

INTISARI

Mineral di lingkungan sekitar gigi berperan dalam meningkatkan resistensi permukaan email gigi terhadap asam. Biji kakao (*Theobroma cacao* L.) memiliki kandungan kalsium, fosfat, dan senyawa theobromine yang berperan dalam remineralisasi. Penelitian ini bertujuan untuk mengetahui pengaruh konsentrasi dan lama perendaman dalam larutan ekstrak biji kakao terhadap kekerasan permukaan dan kristal apatit email gigi.

Sebanyak 50 potongan gigi premolar diukur kekerasannya. Objek direndam dalam saliva artifisial (kontrol) dan larutan ekstrak biji kakao dengan konsentrasi 1400, 3300, dan 6600 mg/L selama 5, 10, dan 15 menit. Prosedur *pH cycling* dilakukan sebagai simulasi aktivitas rongga mulut selama 7 hari. Perubahan nilai kekerasan setelah perlakuan diamati kemudian dianalisis dengan *Two Way ANOVA* dan $LSD_{0,05}$. Selanjutnya objek dijadikan serbuk dan dianalisis dengan *X-Ray Diffraction* (XRD) untuk mengetahui struktur kristal apatit email gigi.

Hasil penelitian menunjukkan semakin besar konsentrasi dan lama perendaman dalam larutan ekstrak biji kakao semakin meningkatkan kekerasan permukaan email gigi. Analisis *Two Way ANOVA* menunjukkan terdapat interaksi antara konsentrasi dan lama perendaman dalam larutan ekstrak biji kakao terhadap kekerasan permukaan email gigi ($p < 0,05$). Hasil uji $LSD_{0,05}$ menunjukkan bahwa kelompok perendaman 6600 mg/L selama 15 menit berbeda secara signifikan dengan kelompok lainnya. Pada analisis grafik XRD terlihat peningkatan puncak pada kelompok tersebut dan menandakan terjadi maturasi kristal.

Kesimpulan penelitian ini adalah konsentrasi perendaman larutan ekstrak biji kakao 6600 mg/L selama 15 menit paling efektif dalam meningkatkan kekerasan permukaan email gigi (*in vitro*). Terdapat pengaruh konsentrasi larutan dan lama perendaman dalam larutan ekstrak biji kakao kristal apatit email gigi.

Kata kunci: konsentrasi perendaman, lama perendaman, ekstrak biji kakao (*Theobroma cacao* L.), kekerasan permukaan email, kristal apatit, remineralisasi.

ABSTRACT

Minerals surrounding the teeth play a part in improving the resistance of tooth enamel surface toward acids. Cocoa bean (*Theobroma cacao* L.) contains calcium, phosphate, and theobromine compound which play a part in remineralization. This research aims to know the effect of concentration and time of immersion in the solution of cocoa bean extract toward the hardness of surface and apatite crystals of tooth enamel.

Fifty pieces of premolars are measured their hardness. The object is immersed in a artificial saliva (control) and a solution of cocoa bean extract with concentration of 1400, 3300, and 6600 mg/L for 5, 10 and 15 minutes. The procedure of *pH cycling* was done as a simulation activity of the oral cavity during 7 days. After treatment observed, the alteration of hardness values then analyzed by *Two Way ANOVA* and $LSD_{0,05}$. Furthermore, the objects are pulverized and analyzed by *X-Ray Diffraction* (XRD) to determine the crystal structure of tooth enamel apatite.

The research findings show that greater concentration and time of immersion in a solution of cocoa bean extract further increase the hardness of tooth enamel surface. The analysis of *Two Way ANOVA* show that there are interactions between concentration and time of immersion in a solution of cocoa bean extract to the hardness of tooth enamel surface ($p < 0.05$). The experiment results of $LSD_{0,05}$ show that the group of immersion 6600 mg/L for 15 minutes are significantly different with other groups. At analysis of XRD graph seems the top improvement in that group and indicates the maturation of the crystals occurred.

The conclusion of this research is a concentration of immersion 6600 mg/L for 15 minutes most effective in improving the hardness of tooth enamel surface (*in vitro*). There is an effect of concentration and time of immersion in tooth enamel apatite crystals.

Keywords : concentration of immersion, timeimmersion, extracts of cocoa bean (*Theobroma cacao* L.), hardness of enamelsurface, apatite crystals, remineralization.