Title: A study of phenolic extract mouthwash from mango seed kernel

Researcher: Assistant Professor Dr. Pitchaon Maisuthisakul
Department of Agro-Industrial Product Development Technology
Department of Food Business Management
School of Science, University of the Thai Chamber of Commerce
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ABSTRACT

Mango (*Mangifera indica* Linn.) is one of the most important tropical fruits in Thailand. From previous report, mango seed kernel extracts contained phenolic components with a high antioxidant activity, which was assessed in homogeneous solution with the 2,2′-azinobis (3-ethylbenzothiazinesulfonic acid) radical cation (ABTS•+) scavenging assays and in an emulsion with the ferric thiocyanate test. The extracts also possessed antibacterial activity. The extract was effectively used in the preparation of many food and cosmetic products such as potato salad, chewing gum, ice cream, mouthwash and toothpaste for preventing dental caries. Hence, the purpose of this study is (1) to investigate the appropriate condition of water extraction process from mango seed kernel, (2) to investigate the antibacterial activity of mango seed kernel against *Streptococcus mutans* and *Staphylococcus aureus*, (3) to investigate in-vitro anti-inflammatory efficiency and the antibacterial activity of mango seed kernel mouthwash against *Streptococcus mutans* and *Staphylococcus aureus* including its properties and (4) to investigate the stability of mouthwash containing mango seed kernel extract.

This study was aimed to study the effect of extraction time on phenolic compounds from ripened and pickled mango seed kernel cultivar of Chok-Anan cultivar (from 2 to 8 h). The total soluble solid and quality of extracts (phenolics concentration, pH and color (L*, a*, b*, C and H°)) were also determined. Extraction was a slow process, with a higher total phenolic content during the first period of extraction and with apparent degradation of constituents beyond 4 h. During longer extraction time, total soluble solid of pickled kernel extraction increased, whereas total soluble solid of ripened

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mango remained constant. pH of extracting supernatant decreased and intense light green color was obtained. The high correlation between total phenolic concentration and total soluble solid (r = 0.970) as well as chroma values (r = 0.810) was found in all type of mango kernel. However, there is no correlation between each parameter. Conversely, Opposite results were obtained from ripened kernel, suggesting that total phenolic content remained the appropriate variable to monitor the extraction time effect.

Aqueous extract of ripened and pickled seed kernel of Mangifera indica was assessed for its anti-inflammatory activity by in-vitro methods. In-vitro anti-inflammatory activity was evaluated using albumin denaturation assay, proteinase inhibitory activity, and membrane stabilization at different concentrations. The total free radical scavenging capacity of fresh and pickled mango seed kernel extracts (FMSKE and PMSKE) were determined by using the DPPH and ABTS methods. The antioxidant activity in a linoleic acid emulsion system was also determined. The antimicrobial activity of the FMSKE and PMSKE was investigated using disc diffusion method, minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) including time kill assay. The results showed that M.indica aqueous kernel extract at a concentration range of 50-800μg/ml significantly (p<0.05) protects the heat induced albumin denaturation. At the concentration of 400 and 800 μg/ml, FMSKE showed significant (p<0.05) inhibition of 42 and 82% of proteinase inhibitory action, but at the concentration of 100 and 200 μg/ml showed slightly different activity. PMSKE exhibited lower inhibition of proteinase than FMSKE. Heat induced haemolysis of erythrocyte was strongly inhibited at the concentration of 200 to 800μg/ml. The DPPH capacity of the FMSKE had the highest value and was significantly (P < 0.05) higher than that of tannic acid. PMSKE showed strong antimicrobial activity against S.aureus more than S. mutans with inhibition zone of 11 mm and 8 mm, respectively. FMSKE exhibited less effective on S.mutans than that on S.aureus. PMSKE was found to be more effective against both microorganisms than FMSKE. The results obtained in the present study indicate that aqueous kernel extracts of M.indica can be a potential source of anti-inflammatory, anti-microbial and antioxidant agents.

Increasing number of people are using mouthwashes for general and oral health care. Few of these mouthwashes, however, have undergone rigorous testing, as evidenced by the limited amount of information on shelf life including anti-inflammatory and antibacterial properties. The aim of this study was to determine the antimicrobial

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properties of mouthwash containing kernel of mango (*Mangifera indica*) against oral pathogens related to caries, *S.aureus* and *S.mutans*, to provide information to dental professionals about the efficacy of their products in vitro and to use these mouthwashes as a base for the evaluation of antimicrobial plant products. The inflammatory inhibitory activity and shelf life of mouthwash were also evaluated. Chlorohexidine mouthwash emerged as the most effective mouthwash to inhibit *S.aureus* and *S.mutans*. Mouthwash containing mango kernel exhibited inhibition zone against *S. aureus* (12mm) more than *S. mutans* (10mm) and also showed inflammatory inhibitory properties higher than chlorohexidine. Unfortunately, the mouthwash containing kernel of *M. indica* showed very little stability due to color changing.

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