the drying process, in comparison to freeze-drying, was the microwave drying.

Funding source(s): N/A

Poster session 5: Maternal, childhood and adolescent nutrition

P46

HUMAN MILK INHIBITS THE GROWTH OF PATHOGENIC *E. COLI*

F. Reda¹, C.T. Lai², N. Trengove¹, D.T. Geddes². ¹School of Health and Sciences, The University of Notre Dame Australia, Australia; ²School of Chemistry and Biochemistry, Thrus University of Western Australia, WA, Australia
E-mail address: donna.geddes@uwa.edu.au (D.T. Geddes).

Background/Aims: Diarrhoea is one of the major causes of death in children under age of 5 globally. Diarrhoea is induced by pathogenic viruses and bacteria. Human milk (HM) contains bioactive immune proteins that are known to protect infant against diarrhoea. The aim the study is to determine the immune capability of human milk in reducing the growth of pathogenic *E. coli*.

Methods: Pathogenic *E.coli*: O16 was used in this study. 12.5 MCFU/ml of it was mixed with HM, bovine milk powder or terrific broth and incubated in shaker at 37°C for 6 hours. At each hour, a mixed suspension was removed from the shaker. CFU/ml of the suspensions were determined by cell

culture method and nitrogen content by the Kjeldahl method.

Results: During the 6 hours incubation, the HM suspension had a log 1 increase of pathogenic *E. coli*, whereas the terrific broth and bovine milk powder had a log 3 increase. The averages of total, non-protein and protein nitrogen in HM were 2.41 \pm 0.32, 0.80 \pm 0.09 and 1.60 \pm 0.26 g/L, respectively and in bovine milk powder were 4.16 \pm 0.43, 0.68 \pm 0.12 and 3.47 \pm 0.42 g/L, respectively.

Conclusions: The bioactive components of HM appeared to inhibit the growth of pathogenic *E. coli*. Minimal changes in the non-protein nitrogen indicated that there was minimal degradation of immune proteins. HM may protect the infant by inhibition of the growth of pathogenic *E. coli*.

Funding source(s): The University of Notre Dame Australia, Medela AG

P47

PARENTAL FEEDING CONTROL BUT NOT USE OF FOOD-TO-SOOTHE AT AGE 3.5 YEARS IS ASSOCIATED WITH LATER ADIPOSITY

S.Y. Chong¹, C.R. Chittleborough¹, T. Gregory^{1,2}, J.W. Lynch¹, M.N. Mittinty¹, L.G. Smithers¹. ¹School of Public Health, University of Adelaide, SA, Australia; ²Telethon Kids Institute, University of Western Australia, WA, Australia
E-mail address: lisa.smithers@adelaide.edu.au (L.G. Smithers).

Background/Aims: Associations of parental feeding practices with adiposity are mixed and are mostly from cross-sectional studies. We aimed to study the associations between parental feeding control and using food to soothe at 3.5 years on adiposity at 7 and 15 years, in a large longitudinal cohort.

Methods: Participants were from the Avon Longitudinal Study of Parents and Children ($n = 7312$). Feeding control was assessed by asking 'how much choice do you allow him/her in deciding what foods he eats at meals?' Use of food to soothe was reported by mothers on the item 'how often do you use sweets or other foods to stop his/her crying or fussing?' BMI at 7 and 15 years was converted to sex- and age-adjusted z-scores. Fat mass was assessed at 15 years using dual energy X-ray absorptiometry. The associations between feeding control, use of food to soothe and BMI z-scores and fat mass were estimated by confounder-adjusted linear regression.

Results: In fully-adjusted models, children given the least choice had lower BMI z-scores (7 years: -0.08; 95%CI -0.17, 0.01); 15 years: -0.12, 95%CI -0.23, -0.02), and lower fat mass (15 years: -1.54 kg, 95%CI -2.35, -0.74), than children with the most choices. There was no evidence of an association between using food to soothe and adiposity.

Conclusions: Contrary to some studies, higher parental control over food choice was associated with lower adiposity, but use of food to soothe was not associated with adiposity at ages 7 and 15.

Funding source(s): University of Adelaide and the Fraser Mustard Centre scholarships

P48

THE EFFECTS OF MICRONUTRIENT INTERVENTIONS ON COGNITIVE PERFORMANCE AMONG SCHOOL-AGED CHILDREN: A SYSTEMATIC REVIEW OF RCTS

L.F. Lam, T. Lawlis. School of Public Health and Nutrition, University of Canberra, ACT, Australia
E-mail address: longfunglam@gmail.com (L.F. Lam).

Background/Aims: Micronutrient interventions have been shown to benefit children's cognitive development, particularly in subjects who were micronutrient-deficient at baseline. However, the Results on healthy subjects remain inconsistent and effect on different cognitive domains remains equivocal. This systematic review highlights the effects of single and multiple micronutrient interventions on different cognitive domains among school-aged children from both developing and developed countries.

Methods: A systematic search of Medline, CINAHL Plus and Academic Search database was conducted to identify trials published after year 2000. Randomized controlled trials (RCTs) that evaluated the effect of

micronutrient interventions on cognitive performance or academic performance among children aged 4–18 years were included. Data were extracted by 2 researchers. The cognitive outcomes assessed were grouped into seven cognitive domains for qualitative analysis.

Results: Nineteen RCTs were included for qualitative synthesis. The major cognitive domains assessed included fluid intelligence, crystallized intelligence, short-term memory, long-term memory, cognitive processing speed, attention and concentration, and school performance. Eight of ten trials reported significant improvement in the fluid intelligence domain among micronutrient-deficient children following micronutrient interventions, especially those who were iron-deficient or iodine-deficient at baseline. The effects of micronutrient interventions on other domains were inconsistent.

Conclusions: Improvement in fluid intelligence among micronutrient-deficient children was consistently reported. Further research is needed to provide more definitive evidence on the beneficial effects of micronutrient interventions on other cognitive domains and the effects in healthy subject from both developing and developed countries.

Funding source(s): N/A

P49

CHANGES IN FATTY ACID COMPOSITION OF HUMAN MILK IN RESPONSE TO COLD-LIKE SYMPTOMS IN THE LACTATING MOTHER AND INFANT

A. Gardner¹, I.A. Rahman¹, C.T. Lai¹, A. Hepworth¹, N. Trengove², P.E. Hartmann¹, D.T. Geddes¹. ¹School of Chemistry and Biochemistry, The University of Western Australia, WA, Australia; ²School of Health and Sciences, The University of Notre Dame Australia, Australia
E-mail address: donna.geddes@uwa.edu.au (D.T. Geddes).

Background/Aims: Infants are reliant on their innate immune systems to protect them from infection. Along with maternal antibodies and multiple bioactive factors human milk (HM) contains fatty acids (FA) and monoglycerides that are known to exhibit antiviral and antibacterial properties *in vitro*. The specific fat content of HM will determine the FA profile and may potentially affect the efficacy of this antimicrobial activity. This preliminary study investigates whether the concentrations of FA in HM change in response to infections leading to cold-like symptoms in the mother or infant.

Methods: Milk samples from were obtained from mothers ($n = 26$) when they and their infants were healthy, and when mother, infant or both suffered cold-like symptoms. The milk was hydrolysed and FA concentrations were measured using gas chromatography. Fifteen FAs were recorded, of which eight were detected in sufficient quantities for statistical analysis. For each fatty acid, the data were analysed by developing linear mixed models; variables considered were infant age and maternal, infant and dyad health, gestational age, birth weight and maternal age. The random effects of the models were infant age and mother. Results were considered significant where $p < 0.05$.

Results: HM concentrations of capric (10 $n=0$) and lauric acids (12 $n=0$) were significantly higher and palmitic acid (16 $n=0$) was lower (all $p < 0.05$) when mothers and infants were healthy compared to infection samples. The concentration differences detected were small (less than 0.5%).

Conclusions: Changes in specific FA were in HM when either the mother or infant or both had cold like symptoms. Whilst differences in FA were small the effects may be additive and potentially have a protective function.

Funding source(s): Medela AG

P50

NEONATAL HYPOGLYCAEMIA AND SCHOOL OUTCOMES AT AGE 8 YEARS

R. Pilkington¹, J.W. Lynch¹, A. McPhee², L.G. Smithers¹. ¹School of Public Health, University of Adelaide, Australia; ²Department of Neonatal Medicine, Women's & Children's Hospital, Adelaide, Australia
E-mail address: lisa.smithers@adelaide.edu.au (L.G. Smithers).

Background/Aims: Hypoglycaemia is a common condition among neonates that has potential to harm the developing brain. In one of the largest studies of this kind, we aimed to use population-level data to examine whether neonatal hypoglycaemia was associated with poorer school

outcomes at age 8 years.

Methods: Whole-of-population data from all births in South Australia (2001–2005) was linked to grade 3 reading, writing, grammar, spelling and numeracy domains collected from the National Assessment Program in Literacy and Numeracy (NAPLAN). Neonatal hypoglycaemia was identified with ICD10 codes. We calculated the RR of poor school outcomes in the whole cohort and after removing infants born preterm, low- or high-birthweight as these infants have complex aetiologies that might confound the hypoglycaemia - schooling association. The main analysis included imputation to address missing information and adjustment for a large battery of perinatal and sociodemographic characteristics. We also undertook a negative control outcome analysis to investigate the potential for residual confounding.

Results: Two percent of infants had hypoglycaemia ($n = 504/25,227$). In the whole cohort analysis, hypoglycaemia was associated with slightly higher RR of poor school outcomes (ranging from 1.07, 95%CI: 0.89–1.29 to 1.16, 95%CI: 1.02–1.31 across domains). These Results were attenuated in the sample restricted to the healthiest neonates (RR ranged 0.83, 95%CI: 0.61–1.12 to 1.12, 95%CI: 0.79–1.58). The negative control outcome analysis showed a relative risk of 1.09, 95%CI: 1.01–1.17 suggesting that the main analyses remained residually confounded.

Conclusions: These Results suggest that hospitalisation and treatment for hypoglycaemia in the neonatal period is unlikely to have lasting effects on academic outcomes.

Funding source(s): NHMRC

P51

RELATIONSHIP BETWEEN URINARY IODINE EXCRETION, MILK AND BREAD INTAKE IN A SAMPLE OF VICTORIAN SCHOOLCHILDREN

K. Beckford¹, C. Grimes¹, C. Margerison¹, L. Riddell¹, S.A. Skeaff², C. Nowson¹. ¹Institute of Physical Activity and Nutrition Research, Deakin University, Burwood, VIC, Australia; ²Department of Human Nutrition, University of Otago, Dunedin, New Zealand
E-mail address: kbec@deakin.edu.au (K. Beckford).

Background/Aims: In response to the re-emergence of iodine deficiency in Australia in the late 1990s, addition of iodised salt to bread was made mandatory in 2009. A decline in iodine concentration in milk may have contributed to the decline in iodine intakes. The present study aimed to: i) identify the major sources of dietary iodine post fortification, and ii) assess the association between food sources of iodine and 24-hour urinary iodine excretion (UIE), a biomarker of iodine intake, in Australian schoolchildren. We hypothesize that bread will be the main source of iodine.

Methods: Twenty-four hour urine samples and 24-hour food recalls were collected from schoolchildren aged 5–12 years from 42 schools across Victoria between 2010–13. Population proportion formula was used to determine dietary sources of iodine. The association between food sources of iodine and UIE was examined using Pearson's correlation.

Results: A valid 24-hour urine and 24-hour recall were provided by 454 children (55% male, mean \pm SD age 10.1 \pm 1.25 years). Mean UIE was 108 \pm 54 μ g/day. Major food sources of dietary iodine included bread (29%) and milk (27%). Those consuming bread ($n = 313$, 69%) and milk ($n = 356$, 78%), consumed 92 \pm 52 g bread/day and 278 \pm 186 g milk/day, respectively. In consumers, milk was associated with UIE ($r = 0.115$, $p = 0.04$), but there was no association between bread intake and UIE ($r = 0.048$, $p = 0.4$).

Conclusions: These Results confirm that Australian children are no longer iodine deficient. Both bread and milk were major food sources of iodine, but only milk was significantly associated with UIE.

Funding source(s): Australian Postgraduate Award

P52

SODIUM INTAKE ASSESSMENT IN A SAMPLE OF AUSTRALIAN PRESCHOOL CHILDREN ATTENDING LONG DAY CARE

S.A. O'Halloran, K.E. Lacy, C. Grimes, K.J. Campbell, C. Nowson. School of Exercise and Nutrition Sciences, Deakin University, VIC, Australia
E-mail address: s.ohalloran@deakin.edu.au (S.A. O'Halloran).

Background/Aims: Approximately half of Australian preschool children attend Long Day Care (LDC). Lunch is regularly provided at these centres