Exploring the antimicrobial effects of neem and cranberry in a liquid-based assay system

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Abstract: This study was conducted to explore the antimicrobial effects of neem, an extract from an evergreen tree native to India, and cranberry in preventing the formation of biofilm on the surface of the tooth that leads to the development of dental caries or tooth decay. These naturally occurring products are ideal considering their availability, particularly in developing regions of the world that lack access to consistent dental care. The goal of this project is to explore the combined effect of two naturally-occurring antimicrobial agents to see whether they display synergy. A synergistic combination is revealed with the display of an inhibitory effect such that 1+1 > 2. Synergy was assessed using a Checkerboard Assay system, which measures the Minimum Inhibitory Concentration (MIC) of the compounds. The MIC is visualized by applying varying concentrations of neem and cranberry along with bacteria and broth in each well of a 96-well plate. The wells that appear to lack any bacterial growth indicate that they are at or above the MIC. These findings were then quantified to assess synergy using the Lowest Fractional Inhibitory Concentration Index (FIC), Mean FIC, and the Two Well Method. Results were not supportive for synergy using the Lowest FIC. Results in the Mean FIC and Two Well method were inconclusive. These results are preliminary and more experimentation will be necessary for definitive conclusions.

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