

ANTIMICROBIAL ACTIVITY OF *Nigella sativa*-GENTAMICIN NANOEMULSION AGAINST OSTEOMYELITIC *Staphylococcus aureus*

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ABSTRACT

Osteomyelitis is a serious bone infection commonly caused by *Staphylococcus aureus*. The treatment of osteomyelitis remains challenging despite recent advances due to the prevalence of antibacterial resistance. Therefore, a novel drug against osteomyelitic bacteria has been formulated to offer a new treatment option for osteomyelitis. The present study aimed to investigate antibacterial properties of *Nigella sativa*-gentamicin emulsion (GNE) containing 50% *N. Sativa* and 0.1% gentamicin against osteomyelitic *S. aureus*. Formulation of GNE (30 µg sample/disc) was tested firstly using the disk diffusion test on Mueller Hinton. 3 strains of *S. aureus* were used namely ATCC 29213, gentamicin sensitive (SC01) and gentamicin resistant (SC03). The zone of inhibition was measured and the MIC and MBC were calculated by using microplate reader. We observed that the zone of inhibition of GNE vs gentamicin-alone was 7.5 vs 21.5 mm (ATCC 29213), 7.5 vs 22.5 mm (SC01) and 9 vs 17.5 mm (SC03). For GNE-alone, MIC and MBC were 937.5 and 1875 ng/mL for ATCC 29213 and SC01, respectively; and 1875 and 3750 ng/mL for SC03. For gentamicin, MIC and MBC were equal for ATCC 29213 at 117.2 gm/mL and SC01 at 58.6 ng/mL. In contrast, SC03 showed MIC of 468.8 ng/mL and MBC of 3750 ng/mL). The results indicated that GNE has the efficacy to kill osteomyelitic bacteria, even at low dose. Hence, GNE would be a suitable carrier to deliver antibiotics for osteomyelitis although further investigation for *in vivo* efficacy and toxicity should be considered.

Keywords: *N. sativa* oil, Gentamicin, Emulsion, Drug delivery, Osteomyelitis

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