

Physiotherapeutic protocol and ZnO nanoparticles: a combined novel treatment program against bacterial pyomyositis

ABSTRACT

Myositis tropicans or pyomyositis is a muscle inflammation resulting from a bacterial infection of skeletal muscle (commonly caused by *Staphylococcus aureus*) that usually leads to hematogenous muscle seeding. The present study was designed to estimate the role of ZnO-NPs and a physiotherapeutic program in the management of induced *biceps femoris* atrophy in rats through histological, biochemical, and radiological examinations at different time intervals. At the beginning, several bacterial strains were evaluated through a proteolytic enzyme activity assay and the highest activity was recorded with the *Staphylococcus aureus* strain. ZnO-NPs were synthesized with the arc discharge method with an average size of 19.4 nm. The antibacterial activity of ZnO-NPs was investigated and it was revealed that the prepared ZnO-NPs showed a minimum inhibitory concentration of 8 µg/mL against the tested bacterium. The cytotoxicity of the prepared ZnO-NPs was tested in C2C12 myoblast cells, and it was elaborated that CC50 was 344.16 µg/mL. *Biceps femoris* pyomyositis was induced with a potent strain (*Staphylococcus aureus*); then, a physiotherapeutic program combined with the prepared ZnO-NPs treatment protocol was applied and evaluated. The combined program claimed antibacterial properties, preventing muscle atrophy, and resulted in the most comparable value of muscle mass.