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PREPARATION, CHARACTERIZATION AND IN VITRO BIOLOGY STUDY OF *SATUREJA KHUZESTANICA JAMZAD* ESSENTIAL OIL-LOADED CHITOSAN NANOPARTICLES

Marzieh Rashidipour. *Young Researchers and Elite Club, Islamic Azad University, Khorramabad Branch, Khorramabad, Iran*

10.1136/bmjopen-2016-015415.98

Background and aims: Complimentary medicine plant an important role in treatment of disease because of variety of usefulness. *Satureja khuzestanica Jamzad* is one of the plants which is used to make nanoparticles. this study aims in Preparation, characterization and in vitro biology study of *Satureja khuzestanica Jamzad* essential oil-loaded chitosan nanoparticles.

Method: The fabrication of *Satureja khuzestanica Jamza* essential oil (SKE) -loaded chitosan nanoparticles was achieved by a two-step method: oil-in water emulsion and ionic gelation of chitosan with pentasodium tripolyphosphate.

Results: The obtained particles possessed encapsulation efficiency (EE) and loading capacity (LC) in the ranges of 13–30% and 3–11.2%, respectively, when the initial carvacrol content was 1–2% of chitosan. The individual particles exhibited a spherical shape with an average diameter of 185.5 nm, and a positively charged surface with a zeta potential value of -24.3 mV. The increment of initial carvacrol content caused a reduction of surface charge. SKE-loaded chitosan nanoparticles showed antimicrobial activity against *S. aureus*, *S. epidermidis* and *S. agalactiae*, *E. faecalis*, *L. monocytogenes*, *E. coli*, *S. typhi*, *S. paratyphi*, *S. enterica*, with an MIC of 62.5, 15.6, 125, 15.6, 7.8, 62.5, 7.8, 15.6, 500 $\mu\text{g/mL}$, respectively. Skin inflammation was induced in the right hind paw of rats by the topical application of 2 mg/paw of carrageenan dissolved in 0.2 ml of 0.9% saline solution. The anti-inflammatory effect of the SKE-loaded chitosan nanoparticles (25, 50, 100 mg/kg) were compared to diclofenac sodium (200mg/kg). SKE-loaded chitosan nanoparticles (50 mg/kg) produced significant anti-inflammatory effect ($P < 0.01$).

Conclusion: The findings from our present study suggest that SKE-loaded chitosan nanoparticles anti-inflammatory and antibacterial properties. SKE-loaded chitosan nanoparticles could serve a potential novel compounds effective in inflammatory and antibacterial conditions.