

To Investigate the Therapeutic Effect of Cinnamon Essential Oil-loaded Nanoemulsion in Murine Vaginal *Candida albicans* Infection

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Outline

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Abstract

Candida albicans is an opportunistic pathogen. It usually coexists in the human oral cavity, gastrointestinal tract and genitourinary tract in a harmless state. When the host's immunity is deficient, it may cause superficial mucosal infections, such as oral and vulvovaginal infections, or even systemic infections. Cinnamon is a safe and harmless natural plant product with a variety of special active ingredients. Cinnamon has antibacterial activity against such as *Escherichia coli* and *Candida*, it can effectively prevent biological diseases and food deterioration. Nanoemulsions are particle sizes ranging from 1 – 200 nm. As a drug delivery system, it can effectively improve the therapeutic effect and component stability of drugs. This study aim to investigate cinnamon essential oil nanoemulsions efficacy of suppressing the infection of *Candida albicans* in the model of in mice. The results showed that the particle size, polymer dispersity index and zeta-potential of cinnamon essential oil nanoemulsions were 19.31 ± 1.11 nm, 0.191 ± 0.009 and -3.30 ± 0.51 , respectively. *In vitro* co-cultivation of 40 mg/mL cinnamon essential oil nanoemulsion with mouse spleen cells had anti-inflammatory and bactericidal activities, meanwhile hadn't significant cytotoxicity. In mice model, the amount of *Candida albicans* in vaginal lavage fluid of mice significantly decreased in the treated group. In the histopathological section, it can also be observed that the damage of the vaginal epithelial layer is suppressed, and the area of bacterial erosion is reduced. In addition, compared with the negative control group after treatment the IgA and IgG concentration of mice were decreased, in the meantime cinnamon essential oil nanoemulsion could reduce the cytokines expression of TNF- α , IFN- γ and IL-17A to avoid excessive inflammatory response. Taken together, cinnamon essential oil nanoemulsion can effectively reduce the inflammatory reaction and the colonization of *Candida albicans* in the vaginal mucosa, indicating that it has the potential to be a drug for the treatment of *Candida albicans* infection.

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