

Effects of *Cirsium setidens nakai* on In Vitro Growth and Osteogenic Differentiation of Human Bone-Derived Mesenchymal Stem Cells

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Abstract

Cirsium setidens nakai belonging to *cirsium* has been reported to have various physiological activities including anticancer activity because it contains polyphenols, dietary fiber, minerals and vitamins. Despite these positive positive efficacies, however, no studies have studied *cirsium setidens nakai* products as biomaterials such as cellular metabolism and bone formation. Thus, the aim of this study was evaluate of osteogenesis differentiation a natural material extracted from *cirsium setidens nakai*. The natural materials in this studys in this studywere created by 40% ethanol extraction process and then dried. FabricatedFabricatedpowders were added to a medium at various concentrations (0.01, 0.05, 0.1, 0.2, and 0.25 $\mu\text{g/mL}$), and pure medium was used as a control. The natural material caused positive increases in cell metabolic activity and mineralized bone formation without cytotoxicity. In addition, we observed higher expression of genes such as ALP, BSP, Runx2 and COL1 in *cirsium setidens nakai* treatment cells. As a result, this study produced and investigated *cirsium setidens nakai* extracts and the natural materials showed potential biomaterials. In this research indicated that the *cirsium setidens nakai* extracts might have promising applications in areas of agricultural, biological and food engineering as a biomaterial.

Keywords

Bioresources, *Cirsium setidens*, Natural materials, Osteogenesis, Tissue regeneration

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