

Scientific Prune Research

A number of promising studies, both human and animal, have investigated the role of prunes in bone health. The California prune industry is currently sponsoring its largest clinical trial on the impact of prunes on bone density in postmenopausal women and this research will be released in 2019. Here are some current published research highlights:

Bone Health

The effect of two doses of dried plum on bone density and bone biomarkers in osteopenic postmenopausal women: a randomized, controlled trial

Hooshmand S, Kern M, Metti D, Shamloufard P, Chai SC, Johnson SA, Payton ME, and Arjmandi BH.
Osteoporosis International. 2016 Jul;27(7):2271-2279

Abstract:

Building on their previous research that demonstrated the ability of 100 g of dried plums/prunes to help prevent bone loss in older, osteopenic postmenopausal women, the investigators examined the possible dose-dependent effects in 48 osteopenic postmenopausal women (65-79 y). The three treatment groups included a control, 50 g dried plums or 100 g dried plums for 6 months. Total body, hip, and lumbar bone mineral density (BMD) were measured at baseline and 6 months using dual-energy X-ray absorptiometry. Bone biomarkers measured at baseline, 3 and 6 months included bone-specific alkaline phosphatase (BAP), tartrate-resistant acid phosphatase (TRAP-5b, a marker of bone resorption), high-sensitivity C-reactive protein (hs-CRP), insulin-like growth factor-1 (IGF-1), and sclerostin. In addition, osteoprotegerin (OPG), receptor activator of nuclear factor kappa-B ligand (RANKL), calcium, phosphorous, and vitamin D were measured at baseline and 6 months. According to the results, both doses of dried plums prevented the loss of total body BMD compared to the control ($P < 0.05$). TRAP-5b decreased at 3 months and was sustained at 6 months for both 50 g and 100 g doses. There were no significant changes in BAP for either dose of dried plum groups, although the BAP/TRAP-5b ratio was significantly ($p < 0.05$) greater at 6 months in both dried plum groups whereas there were no changes in the control group. The results suggest that a lower dose (50 g) of dried plums may be as effective as 100 g in preventing bone loss in older, osteopenic postmenopausal women. The investigators suggest that this may be due in part to the ability of dried plums to prevent bone resorption.

Bone Health

Postmenopausal Women: Efficacy and Possible Mechanisms

Bahram H. Arjmandi, Sarah A. Johnson, Shirin Pourafshar, Negin Navaei, Kelli S. George, Shirin Hooshmand, Sheau C. Chai and Neda S. Akhavan.
May 2017 Nutrients Journal, vol. 9, page 496

Abstract:

Osteoporosis is an age-related chronic disease characterized by a loss of bone mass and quality, and is associated with an increased risk of fragility fractures. Postmenopausal women are at the greatest risk of developing osteoporosis due to the cessation in ovarian hormone production, which causes accelerated bone loss. As the demographic shifts to a more aged population, a growing number of postmenopausal women will be afflicted with osteoporosis. Certain lifestyle factors, including nutrition and exercise, are known to reduce the risk of developing osteoporosis and therefore play an important role in bone health. In terms of nutrition, accumulating evidence suggests that dried plum (*Prunus domestica* L.) is potentially an efficacious intervention for preventing and reversing bone mass and structural loss in an ovariectomized rat model of osteoporosis, as well as in osteopenic postmenopausal women. Here, we provide evidence supporting the efficacy of dried plum in preventing and reversing bone loss associated with ovarian hormone deficiency in rodent models and in humans. We end with the results of a recent follow-up study demonstrating that postmenopausal women who previously consumed 100 g dried plum per day during our one-year clinical trial conducted five years earlier retained bone mineral density to a greater extent than those receiving a comparative control. Additionally, we highlight the possible mechanisms of action by which bioactive compounds in dried plum exert bone-protective effects. Overall, the findings of our research and others strongly suggest that dried plum in its wholeform is a promising and efficacious functional food therapy for preventing bone loss in postmenopausal women, with the potential for long-lasting bone-protective effects.

Bone Health

The Effect of Dried Plum on Serum Levels of Receptor Activator of NF- κ B Ligand, Osteoprotegerin and Sclerostin in Osteopenic Postmenopausal Women: A Randomised Controlled Trial

Shirin Hooshmand, Jayme R. Y. Brisco and Bahram H. Arjmandi
British Journal of Nutrition, April 2014.
doi:10.1017/S0007114514000671

Abstract:

The mechanisms by which dried plums impart bone-protective properties remain unclear. Recent research has shown that osteocytes may control bone formation via the production of sclerostin and bone resorption via the receptor activator of NF- κ B ligand (RANKL) and its inhibitor osteoprotegerin (OPG). In this study, the researchers measured serum levels of RANKL, OPG and sclerostin in osteopenic postmenopausal women (n 160) to investigate the mechanism of action of dried plum in reversing bone loss. Participants were randomly assigned to the treatment group of either 100 g dried plum/d or 75 g dried apple/d (comparative control) for 1 year (Previously reported in "Comparative Effects of Dried Plum and Dried Apple on Bone in Postmenopausal Women"). All participants received 500mg Ca plus 400 IU (10 mg) vitamin D daily. Bone mineral densities (BMD) of the lumbar spine, forearm, hip and whole body were assessed at baseline and at the end of the study using dual-energy X-ray absorptiometry. Blood samples were collected at baseline and after 12 months to assess bone biomarkers. Dried plum significantly increased the BMD of the ulna and spine in comparison with the control group. In comparison with corresponding baseline values, dried plum increased the RANKL levels by only +1.99 v. +18.33% and increased the OPG levels by +4.87 v.-2.15% in the control group. Serum sclerostin levels were reduced by -1.12% in the dried plum group v. +3.78% in the control group. Although percentage changes did not reach statistical significance (P <0.05), these preliminary data may indicate that the positive effects of dried plum on bone are in part due to the suppression of RANKL production, the promotion of OPG and the inhibition of sclerostin.

Glucose Response

A Diet Rich in Soluble and Insoluble Fiber Improves Glycemic Control and Reduces Hyperlipidemia Among Patients with Type 2 Diabetes Mellitus

McIntosh, M. and C. Miller (2001). *Nutr Rev* 59(2): 52-5.

Abstract:

Subjects with type 2 diabetes who consumed a diet containing food naturally rich in fiber (e.g., 50 g fiber/day, 50% soluble) for 6 weeks had significant improvements in glycemic control and lipid levels when compared with patients who consumed a diet with moderate amounts of fiber (e.g., 25 g fiber/day, 50% soluble).

Digestive Health

Randomised Clinical Trial: Dried plums/ prunes vs. Psyllium for Constipation

Attaluri A, Donahoe R, Valestin J, Brown and Rao SSC.
Alimentary Pharmacology and Therapeutics 2011; 33: 822-28.

Abstract:

Although dried plums/prunes and prune juice have been traditionally used for the treatment of constipation, dried plums have not been systematically assessed in patients with well-defined constipation. This study investigated and compared the effects of dried plums and psyllium in patients with chronic constipation. Forty constipated subjects (m/f = 3/37, mean age = 38 y) participated in an 8-week, single-blind, randomised cross-over study. Participants received dried plums (50 g b.d, 6 gm fiber/d) or psyllium (11 g b.d., 6 gm fiber/d) for 3 weeks each, in a crossover trial with a 1-week washout period. Participants maintained a daily symptom and stool diary. Assessments included number of complete spontaneous bowel movements per week, global relief of constipation, stool consistency, straining, tolerability and taste. The number of complete spontaneous bowel movements per week (primary outcome measure) and stool consistency scores improved significantly.

Weight Management

Short-term Effects of a Snack Including Dried Prunes on Energy Intake and Satiety in Normal-weight Individuals

Farajian P, Katsagani M, Zampelas A.
Eating Behaviors 11 (2010)201-203.

Abstract

This study investigated the effect of a preload including dried prunes eaten as a snack prior to a meal compared to a preload of an isoenergetic and equal weighed bread product. Researchers investigated short-term effect on satiety measured by subsequent ad lib meal intake and reduced appetite for dessert after lunch; and assessed satiety by visual analogue scales (VAS). Participants in the randomized within-subject crossover study included 45 healthy, normal-weight subjects. Results indicated that when subjects consumed the preload that included dried prunes, they consumed less of the dessert and had lower total energy intake at the meal. Subjects' feeling of hunger, desire and motivation to eat as assessed by VAS, were lower at all time points between the snack and meal. Macronutrient content of both preloads was similar. The authors suggest that the satiating power of prunes could be due to the fiber content.