

NANO SPRAY ANTI ACNE : Nanotechnology-based Serum Spray Innovation from Betel Leaf Extract in overcoming *Propionibacterium acnes* bacteria causes by Acne Problems

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ABSTRACT

Acne is an inflammation and blockage of the oil gland ducts in the skin caused by the bacteria *Propionibacterium acne*, *Staphylococcus epidermidis*, and *Staphylococcus aureus*. Acne treatment is usually done by giving antibiotics and chemicals that have irritating side effects. Therefore, other alternatives are needed by using natural products that have milder side effects and are halal. The author reviews the potential of Betel Leaf Extract which can be used as an acne medication because it has a high antibacterial content. The method used in this paper is a narrative literature study. The author uses global journal publication websites such as Science Direct and Google Scholar with the keywords Betel Leaf, Antimicrobial, *Propionibacterium*, Acne, and Nano Spray Serum. Based on the literature obtained, the results of the ethanol extract of betel leaf have antibacterial activity against *P. acne* and multiresistant *Staphylococcus aureus* with a KBM of 0.5% w/v. Betel leaf extract is combined with distilled water, *polyoxyethylene sorbitan monooleate* as a solvent, *chitosan* as a preservative, and *acetic acid* by ultrasonication method which functions to break particles into nano size with the help of sound waves above 20 kHz. The spray form was chosen because it can accelerate the absorption of serum into facial skin. In conclusion, Betel Leaf Extract has the potential to be a safe and halal organic material for serum spray preparations as a halal skincare solution for acne problems.

Keywords: *Betel Leaf, Antimicrobial, Propionibacterium, nano spray serum, Acne.*