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Enhancing antibacterial action of *Origanum vulgare* essential oil through nanoemulsions

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During recent years, plant essential oils have increasingly come into focus in phytomedicine. Their widespread use has raised scientists' interest in basic research of essential oils. In particular, its antimicrobial properties. Due to their bactericidal and fungicidal properties, pharmaceutical and food uses are more and more widespread as alternatives to synthetic chemical products to protect the ecological equilibrium. Oil from the common herb oregano (*Origanum vulgare*) may be an effective treatment against dangerous and sometimes drug-resistant bacteria. Studies have shown that oregano oil and in particular carvacrol, one of oregano's chemical components, appear to reduce infection as effectively as traditional antibiotics. There has been growing interest in the utilization of emulsions in the food, beverage, and pharmaceutical industries. Emulsions have the ability to greatly increase the bioavailability of highly lipophilic substances encapsulated within them. Our research has found that by creating cationic nanoemulsions, we were able to enhance the antimicrobial activity of oregano essential oil against pathogenic bacteria. We were able to reach a MIC of 7 PPM for *E. coli*.

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