

INTISARI

Resin komposit *nanofiller* merupakan salah satu jenis resin komposit yang digunakan sebagai bahan restorasi. Resin komposit *nanofiller* memiliki partikel *filler silica* berukuran 1-100 nm sehingga memiliki estetika dan tingkat kehalusan yang tinggi. Monomer dari resin komposit seperti *bis*-GMA, UDMA dan TEGDMA dapat terlepas apabila menyentuh cairan rongga mulut. Konsentrasi pelepasan monomer dapat mempengaruhi biokompatibilitas resin komposit. Tujuan penelitian adalah untuk mengetahui pengaruh variasi pH terhadap pelepasan monomer dari resin komposit *nanofiller*.

Sampel yang digunakan adalah resin komposit *nanofiller* Filtek Z250XT (3M ESPE, Seefeld, Germany). Dua belas sampel berbentuk balok (6 x 4 x 2 mm) dibagi kedalam tiga kelompok kemudian direndam dengan larutan $\pm$ pH 3,5 (asam sitrat), $\pm$ pH 7 (akuades), dan $\pm$ pH 8 (sorensen's fosfat) selama 7 hari. Setelah 7 hari perendaman, larutan perendam dianalisis menggunakan HPLC untuk mengetahui konsentrasi pelepasan monomer. Monomer dianalisis menggunakan *mobile phase* berupa asetronitril dan air dengan perbandingan 7:3, *flow rate* 1 ml/menit pada suhu ruangan. Kolom yang digunakan adalah C18 5 μ m, panjang 125 mm, berdiameter 4 mm. Panjang gelombang yang digunakan 220 nm. Data diuji secara statistik menggunakan ONE-WAY ANOVA.

Rerata konsentrasi pelepasan monomer (μ g/ml) pada 3 kelompok pH ($\pm$ pH 3,5; $\pm$ pH 7; dan $\pm$ pH 8) adalah $3,65 \pm 0,57$; $1,50 \pm 0,67$; dan $4,07 \pm 0,91$. Hasil uji ONE-WAY ANOVA menunjukkan terdapat perbedaan rerata konsentrasi pelepasan monomer antara tiga kelompok pH ($p < 0,05$). Kesimpulan dari penelitian ini adalah perendaman resin komposit *nanofiller* dalam larutan asam dan basa meningkatkan pelepasan monomer *bis*-GMA dari resin komposit *nanofiller*.

Kata Kunci : resin komposit *nanofiller*, pH, asam sitrat, sorensen's fosfat, pelepasan monomer

ABSTRACT

Nanofilled composite resin is a kind of composite resin that is used for restorative material. Nanofilled composite resin has silica filler particle size of 1-100 nm, providing high level of aesthetic and refinement properties. Monomer from composite resin such as *bis*-GMA, UDMA dan TEGDMA can be released when in contact with oral fluid. Concentration of monomer release may affect the biocompatibility of composite resin. The objective of this study was to determine the effect of pH variation on monomer release of nanofilled composite resin.

The samples used were nanofilled composite resin Filtek Z250XT (3M ESPE, Seefeld, Germany). Twelve samples (6 x 4 x 2 mm) were divided into three groups and then soaked into solution of $\pm$ pH 3.5 (citric acid), $\pm$ pH 7 (distilled water), and $\pm$ pH 8 (sorensen's phosphate) for 7 days. After 7 days of immersion, each of the solutions was analyzed using HPLC to determine the concentration of monomer release. Monomer was analyzed using a mobile phase of acetonitrile and water with ratio of 7:3, flow rate 1 ml/min at room temperature. The column used was C18 5 μ m, 125 mm in length and 4 mm in diameter. The wavelength used was 220 nm. Data were statistically analyzed using ONE-WAY ANOVA.

The means concentration of monomer release (μ g/ml) on the 3 (three) pH groups ($\pm$ pH 3.5; $\pm$ pH 7; $\pm$ pH 8) were 2.97 ± 1.13 ; 1.50 ± 0.67 ; and 4.07 ± 0.91 . Results of ONE-WAY ANOVA showed that there were differences between means concentration of monomer release from the three groups ($p < 0.05$). The conclusion of this study was the immersion of nanofilled composite resin in an acid solution and alkaline solution increased the *bis*-GMA monomer release from nanofilled composite resin.

Keywords : nanofilled composite resin, pH, citric acid, sorensen's phosphate, monomer release