Novel Oral Treatments Infused With Native Plant Extracts to Improve Oral Health in Developing Countries

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Oral diseases such as tooth decay are expected to affect 3.5 billion individuals worldwide. In most developing countries, access to primary oral health treatments is limited due to an unequal distribution of oral health specialists and a lack of sufficient health facilities. To address this problem, this study investigated Psidium guajava and Acmella oleracea extracts, plants native to developing countries, and their prevention of the growth of a tooth decay causing bacteria, Streptococcus mutans. This project was conducted using the following methods: First, to collect the extract from P. guajava leaves and A. oleracea buds, ethanol extraction and rotary evaporation was performed. Secondly, toothpaste bits were produced and infused with plant extracts. To create the toothpaste bits, 142g of baking soda and 60ml of coconut oil were combined. 0.800g of the paste was infused with 20μL of plant extracts. Bits were then rolled in baking soda and let sit to fully dry. Lastly, antimicrobial assays (Kirby-Bauer and Area Coverage Analysis) were performed. Data was analyzed using R- studio, Microsoft excel, and Image J. The results showed that Streptococcus mutans showed susceptibility to all the prepared toothpaste bits (ANOVA, $p< 0.05$) Combining Acmella oleracea and the toothpaste diminishes the effects of Acmella oleracea. The mouthwash made from the aqueous solution of Acmella oleracea was able to inhibit the growth of S. mutans. Therefore, 50% concentration of Acmella oleracea is the minimum concentration needed to fully inhibit the growth of Streptococcus mutans.

Awards Won:
Arizona State University: Arizona State University ISEF Scholarship (valued at up to $52,000 each)
University of Arizona: Renewal Tuition Scholarship