

Prediction of Antibacterial Peptides against *Propionibacterium acnes* from the Peptidomes of *Achatina fulica* Mucus Fractions

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Abstract : Acne vulgaris is a common skin disease mainly caused by the Gram-positive pathogenic bacterium, *Propionibacterium acnes*. This bacterium stimulates inflammation process in human sebaceous glands. Giant African snail (*Achatina fulica*) is alien species that rapidly reproduces and seriously damages agricultural products in Thailand. There were several research reports on the medical and pharmaceutical benefits of this snail mucus peptides and proteins. This study aimed to in silico predict multifunctional bioactive peptides from *A. fulica* mucus peptidome using several bioinformatic tools for determination of antimicrobial (iAMPpred), anti-biofilm (dPABBs), cytotoxic (Toxinpred), cell membrane penetrating (CPPpred) and anti-quorum sensing (QSPpred) peptides. Three candidate peptides with the highest predictive score were selected and re-designed/modified to improve the required activities. Structural and physicochemical properties of six anti-*P. acnes* (APA) peptide candidates were performed by PEP-FOLD3 program and the five aforementioned tools. All candidates had random coiled structure and were named as APA1-ori, APA2-ori, APA3-ori, APA1-mod, APA2-mod and APA3-mod. To validate the APA activity, these peptide candidates were synthesized and tested against six isolates of *P. acnes*. The modified APA peptides showed high APA activity on some isolates. Therefore, our biomimetic mucus peptides could be useful for preventing acne vulgaris and further examined on other activities important to medical and pharmaceutical applications.

Keywords : *Propionibacterium acnes*, *Achatina fulica*, peptidomes, antibacterial peptides, snail mucus

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