INTISARI

E-glass fiber merupakan *reinforcement fiber* yang sering digunakan di kedokteran gigi karena berikatan baik dengan polimer melalui *silane coupling agent*, meningkatkan kekuatan mekanis dan tidak sensitif terhadap kelembaban. Ketersediaan *E-glass fiber dental* di Indonesia terbatas dengan harga relatif mahal. *Glass fiber non dental* banyak tersedia di Indonesia dengan harga terjangkau, yang biasa digunakan pada pembuatan panel *gypsum* dan komponen otomotif. Tujuan penelitian ini adalah mengetahui pengaruh komposisi dan volumetrik *glass fiber non dental* terhadap penyerapan air dan kekuatan fleksural pada gigi tiruan cekat.

Bahan yang digunakan dalam penelitian ini adalah *E-glass fiber dental* (Fiber-splint, Polydentia SA, Switzerland), *glass fiber non dental* A (LT, China),*glass fiber non dental* B(CMAX, China) dan *glass fiber non dental* C(HJ, China), *flowable composite* (CharmFil Flow, Denkist, Korea) dan *silane coupling agent* (Monobond S, Ivoclar Vivadent, Liechtenstein). Subjek dibagi dalam 16 kelompok, terdiri atas 8 kelompok untuk uji penyerapan air dan 8 kelompok untuk uji kekuatan fleksural. Uji penyerapan air dan kekuatan fleksural masing-masing terbagi atas kelompok (vol%): 0% (Matriks), *E-glass dental*: 2,3%, *glass fiber non dental* A: 2,3%, 4,6%; B: 2,3%, 4,6%; dan C: 2,3%, 4,6%. Uji penyerapan air dan kekuatan fleksural berdasarkan ISO 10477 dan 4049. Hasil yang diperoleh dianalisis menggunakan ANAVA dua jalur.

Hasil penelitian menunjukkan rerata penyerapan air (%) terendah pada kelompok 4,6% *glass fiber non dental* B (0,529±0,011) dan tertinggi pada 0% *fiber* (0,767±0,014). Kekuatan fleksural (MPa) terendah pada kelompok 0% *fiber* (126,18±5,21) dan tertinggi pada 4,6% *glass fiber non dental* A (239,90± 8,83). Hasil analisis statistik menunjukkan variabel komposisi dan volumetrik *fiber* memberikan pengaruh yang signifikan (α <0,05). Kesimpulan penelitian ini bahwa kandungan alkali oksida (Na_2O dan K_2O) yang rendah pada *glass fiber* mengurangi penyerapan air dan kandungan SiO_2, Al_2O_3 dan alkali tanah oksida (MgO dan CaO) yang tinggi meningkatkan kekuatan fleksural. Peningkatan volumetrik *fiber* menurunkan penyerapan air dan meningkatkan kekuatan fleksural *fiber reinforced composites*.

Kata kunci : *glass fiber non dental*, komposisi *fiber*, volumetrik, penyerapan air, kekuatan fleksural

ABSTRACT

E-glass fiber is a fiber reinforcement the commonly used in dentistry because it has a good bonding with polymers via silane coupling agent, increase the mechanical strength and insensitive to moisture. The availability of E- glass fiber dental is limited in Indonesia with relatively high cost. Glass fiber non dental is widely available in Indonesia with lower cost, usually used the manufacture of gypsum panels and automotive components. The purpose of this study was to evaluate the effect of composition and volumetric of glass fiber non-dental on water sorption and flexural strength on fixed partial denture.

The Material used in this study were E-glass fiber dental (Fiber-splint, Polydentia SA, Switzerland), glass fiber non dental A (LT, China), B (CMAX, China) and C (HJ, China), flowable composite (CharmFil Flow, Denkist, Korea) and silane coupling agent (Monobond S, Ivoclar Vivadent, Liechtenstein). Subject were divided into 16 groups, consist of 8 groups for water sorption test and 8 groups for flexural strength test. Test of Water sorption and flexural strength were divided into groups (vol%): 0% fiber, E-glass dental 2.3%, glass fiber non dental A: 2.3%, 4.6 %; B: 2.3 %, 4,6%; C:2.3 %, 4,6%. Water sorption and flexural test were according to ISO 10477and 4049. Statistical analysis used two way ANOVA.

The result showed that the mean of water sorption (%) the lowest on group 4.6vol% glass fiber non dental B (0.529±0.011) and the highest on 0 vol% fiber (0.767±0.014). Flexural strength (MPa) the lowest on group 0 vol% fiber (126.18 ±5.21) and the highest on 4.6vol% glass fiber non dental A(239.9±8.83). The statistical analysis of the result showed that composition and volumeric fiber had significant effect (α <0,05). Conclusions of the studied that were low alkali oxide content (Na_2O and K_2O) of glass fiber decreased water sorption and the higher contents of SiO_2, Al_2O_3 and earth alkali oxide (MgO and CaO) increased flexural strength of fiber reinforced composites. Increasing the volumetric fibers decreased water sorption and improved flexural strength of fiber reinforced composites.

Keywords : glass fiber non dental, composition of fiber, volumetric, water sorption, flexural strength.