

## INTISARI

Theobromine merupakan alkaloid golongan *methylxanthine* yang memiliki efek antikariogenik yang mampu mengurangi kelarutan mineral dalam email. Penelitian ini bertujuan menganalisis pengaruh aplikasi topikal gel theobromine 5% terhadap kelarutan ion kalsium dan fosfat pada gigi desidui dalam saliva buatan.

Objek penelitian sebanyak dua puluh tujuh gigi incisivus desidui dibagi menjadi 3 kelompok. Kelompok 1 dilakukan aplikasi topikal gel theobromine 5%, kelompok 2 aplikasi topikal varnish sodium fluoride 5% sebagai kontrol positif dan kelompok 3 sebagai kontrol negatif. Setiap kelompok dilakukan topikal aplikasi menggunakan *microbrush* selama 4 menit kemudian dilakukan proses *pH-cycling* selama 5 hari. Kelarutan ion kalsium dalam saliva buatan diukur dengan menggunakan alat *Atomic Absorption Spectroscopy* (AAS) sedangkan kelarutan ion fosfat dalam saliva buatan diukur dengan menggunakan *UV-VIS Spectrofotometer*. Hasil analisis menggunakan uji Oneway ANOVA dilanjutkan uji *post hoc* LSD.

Hasil penelitian menunjukkan rata-rata kelarutan ion kalsium setelah aplikasi topikal gel theobromine 5% dalam saliva buatan sebesar  $0,1382 \pm 0,0720$  ppm, varnish sodium fluoride 5% sebesar  $0,1232 \pm 0,0711$  ppm dan kontrol negatif  $0,6081 \pm 0,0879$  ppm. Rata-rata kelarutan ion fosfat setelah aplikasi topikal gel theobromine 5% dalam saliva buatan diperoleh  $0,2731 \pm 0,1283$  ppm, varnish sodium fluoride 5% sebesar  $0,1289 \pm 0,0627$  ppm dan kontrol negatif  $0,7509 \pm 0,1360$  ppm. Hasil uji Oneway ANOVA menunjukkan tidak ada perbedaan yang bermakna pada kelarutan ion kalsium setelah aplikasi topikal gel theobromine 5% dan kontrol positif ( $p > 0,05$ ), sedangkan pengukuran kelarutan ion fosfat setelah aplikasi topikal gel theobromine, varnish sodium fluoride 5% dan kontrol negatif menunjukkan perbedaan yang bermakna ( $p < 0,05$ ). Kesimpulan penelitian ini adalah kelarutan ion kalsium setelah aplikasi gel theobromine 5% tidak ada perbedaan dengan varnish sodium fluoride 5% dan kelarutan ion fosfat setelah aplikasi gel theobromine 5% lebih tinggi dibanding varnish sodium fluoride 5%

**Kata kunci:** theobromine, sodium fluoride, kelarutan kalsium, kelarutan fosfat

## ABSTRACT

Theobromine is classified as *methylxanthine* having the anticariogenic effect to reduce the solubility of minerals in the email. This study aims to analyze the effect of the topical application of the theobromine gel of 5% on the solubility of calcium ions and phosphate in deciduous teeth in artificial saliva.

There were 27 incisivus deciduous teeth as the objects of this research, divided into 3 groups. In group 1 the topical application of the theobromine gel of 5% was performed, in group 2 the topical application of sodium fluoride varnish 5% was carried out as the positive control and in group 3 as the negative control. In each group, the topical application using *microbrush* was performed for 4 minutes, then the process of *pH-cycling* was carried out for 5 days. The solubility of calcium ions in artificial saliva was measured using the *Atomic Absorption Spectroscopy* (AAS) tool while the solubility of phosphate ions in artificial saliva was measured using *UV-VIS Spectrophotometer*. The results of the analysis using the Oneway ANOVA test was followed by the *post hoc* LSD test.

The results showed the average solubility of calcium ions after the topical application of the theobromine gel of 5% in the artificial saliva was  $0.1382 \pm 0.0720$  ppm,  $0.1232 \pm 0.0711$  ppm in the sodium fluoride varnish 5%, and  $0.6081 \pm 0.0879$  ppm in the negative control. The average solubility of phosphate ions after the topical application of the theobromine gel of 5% in artificial saliva was  $0.2731 \pm 0.1283$  ppm,  $0.1289 \pm 0.0627$  ppm in sodium fluoride varnish 5%, and  $0.7509 \pm 0.1360$  ppm in the negative control. The result of the Oneway ANOVA test showed no significant differences in the solubility of calcium ions after the topical application of the theobromine gel of 5% and the positive control ( $p > 0.05$ ), while the measurement of the solubility of phosphate ions after the topical application of the theobromine gel, varnish sodium fluoride 5% and the negative control showed a significant difference ( $p < 0.05$ ). It is concluded that there is no difference in the solubility of calcium ions after the application of the theobromine gel with the concentration of 5% from the sodium fluoride varnish 5% and the solubility of phosphate ions after the application of the theobromine gel of 5% is higher than the sodium fluoride varnish 5%.

**Keywords:** theobromine, sodium fluoride, solubility of calcium, solubility of phosphate