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Preparation, characterization, and in vivo evaluation of nano formulations of ferulic acid in diabetic wound healing.

Bairagi U¹, Mittal P¹, Singh J¹, Mishra B¹.

Diabetes mellitus is most common disorder characterize by hyperglycemia. Chronic hyperglycemia may lead to over production of free radicals thereby results in oxidative stress which impaired healing of wounds. Ferulic acid (FA) has been shown to have antidiabetic and antioxidant properties. The aim of the present study was to develop Ferulic acid nanoparticles and to study its hypoglycemic and wound healing activities. Ferulic acid-poly(lactic-co-glycolic acid) (FA-PLGA) nanoparticles were prepared by nano precipitation method. The prepared FA-PLGA nanoparticles had an average size of 240nm. Scanning electron microscopy (SEM) and atomic force microscopy (AFM) analysis showed the prepared FA-PLGA nanoparticles were spherical in shape. Drug encapsulation assay showed that 88.49% FA was encapsulated in PLGA. Carbopol 980 was used to formulate FA-PLGA nanoparticles loaded hydrogel. FA-loaded polymeric nanoparticles dispersion (oral administration) and FA-loaded polymeric nanoparticles based hydrogel (topical administration) treated wounds were found to epithelize faster as compared with diabetic wound control group. The hydroxyproline content increased significantly when compared with diabetic wound control. Therefore, the results indicate that FA significantly promotes wound healing in diabetic rats.