



ABSTRACT

Diabetes is a serious metabolic disorder characterized by abnormal glucose levels in body. It can cause severe complications; one of them is delayed wound healing which can even cause organ amputation. Wound healing is a complex process that advances in series of stages to heal the damaged skin. Nanotechnology is the recent technology that is widely used in medical field. To treat diabetic wound, nanotechnology was employed in the form of nanoparticles for healing. Silver nanoparticles (AgNPs) were made using *Cucumis sativus* (cucumber) pulp extract and AgNO₃. Synthesis of AgNPs was confirmed by characterization using ultraviolet-visible spectrophotometry (UV-Vis), Fourier-transform infrared spectroscopy (FTIR), X-ray diffraction (XRD), Photoluminescence Spectroscopy (PL), scanning electron microscopy (SEM) and energy dispersive X-ray (EDX). It was clear from these analyses that the nanoparticles have particular size and morphology that makes them effective. Antibacterial activity of AgNPs was evaluated where using agar well diffusion assay. The 100% concentration of AgNPs solution showed 2.5±0.57 mm zone of inhibition against *Staphylococcus aureus*. Antioxidant activity was checked where AgNPs showed 99.51±0.07% activity at 100% concentration. Cucumber extract at 100% concentration also showed 99.44±0.06% activity. These activities were compared with ascorbic acid which is a standard antioxidant and showed 99.77±0.04% at 100% concentration. To check healing property of AgNPs, albino mice were used. Diabetes was induced in mice using alloxan monohydrate and then wounds were formed on the skin of diabetic mice using biopsy punch. The diabetic wounded mice were then treated with AgNPs ointment that was made using Vaseline petroleum jelly as base and this ointment was applied to wounds. Histological analysis was done which confirmed that wounds were healed within 15 days of treatment. It can be concluded that green synthesized AgNPs with cucumber pulp extract possess excellent healing properties and therefore can be used to cure diabetic wounds.

Keywords: diabetes, wound healing, diabetic wound, silver nanoparticles, cucumber