The new niosomal formulation of lactobacillus acidophilus and bifidobacterium bifidum with allium sativum based on allicin in treating acnes

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Abstract

Background and Aim : Acne vulgaris is one of the most common skin disorders, typically caused by excessive sebum production, bacterial proliferation, and inflammation. Current treatments, such as antibiotics and retinoids, have limitations including side effects and microbial resistance. This study investigates a novel therapeutic approach using a niosomal formulation containing Lactobacillus acidophilus, Bifidobacterium bifidum, and Allium sativum (garlic), with a focus on its in vitro efficacy in treating acne using cell line models. Allicin, the active compound in garlic, is believed to have antimicrobial and anti-inflammatory properties that may be beneficial for acne treatment.

Methods : Treatment and Assessment: The cell cultures were treated with the niosomal formulation, and its effects on bacterial growth (e.g., Propionibacterium acnes), sebum production, and inflammatory markers were assessed. Control groups included untreated cells and cells treated with standard acne medications. Cytotoxicity and Proliferation: Cell viability and proliferation were measured using assays like MTT or XTT. Bacterial Inhibition: Antimicrobial activity was evaluated by assessing the growth inhibition of P. acnes. Inflammation Markers: Levels of pro-inflammatory cytokines (such as IL-6, TNF-α) were measured using ELISA or RT-PCR. Morphological Changes: Cellular morphology was analyzed using microscopy.

Results : The niosomal formulation containing Lactobacillus acidophilus, Bifidobacterium bifidum, and allicin demonstrated significant antibacterial activity against P. acnes. Additionally, the formulation reduced the secretion of inflammatory cytokines and exhibited protective effects on skin cells, promoting cell viability and proliferation. The formulation also led to a reduction in the size and number of acne lesions in cell culture models, indicating its potential as a treatment for acne vulgaris.

Conclusion : The niosomal delivery system was effective in enhancing the stability and bioavailability of active ingredients like allicin and promoting their targeted delivery to skin cells. The combination of probiotics (Lactobacillus acidophilus and Bifidobacterium bifidum) with allicin derived from garlic demonstrated a synergistic effect against acne by balancing skin microbiota and reducing inflammation. These findings highlight the potential of this novel formulation as a safer and more effective alternative to conventional acne treatments. This study provides evidence supporting the efficacy of a niosomal formulation containing Lactobacillus acidophilus, Bifidobacterium bifidum, and allicin from Allium sativum in treating acne in vitro. Further studies, including clinical trials, are needed to confirm these results and assess the long-term safety and effectiveness of the formulation in acne management. This is the English version of the summary, capturing all the main points of the original research.

Keywords : niosomal formulation, lactobacillus acidophilus, bifidobacterium bifidum, allium sativum, allicin,treating acnes