

Volatile Sulfur Compounds and their Effects on *Streptococcus mutans* Biofilm

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Volatile sulfur compounds (VSC) are produced by certain anaerobic bacteria known to cause halitosis in the oral cavity. *Porphyromonas gingivalis* produces VSC and causes halitosis and periodontal disease. *Streptococcus mutans* is a facultative anaerobic bacterium that is most commonly known for causing dental caries in the oral cavity. No research has been reported indicating a connection between *S. mutans* and VSC. An observation was made by Dr. Richard Gregory and Ph.D. student Ruijie Huang that when an *S. mutans* culture was left in an anaerobic environment with *P. gingivalis*, the growth of *S. mutans* appeared to be inhibited. This study explored that observation using not only *P. gingivalis* culture supernatant containing VSC but also other VSC, such as DTT, and 2ME to demonstrate that VSC inhibit the growth of *S. mutans* biofilm using total growth and biofilm formation after crystal violet staining. The results were read using a spectrophotometer to read the total growth and biofilm formation. These results indicate that *S. mutans* total growth and biofilm is significantly inhibited ($p < 0.05$) by the presence of VSC. Results also establish that different VSC inhibit *S. mutans* depending on the amount of sulfur in each agent; however, each agent greatly reduced the amount of *S. mutans* biofilm. Due to these results, one can conclude that there is an inhibitory relationship between VSC and *S. mutans*. A person with a major case of halitosis or a person who has periodontal disease would most likely have little to no evidence of dental caries at that time.

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