Studi biomimetika potensi alkaloid biji kakao Sulawesi Tengah sebagai alternatif agen remineralisasi email gigi = A biomimetic study of alkaloids potential of Central Sulawesi cacao beans as an alternative of tooth enamel remineralization agents

Rina Permatasari, author

Abstrak

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Karies gigi masih menjadi masalah kesehatan gigi di Indonesia, sehingga pencegahan menjadi penting. Email gigi merupakan lapisan terluar gigi yang berperan dalam ketahanan gigi terhadap penyebab karies. Biji Kakao Sulawesi Tengah merupakan bahan alam hasil perkebunan unggulan Indonesia, mengandung senyawa alkaloid yang berpotensi meningkatkan ketahanan host email gigi . Penelitian ini merupakan studi biomimetika eksperimental laboratorik in vitro, yang mencakup identifikasi karakteristik senyawaan alkaloid biji kakao klon Sulawesi-1 S1 dan Sulawesi-2 S2 asal Sulawesi Tengah untuk mendapatkan prototype biomimetika, uji khasiat formula alkaloid pada email gigi berupa uji kekerasan email gigi, karakteristik permukaan dan kristal apatit email, serta uji karakteristik permukaan email setelah proses demineralisasi dan remineralisasi email gigi. Hasil penelitian menunjukkan bahwa senyawaan alkaloid klon biji kakao klon S1 dan S2 asal Sulawesi Tengah teridentifikasi mengandung Teobromin T , Teofilin TF dan Kafein K , dengan komposisi T : TF : K = 6 : 1 : 1 untuk S1 dan T : TF : K = 4 : 1 : 1 untuk S2. Formula alkaloid biomimik S1 lebih bermakna dalam meningkatkan kekerasan mikro email gigi dibandingkan S2. Formula alkaloid biomimik S1 dapat mempengaruhi karakteristik permukaan dan meningkatkan derajat kristalinitas apatit email gigi, serta berkhasiat terhadap remineralisasi email gigi. Dengan demikian alkaloid biji kakao Sulawesi Tengah dalam bentuk formula biomimik, berpotensi sebagai alternatif agen remineralisasi email gigi.<hr />
ABSTRACT
Dental caries is still a major dental health problem in Indonesia, and preventive measures needs to be done to resolve it. The enamel is the outermost layer of teeth in which play a role in resistance to the cause of dental caries. Central Sulawesi cacao beans are natural materials featured Indonesian plantation crops, contains the alkaloid compounds that could potentially increase the resistance of the host the enamel . The research was a biomimetic study laboratory experiment in vitro, which covered identification of the characteristics of cacao beans s alkaloid compounds of clones Sulawesi 1 S1 and Sulawesi 2 S2 from Central Sulawesi, to obtain biomimetics prototype, to test the efficacy of the alkaloid formula to tooth enamel i.e. enamel microhardhess, surface and apatite crystal characteristics test, and also enamel surface characteristics test after demineralization and remineralization process of tooth enamel. The results of this research showed that the cacao beans s alkaloid compounds of clones S1 and S2 from Central Sulawesi contains Theobromine T , Theophylline TF and Caffeine K , with composition T TF K 6 1 1 for S1 and T TF K 4 1 1 for S2. The S1 biomimic alkaloid formula was more significant in increasing tooth enamel microhardness than S2. S1 biomimic alkaloid formula affected the characteristics of the surface and increased the degree of apatite crystallinity of tooth enamel, as well as efficacious against the remineralization of tooth enamel. Thus Central Sulawesi cacao beans alkaloid in the form of biomimic

formula, have potential as an alternative remineralization agents of tooth enamel.