

**PELEPASAN ION FOSFAT *RESIN MODIFIED GLASS IONOMER* DAN
ENHANCED RESIN MODIFIED GLASS IONOMER DALAM
SIMULATED BODY FLUID DENGAN LAMA
PERENDAMAN 14, 21, 28 HARI**

INTISARI

Resin-Modified Glass Ionomer (RMGI) dan *Enhanced Resin-Modified Glass Ionomer* (ERMGI) merupakan pengembangan dari bahan restorasi *glass ionomer* (GI) yang memiliki kemampuan melepaskan ion fosfat. Pelepasan ion dari bahan restorasi dipengaruhi oleh beberapa faktor, seperti lama perendaman, media perendaman, dan komposisi material. Penelitian ini bertujuan mengetahui jumlah pelepasan ion fosfat pada RMGI dan ERMGI selama 14 hari, 21 hari, dan 28 hari dalam *Simulated Body Fluid* (SBF).

Penelitian eksperimental dilakukan terhadap 48 spesimen yang terdiri atas kelompok RMGI (I) dan ERMGI (II) berbentuk silinder berdiameter 15 mm dan ketebalan 1 mm. Spesimen dibedakan kembali menjadi tiga subkelompok berdasarkan lama perendaman, yaitu 14 hari (A), 21 hari (B), dan 28 hari (C). Spesimen direndam dalam 10 mL SBF dan dilakukan pengukuran jumlah pelepasan ion fosfat menggunakan spektrofotometer UV-Vis pada panjang gelombang 836 nm. Data dianalisis menggunakan SPSS dengan tingkat kepercayaan 95% ($\alpha=0,05$). Uji normalitas *Shapiro-Wilk* dan homogenitas *Levene's* menunjukkan data berdistribusi normal dan homogen ($p > 0,05$) sehingga digunakan uji statistik parametrik Analisis Varian (Anava) dua jalur dan dilanjutkan dengan uji *Tukey's Post Hoc*.

Hasil uji Anava dua jalur menunjukkan bahwa jenis bahan restorasi dan lama perendaman berpengaruh signifikan terhadap pelepasan ion fosfat ($p < 0,05$) serta terdapat interaksi antara keduanya ($p < 0,05$). Kesimpulan dari penelitian ini adalah rerata jumlah pelepasan ion fosfat pada RMGI lebih sedikit daripada ERMGI pada perendaman selama 14 hari, tetapi lebih tinggi pada lama perendaman 21 hari dan 28 hari. Jumlah pelepasan ion fosfat oleh RMGI signifikan antara lama perendaman 14 hari dan 28 hari, tetapi tidak terdapat perbedaan pada lama perendaman 21 hari dengan 14 hari maupun 28 hari. Jumlah pelepasan ion fosfat oleh ERMGI signifikan pada lama perendaman 14 hari, 21 hari, dan 28 hari.

Kata kunci: *ion fosfat, resin-modified glass ionomer, enhanced resin-modified glass ionomer, simulated body fluid, lama perendaman*

**PHOSPHATE ION RELEASE OF RESIN MODIFIED GLASS IONOMER
AND ENHANCED RESIN MODIFIED GLASS IONOMER IN
SIMULATED BODY FLUID WITH IMMERSION
PERIODS OF 14, 21, AND 28 DAYS**

ABSTRACT

Resin-Modified Glass Ionomer (RMGI) and Enhanced Resin-Modified Glass Ionomer (ERMGI) are developments of conventional glass ionomer (GI) restorative materials that possess phosphate ion release capability. Ion release from restorative materials is influenced by several factors, including immersion time, immersion medium, and material composition. This study aimed to determine the amount of phosphate ion release from RMGI and ERMGI after 14, 21, and 28 days of immersion in Simulated Body Fluid (SBF).

An experimental study was conducted using 48 cylindrical specimens (15 mm in diameter and 1 mm in thickness), divided into two main groups: RMGI (I) and ERMGI (II). Each group was further divided into three subgroups based on the immersion duration—14 days (A), 21 days (B), and 28 days (C). The specimens were immersed in 10 mL of SBF, and phosphate ion release was measured using UV-Vis spectrophotometer at a wavelength of 836 nm. Data were analyzed using SPSS with a 95% confidence level ($\alpha=0,05$). The Shapiro-Wilk and Levene's tests confirmed data normality and homogeneity ($p > 0,05$), allowing further analysis using two-way ANOVA followed by Tukey's post hoc test.

The two-way ANOVA revealed that the type of restorative material and immersion duration significantly affected phosphate ion release ($p < 0,05$), with a significant interaction between the two factors ($p < 0,05$). The mean phosphate ion release from RMGI was lower than that from ERMGI after 14 days of immersion, but higher after 21 and 28 days. The phosphate ion release from RMGI differed significantly between 14 and 28 days of immersion, but no significant difference was observed between 21 days and either 14 or 28 days. In contrast, phosphate ion released from ERMGI differed significantly among the 14-, 21-, and 28-day immersion periods.

Keywords: phosphate ion, resin-modified glass ionomer, enhanced resin-modified glass ionomer, simulated body fluid, immersion