commercially available ethanolic extract of Boswellic acid isolated from gum resin of *Boswellia serrata* and was administered orally for 21 days following CIA induction. Measurement of the clinical severity of arthritis, biochemical analyses and histological examinations were undertaken to assess the effect of BSE.

The measurement of clinical severity of arthritis was undertaken through measuring the thickness of each affected hind paw with digital calliper. After CIA induction, clinical signs of the disease were erythema of one or more ankle joints and involvement of the metatarsal and interfalangeal joints of the hind paws observed after 8-9 days. Oral BSE administration reduced the progression of arthritis as evidenced by inhibition in arthritis scores compared to the CIA rats with significantly suppressed hind paw swelling on day 14 and 21.

The BSE interventions demonstrated significant changes compared to CIA group in all of the biochemical parameters assessed. Compared to the CIA group, administration of BSE at both doses showed a significant decrease in articular elastase and myeloperoxidase levels resulting in reduction of neutrophil activation and infiltration in the synovial tissues of the joints, decreased thiobarbituric acid reactive substance levels by inhibiting lipid peroxidation in the cartilage tissue, restored glutathione and superoxide dismutase levels and reduced the increase in nitrate levels that occurred in the CIA group. Administration with BSE at both doses was also observed to significantly down regulate the levels of IL-1β, IL-6, TNF-α, IFN-γ while increasing IL-10 compared to the CIA group on day 21. BSE at 200mg/kg also significantly down regulated PGE₂. Consistent with the biochemical alterations, the protective effects of BSE against CIA were also evidenced from the bone histological findings. The elevated number of infiltrating cells, extensive bone degradation and synovial hyperplasia observed in the CIA group were reversed to normal with the BSE groups, with a greater effect observed at the higher dose.

The authors concluded that the *Boswellia serrata* extract may have significant potential as an alternative treatment for chronic inflammatory conditions including rheumatoid arthritis, with the effect possibly being mediated by controlling pro- and anti-inflammatory cytokines, nitric oxide and antioxidant enzymes with possible modulation of the immune system.

**Panax ginseng effect on obesity and gut microbiota**


The gut microbiota is a key etiological factor in the control of body weight with recent studies demonstrating a strong microbial influence on host metabolism, energy utilisation and storage, and metabolic disease. Accordingly, therapeutic interventions that can help maintain balance in the microbiome may have an influence on host weight and/or obesity.

The root of *Panax ginseng* (ginseng) has long been used as a general health tonic in Asian countries with the pharmacological properties of the herb attributed to ginsenosides or steroidal sapogenins. Ginseng has demonstrated numerous biological activities in inflammation, immunology and cancer with effects on obesity and metabolic disease also reported. Intestinal metabolism of ginseng is dependent on the composition of gut microbiota and as such may be variable between individuals depending on their microbiome.

The present study aimed to assess the effects of ginseng on obesity and gut microbiota using pyrosequencing, and additionally reviewed differences of ginseng's anti-obesity effects depending on gut microbiota composition.

The study was conducted in Korea with middle-aged obese women (BMI ≥25kg/m²), between 40-60 years of age. Participants had to be weight stable during the past 6 months and free from antibiotics, probiotics or other medications that could influence weight for the 3 months prior. Exclusion criteria included smoking, pregnancy and those with weight-influencing diseases. Participants were required to take <80% of study intervention to be included in the final analysis. The results for ten participants were available for analysis.

The *Panax ginseng* were provided in freeze-dried granulated extracts weighing 4g each packed in paper medicine pockets with participants required to take one packet twice daily for 8 weeks. Blood pressure, heart rate, body weight, weight circumference and body composition were measured at baseline and every 2nd week. Blood analysis and stool analysis were checked on the 1st visit (week 0) and on the last day (week 8). Blood chemistry analysis included fasting glucose, high-density lipoprotein cholesterol (HDL), triglycerides (TG), and total cholesterol (TC). Stool samples were provided at the start and conclusion of the study with genomic DNA extracted from faecal samples using a Fast DNA SPIN extraction kit.

After 8 weeks of ginseng supplementation, significant differences were observed in weight and BMI, however no significant changes were observed in waist circumference, body fat percentage, HDL, TG, TC and glucose. Stool samples were analysed to assess the gut microbiota of participants prior to and after ginseng treatment.

Predominant phyla in average community compositions were Firmicutes, Actinobacteria and Bacteriodetes with no significant change in phylum level before and after intervention. The main dominant genera however changed after ginseng intake with *B. animalis, B. bifidobacterium* and *A. rectiventris* dominant prior to the intervention, whereas *B. animalis, B. bifidobacterium* and *A. rectiventris*...
*Faecalicibacterium* were most abundant after intervention. Differences in metabolism of ginseng based on human intestinal microbes were investigated by comparing the gut microbiota of the effective weight loss group (EWG) with weight change of -2.4±0.38 kg, and the ineffective weight loss group (IWG) with weight change of 0.6±0.64 kg. Whilst no significant differences in general characteristics were observed between the groups, different gut microbiota was apparent with the richness of bacterial communities obtained from EWG being relatively higher than that of IWG. The three predominant genera in EWG were *Blautia*, *Anaerostipes* and *Oscillibacter* whereas those in IWG were *Bifidobacterium*, *Blautia* and *Clostridium* g4. Authors proposed the anti-obesity effects of ginseng could work differently depending on gut microbiota composition as explained above. Both the EWG and IWG also demonstrated changes of microbial composition after ginseng intake, however nothing of statistical significance.

The authors noted that despite the weight changes, there were no significant effects on obesity related parameters in the study, which is in contrast to some of the ginseng effects previously reported. Possible explanations included the duration of time of intervention and differences in effects of humans and animals.

This is an interesting study demonstrating not only a weight loss effect and influence on gut microbiota in participants, but also demonstrating differing anti-obesity effects dependant on the gut microflora composition prior to intervention. The study is limited by its small sample size, no control group, a limited population and length of study. Future direction of research should aim to validate these results in larger scale studies and further understand the influence of different initial gut microbiota composition in different populations, ages and genders and effect of *Panax ginseng* in weight management.

**β-amyrin palmitate from *Hemidesmus indicus* for diabetes**


*Hemidesmus indicus* (hemidesmus), originally used in Ayurvedic and other traditional medicines for conditions such as rheumatism, leprosy, impotence, skin infections, fever, leucoderma, bronchitis and leucorrhoea, has been demonstrated to exhibit a variety of therapeutic activities including being anti-inflammatory, hepatoprotective, antibacterial, antileptic and hypocholesterolemic. Whilst hemidesmus was not traditionally used in treatment of diabetes mellitus, the current study aimed to investigate its effect in diabetic rats after authors observed a decrease in blood glucose levels after administration of hemidesmus in mice in previous investigations.

There were several aims to the study, with the first being to isolate the active anti-hyperglycemic principle from the root, and secondly to determine to effect and potential of this compound as an anti-diabetes mellitus therapy. Roots of *H. indicus* underwent a series of extraction processes, repeated column chromatography and preparative thin layer chromatography to isolate the active constituent of β-amyrin palmitate. β-Amyrin palmitate is known to be present in a number of plants including *Labelia inflata*, *Protrium leptophyllum* and *Tabernaemontana dichotoma*, however this is the first reporting of isolation of β-amyrin palmitate from hemidesmus.

To determine the effect of different per oral (p.o.) doses of β-amyrin palmitate on glucose tolerance, male Wistar rats of 175-200g body weight were divided into four groups of six. A control group received the vehicle (5% Tween 80, 1ml p.o.) with the experimental groups receiving 25, 50 or 100µg/kg bodyweight of β-amyrin palmitate in the vehicle. All groups were loaded with 60%glucose (3g/kg p.o.; 1ml/200g bodyweight) 30 minutes after administration of intervention with blood samples collected 1 minute prior to intervention administration and at 30, 90 and 150 minutes after glucose loading. β-Amyrin palmitate was observed to exert significant anti-hyperglycemic activity at all doses, with the optimal dose being 50µg/kg. The effect of intraperitoneally loaded glucose was also investigated, however in contrast to the oral glucose loading, β-amyrin palmitate did not lower glucose levels significantly. The effect of β-amyrin palmitate 50µg/kg administration for 15 days in non-diabetic rats was investigated, with the daily administration of β-amyrin palmitate 50µg/kg resulting in a significant decrease in non-fasted and fasting blood glucose levels, without influencing body weight or liver weight.

The effect of β-amyrin palmitate was also assessed in rats induced with diabetes by two methods. Injection of streptozotocin in neonatal rats produces a model of non-obese type 2 diabetes mellitus with β-cell deficiency, decreased basal insulin levels and some level of insulin resistance. Male rats with blood glucose levels in the range of 12.2-13.8mmol/l were used to assess the efficacy of β-amyrin palmitate in this model. Rats were treated for 20 days with daily dose of 50µg/kg β-amyrin palmitate, 500µg/kg glibenclamide, a drug that is in current use for diabetes mellitus, or control. Blood samples were taken prior to intervention administration on day 1 and 1hr after administration on days 5, 10, 15 and 20. The rats were sacrificed after day 20 with liver samples removed for glycogen estimation.

In the second method, diabetes was induced in male Wistar rats with alloxan, which destroys β-cells of the pancreas. Diabetic alloxan rats with blood glucose levels between 16.6-18.8mmol/l were selected for evaluation of β-amyrin palmitate. Rats were treated for 15 days with daily dose of 50µg/kg β-amyrin palmitate, 5IU/kg insulin