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

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 International Journal of Pharmacy and Pharmaceutical Sciences  
 Volume 6, Issue 11, 2014, Pages 171-176

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## Formulation and stability testing of gentamicin-n. sativa fusion emulsions for osteo-healing application (Article)

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### Abstract

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An alternative osteo-healing formulation with osteo-healing properties was formulated by combining gentamicin and Nigella sativa (N. sativa) oil in an emulsion to reduce gentamicin toxicity effect over prolonged use in osteo-infection treatment. This work aims to test the aqueous solubility and physicochemical properties of the emulsion. Four emulsions (emulsion A, B, C and D) had been formulated, with final concentration of gentamicin was made constant at 0.1% (w/v) whereas N. sativa oil concentration was varied between 32.5% (v/v) to 46.4% (v/v) in all formulations. Then, stability studies of all emulsion were performed by centrifugation at (5000rpm, 5 minutes), at different storage conditions (8°C, 25°C and 50°C), organoleptic characteristics, freeze-thawcycle, pH determination, particle size measurement, zeta-potential analysis, and pH titration analysis. Results showed no phase separation after centrifugation for freshly prepared emulsions. Storage at 8°C, all emulsions also showed no phase separation at all-time points. At 25°C storage condition, three formulations were stable at day 7 but phase separation was formed in all emulsions by day 14 showed good stability at day 7 and all emulsions formed phase separation at day 14. No emulsions were stable in storage temperature of 50° C. The particle size of the emulsions increased with an increment of N. sativa oil concentration. Zeta-potential analysis showed a range of  $-32.2 \pm 0.15$  mV to  $-48.0 \pm 0.45$  mV. When pH titration analysis was performed, the zeta potential indicated that the emulsion stability was affected by acidic conditions. We concluded that the use of gentamicin-N. Sativa emulsions must take into account the storage condition with preference of low temperature and fresh preparation at higher alkalinity and the lowest possibility of N. sativa oil. © 2014, International Journal of Pharmacy and Pharmaceutical Sciences. All right reserved.

### Author keywords

Emulsion Gentamicin Nigellasativa Osteo Stability

### Indexed keywords

EMTREE drug terms: gentamicin

EMTREE medical terms: Article black cumin drug formulation drug hydrolysis drug stability emulsion flocculation fracture healing freeze thawing Nigella sativa emulsion particle size zeta potential

### Chemicals and CAS Registry Numbers:

gentamicin, 1392-48-9, 1403-66-3, 1405-41-0

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