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Research article

Preventive effect of dried plum extract against dexamethasone-induced osteoporosis in male rats through inhibiting cathepsin-K activity, lipogenesis and trabecular bone loss

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Key words: Osteoporosis; Dexamethasone, Dried plum, Cathepsin-K, Collagen type-1.

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Abstract

Objectives: Bone protective effect of dried plum extract (DPE) was investigated in dexamethasone (DEX) treated male rats, as an animal model of osteoporosis. **Material and methods:** Rats received intramuscular injection of DEX (7 mg/kg b.wt.) once a week for 4 weeks, whereas DPE (150 mg/kg b.wt.) was given orally for the same duration. **Results:** DEX-treated rats exhibited significant decline in the body weight accompanied by marked reduction in serum and bone minerals (Ca, P), bone mineral density (BMD) and serum total protein (TP) with elevation in serum creatinine (CR) level. Serum parathyroid hormone (PTH), osteocalcin (OC) and hydroxyproline (HYP) were increased, whereas calcitonin (CT), insulin like growth factor-I (IGF-I) and prostaglandin E_2 (PGE_2) were decreased, along with notable reduction in bone collagen type-1 (Col-1). Marked elevation in serum and bone lipids (TL, TG, TC), alkaline and acid phosphatases (ALP, ACP), as well as bone cathepsin-K (Cath-K) and oxidative stress markers [hydrogen peroxide (H_2O_2), malondialdhyde (MDA)] were recorded with decreased antioxidant components [reduced glutathione (GSH), superoxide dismutase (SOD), catalase (CAT)] in bone of DEX treated rats. Bone histopathological alterations were also observed with DEX treatment, as reflected by thinning of trabecular bone and loss of connection with noticeable porosity, indicating bone fragility. Consumption of DPE showed high ability to protect against DEX-induced biochemical and histological alterations in bone tissue, particularly through normalizing BMD and improving trabecular bone thickness and structure. **Conclusion:** Dried plum could be considered as a potential dietary approach for preventing bone loss and structural deterioration caused by DEX treatment.