The Development of Drug Delivery System for Caries
Preventive and Therapeutic Approach

Pensiri Sirikumgorn, Jomjai Peerapattana*, Apa Juntevee, Nasajea Naunkaew

Introduction: Mangosteen is the fruit of *Garcinia mangostana* that is popular fruit in Thailand. The major component in mangosteen peel is α-mangostin. Several studies indicate cariogenic bacteria are caused tooth caries and α-mangostin has antibacterial effect. Hence, this study aims to extract α-mangostin and examine anti-cariogenic bacteria activity against *Streptococcus mutans*. Then, formulate drug delivery system which can attach on tooth surface and composing of α-mangostin. Material and method: The mangostin crude was extracted by maceration with 95%ethanol and extract α-mangostin by column chromatography. High Performance Liquid Chromatography (HPLC) and Thin Layer Chromatography (TLC) method was used to determine this extract. After extraction, the minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) values of α-mangostin against *S. mutans* was determined. The 20 formulations was designed and prepared follow computerized program (optimization program) and the pH, drying time, adhesion properties, drug release was investigated. Result: The yield percentage of crude extract and α-mangostin extract are 12.23 ± 0.07 and 1.07 ± 0.09, respectively. The MIC value is 2.1 μg/mL and MBC value is 4.2 μg/mL. For the formulation, pH is about 8, drying time is between 40 – 120 section, adhesion properties was measured from residua weight of formulation after applied on tooth and immersed in artificial saliva for 12 hours, and α-mangostin release was determined by HPLC. Conclusion: α-mangostin show antibacteria affect against cariogenic bacteria *S. mutans* and can be used for anti-caries formulation. The computerized program is alternative method for drug formulation. The result of pH, drying time, adhesion properties and drug release will be investigated again by this program to select the best formulation.

Keywords: α-Mangostin, Cariogenic bacteria, anti-caries formulation

Faculty of Pharmaceutical sciences and Faculty of Dentistry,
Khon Kaen University, Khon Kaen, 40002, Thailand

*correspondence author: E-mail: jomsuj@kku.ac.th