

Ficus deltoidea promotes bone formation in streptozotocin-induced diabetic rats

ABSTRACT

Context: Diabetes mellitus increases the risk of bone diseases including osteoporosis and osteoarthritis. We have previously demonstrated that *Ficus deltoidea* Jack (Moraceae) is capable of reducing hyperglycaemia. However, whether *F. deltoidea* could protect against diabetic osteoporosis remains to be determined. **Objective:** The study examines the effect of *F. deltoidea* on bone histomorphometric parameters, oxidative stress, and turnover markers in diabetic rats. **Materials and methods:** Streptozotocin (STZ)-induced diabetic Sprague-Dawley rats (n = 6 animals per group) received one of the following treatments via gavage for 8 weeks: saline (diabetic control), metformin (1000 mg/kg bwt), and methanol leaves extract of *F. deltoidea* (1000 mg/kg bwt). A group of healthy rats served as normal control. The femoral bones were excised and scanned *ex vivo* using micro-computed tomography (micro-CT) for histomorphometric analysis. The serum levels of insulin, oxidative stress, and bone turnover markers were determined by ELISA assays. **Results:** Treatment of diabetic rats with *F. deltoidea* could significantly increase bone mineral density (BMD) (from 526.98 ± 11.87 to 637.74 ± 3.90). Higher levels of insulin (2.41 ± 0.08 vs. 1.58 ± 0.16), osteocalcin (155.66 ± 4.11 vs. 14.35 ± 0.97), and total bone n-3 PUFA (2.34 ± 0.47 vs. 1.44 ± 0.18) in parallel with the presence of chondrocyte hypertrophy were also observed following *F. deltoidea* treatment compared to diabetic control. **Conclusions:** *F. deltoidea* could prevent diabetic osteoporosis by enhancing osteogenesis and inhibiting bone oxidative stress. These findings support the potential use of *F. deltoidea* for osteoporosis therapy in diabetes.

Keyword: Diabetes; Osteoporosis; Bone histomorphometry; Micro-CT; Insulin; Antioxidant; Osteocalcin; BALP; DPD; Fatty acids