

# THE THRESHOLD VALUE OF ENAMEL MINERAL SOLUBILITY AND DENTAL EROSION AFTER CONSUMING ACIDIC SOFT DRINKS

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## ABSTRACT

**Background:** *Dental erosion is irreversible and caused by acidic softdrink consumption. Dental erosion prevention already been done, but it still has not been satisfying since the consumption of acidic softdrink is still high. There is still not any dates that explain the threshold value of enamel mineral solubility and the occurrence of dental erosion after consuming acidic softdrink.*

**Purpose:** *This research aims to find the threshold value of enamel mineral solubility and dental erosion before and after consuming acidic soft drinks.*  
**Methods:** *Subjects of the research are saliva and enamel of 12 marmoths, which have some criteria such as age  $\geq 70$  days, body weight  $\geq 600$  grams, and teeth considered to be healthy. The sample divided equally into 4 groups. Each of those marmoths was given a drink as much as 2.5 cc/consumption (there are 1, 2 and 3x per day) by using syringe without injection needle. Salivary minerals then were examined by using Atomic Absorption Spectrophotometric (ASS), while dental erosion was examined using Scanning Electron Microscop (SEM). The data were analyzed by using Paired t-test.*  
**Results:** *It is known that the threshold value of enamel mineral solubility (K, Na, Fe, Mg, Cl, P, Ca, F, C) has significant difference ( $p < 0.05$ ) after being exposed to folic acid. Meanwhile, Fe did not*

*have significant difference ( $p = 0.090$ ) after being exposed to citric acid. Similarly, C did not have significant difference ( $p = 0.063$ ) after being exposed to bicarbonate acid. Furthermore, it is also known that the threshold time value of dental erosion are on the 105th day for folic acid, on the 111th day for citric acid, and on the 117th day for bicarbonate acid.*  
**Conclusion:** *Threshold value of enamel mineral solubility before and after consuming soft drinks containing acid is different. Based on the threshold value of dental erosion, it is known that folic acid is the most erosive acid.*

**Key words:** *Soft drinks, threshold value, mineral solubility, dental erosion*

## ABSTRAK

**Latar belakang:** *Erosi gigi bersifat irreversible disebabkan oleh konsumsi minuman ringan yang mengandung asam. Pencegahan erosi gigi telah dilakukan tetapi hasilnya tidak memuaskan karena masih banyak orang selalu mengkonsumsi minuman ringan yang berasam. Tidak ada satupun yang menjelaskan lebih terperinci tentang perbedaan nilai ambang kelarutan email dan waktu erosi gigi setelah konsumsi minuman ringan yang berasam.*  
**Tujuan:** *Penelitian eksperimen ini untuk mengetahui perbedaan nilai ambang kelarutan mineral email dan erosi gigi sebelum dan setelah mengkonsumsi minuman ringan yang mengandung asam.*  
**Metode:** *Subjek*

*dari penelitian ini adalah saliva dan enamel dari 12 ekor kelinci dengan kriteria usia lebih dari 70 hari, berat lebih dari 600 gram, dan gigi dalam keadaan sehat. Sampel dibagi menjadi 4 kelompok. Masing-masing kelinci diberikan 2,5 ml minuman sekali konsumsi (1, 2, dan 3 kali sehari) menggunakan spuit tanpa jarum. Mineral saliva dianalisa menggunakan Atomic Absorption Spectrophotometric (ASS), sedangkan erosi gigi diperiksa dengan menggunakan Scanning Electron Microscop (SEM). Data analisa dengan Paired-t test.*

**Hasil:** Semua mineral email (K, Na, Fe, Mg, Cl, P, Ca, F, C) nilai ambang kelarutannya berbeda secara bermakna sebelum dan setelah terpapar oleh asam folat ( $p < 0.05$ ). Sebelum dan setelah terpapar oleh asam sitrat nilai ambang kelarutan mineral Fe tidak bermakna ( $p = 0,090$ ), sebelum dan setelah terpapar oleh asam bikarbonat nilai ambang kelarutan mineral C tidak bermakna ( $p = 0,063$ ). Nilai ambang waktu erosi gigi didapatkan pada hari ke 105 untuk asam folat, hari ke 111 untuk asam sitrat dan hari ke 117 untuk asam bikarbonat. **Kesimpulan:** Nilai ambang kelarutan mineral email sebelum dan setelah konsumsi minuman ringan mengandung asam berbeda. Berdasarkan nilai ambang erosi gigi, dapat diketahui bahwa asam folat merupakan asam yang paling erosif.

**Kata kunci:** Minuman ringan, nilai ambang, kelarutan mineral, erosi gigi