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Beneficial effects of grape seed proanthocyanidins extract on formation of tibia bone in low-calcium feeding rats

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Abstract We investigated the effects of grape seed proanthocyanidin extract (GSPE), 3 mg added in 100 g standard diet with calcium content 480 mg/100 g, on rat tibia formation following a low-calcium feeding (30% calcium of standard diet), by examining bone density, mineral content, geometric and bone strength. Five-week old male Wistar rats ($n=40$), were randomly divided into: control (Co), low-calcium diet (LC), low-calcium diet-standard diet (LCS), low-calcium diet-standard diet with supplementary GSPE (LCSG) groups. Rat metaphysis tibia bones were analyzed using three-dimensional peripheral quantitative computed tomography (pQCT), as well as the whole tibia bones for mechanical resistance using a material testing machine. Our findings showed that there were no significant differences in body weight among the 4 groups. While, all bone parameters of LC were significantly lower than Co. Further, trabecular bone density (TrBD), trabecular bone mineral content (TrBMC), cross-sectional moment of inertia to the reference axis y (yCSMI), stress strain index to the reference axis x (xSSI) in LCSG were significantly higher than those in LCS. Furthermore, the stiffness in LCSG and LCS were significantly higher than that in LC. We concluded that a mixture of calcium and GSPE in the diet would have a beneficial effect on bone formation for the treatment of bone debility in rats. Further, an increase bone mass in the metaphysis tibia bone is likely accompanied by an increase of bone strength within the whole tibia bone.

Key words Calcium, Dietary therapy, Grape seed proanthocyanidin extract, Rat, Tibia bone



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