

Antimicrobial Activity of *Allium sativum*- Loaded Oral Thin Film Against *Streptococcus mutans*

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Structured Abstract

Background: *Streptococcus mutans* is a well-known bacterium that causes dental diseases such as tooth erosion. Few antimicrobial agents have been developed to combat *S. mutans* in the mouth. This includes the use of fluoride. However, the excessive use of fluoride can cause significant tooth discoloration. Hence, the use of herbs such as *Allium sativum*, or known as garlic, is proposed to fight against *S. mutans* in the mouth. *A. sativum* was chosen as antimicrobial agent because it contains allicin. Allicin has the ability to reduce inflammation, as well as blocking free radical. In addition, the release of allicin from *A. sativum* is very rapid, making it suitable to be antimicrobial, fighting the pathogen in the mouth. However, direct application of garlic may not be really suitable. Therefore, *A. sativum* extract is loaded into oral thin film (OTF) to release the properties, as OTF improves its absorption rate and is not easily interrupted by drinking and eating.

Methods: This study aimed to first investigate the minimum inhibitory concentration (MIC) of *A. sativum* extract against *S. mutans* using the broth microdilution method. Next, the oral thin film (OTF) containing *A. sativum* will be prepared using the solvent casting method. Lastly, the release and antibacterial property of oral thin film containing *A. sativum* extract against *S. mutans* will be assessed using the well diffusion method (WDM).

Results: The higher the concentration of *A. sativum* extract, the greater its ability to inhibit the growth of *S. mutans*. Thinner profile of oral thin films increases the effectiveness in delivering and the release of antimicrobial properties, compared to thicker oral thin films. As time increases, the zone of inhibition also increases, suggesting that the release of antimicrobial properties of *A. sativum* extract continues over time. The slow-releasing properties of the OTFs was found to be directly proportional in the inhibition of the growth of *S. mutans* over time.

Conclusion: In conclusion, oral thin films (OTF) that contains *A. sativum* extract have the potential to become antimicrobial agent against pathogen in mouth as well as it has chances to be used as a treatment of dental caries.

Keywords: *S. mutans*, *Allium sativum*, oral thin film (OTF), allicin, antimicrobial

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