Investigation of the Antimicrobial Activity of Soy based Isoflavones and Peptides against Pathogenic Biofilms

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by

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Abstract:

Pathogenic bacteria are a great concern to both food and medical industry owing to their pathogenicity and antibiotic resistance. Plant based antibiotics and antimicrobials are much appreciated over chemicals because of their biocompatibility, biodegradability, and multi-functionality. Soybean (Glycine max) has attracted a lot of interest because of the presence of therapeutic bioactive compounds such as isoflavones and peptides. The antimicrobial activity of soy isoflavones extracted using ultrasonication technique was assessed against Pseudomonas aeruginosa, Listeria monocytogenes, Methicillin-Resistant Staphylococcus aureus, and Escherichia coli. Results demonstrated that soy isoflavones at 100 µg/ml concentration could inhibit both L. monocytogenes and E.coli. The structure of isoflavones and its possible mechanism of action on bacterial cells were further visualized and quantified using Atomic Force Microscopy (AFM) and Scanning Electron Microscopy (SEM). The antimicrobial efficacy of two synthesized soy peptides (PGTAVFK and IKAFKEATKVVKVVLWTA) against P. aeruginosa and L. monocytogenes was also investigated. Results showed that PGTAVFK could inhibit L. monocytogenes at 312.5 µM concentration and IKAFKEATKVKVVLWTA could inhibit both bacteria at 37.2 µM concentration. These studies could be significant to both food and medical fields in understanding and examining the therapeutic potential of soy isoflavones and peptides.