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| Title | : DEVELOPMENT OF CHITOSAN COATED LIPOSOMES FOR DELIVERING TAMARIND FRUIT PULP'S AHAs TO SKIN |
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## Abstract

Tamarind fruit pulps have been traditionally used for cosmetic purpose for many years. Promising report showed that the tamarind's fruit pulp contains a major component of tartaric acid and a minor amount of lactic acid, citric acid and malic acid. However, according to low permeability through skin of AHAs, high AHAs concentrations must be used, leading to skin irritation as far as burning. Liposomes have been shown a great potential as active delivery system. In addition, coating the shell of liposome with some polymers may promote the controlled release of the AHAs. Therefore, liposomes modified by chitosan coated were developed in this study. The lyophilized tamarind extract contained tartaric acid about 20-30% was used as active agent. Reverse phase evaporation method permitted to obtain well-formed tamarind extract loaded liposome. Various parameters including, time of sonication, evaporation and shaking were varied to optimize conditions for the liposome preparation. The appropriate time for sonication and evaporation were 7-20 and 60 min, respectively while that for shaking was 1 min. The highest entrapment efficiency of liposomes (60-70%) was obtained by incorporating lipoid® and cholesterol 2:1 molar ratio with extrusion process. Coating liposomes with chitosan did not affect the encapsulation efficiency but liposomes size increased from100-200 nm to 200-300 nm. The differences in source (crab, squid and shrimp) and amount of chitosan (1, 2 and 3 ml) did not influence on encapsulation efficiency. However, the important parameter tended to be chitosan concentration (0.1, 0.5 and 1%

w/v). Zeta potential of vesicle also increased when the concentration of chitosan increased from 0.1 to 1% w/v. *In vitro* release study by dialysis technique was performed to evaluate the controlled release ability of the developed chitosan coated liposome. Results obtained from this study represented the strengthen of the chitosan coated liposome by the prolong and lower release of tartaric acid, as comparing to the uncoated liposome. Tartaric acid remained in chitosan coated liposomes vesicle (54.67%) was 2-fold higher than uncoated liposomes (29.04%). The study in *in vitro* skin cell model indicated that the developed system could enhance the potential of tamarind's AHAs on stimulation of human keratinocyte (HaCaT) proliferation 2-fold higher than free form of tamarind extract. However, we did not see the effect of the tamarind's AHAs on melanogenesis inhibitory of human melanoma cell line (MML-1). The obtained results indicated the potential of the tamarind's AHAs for application in skin renewal enhancement. Moreover, the coating liposome with chitosan will improve the stability of the liposome during storage and/or application and may also prolong release of the AHAs.