

## ABSTRACT

Fiber-reinforced composite has been widely used for crown and bridge in dental applications in this modern days. In the meantime, alcoholic beverages has become a daily consumption in a certain country, and the alcohol is found to have a weakening effect on the resin composite. This study is aimed to determine the effect of various alcoholic beverages on the flexural strength of polyethylene fiber-reinforced composite.

The research material used in this study was FRC with flowable composite resin matrix (i-FLOW<sup>N</sup> i-dental, Lithuania) and Polyethylene fiber (Vactrise, USA). The FRC samples in the dimension of 2mm x 2mm x 25 mm were light cured for 20 seconds using a light curing unit. 20 samples were divided into 5 groups (n=4) where, Group 1 (control – aquades), Group 2 (Beer – 4.5% alcohol), Group 3 (Vermouth – 15% alcohol), Group 4 (Rum – 21% alcohol) and Group 5 (Tequila – 41% alcohol). Each samples was immersed in their respected solution in 37°C for 5 seconds follow up in aquades in 5 seconds for each cycle, 10 cycles were carried out for each day for 28 days. Flexural test were carried out by using the three-point bending test. The flexural strength data were then analyzed statistically using One-Way ANOVA then proceed with post hoc LSD.

The result showed that the mean of the flexural strength  $\pm$  s.d. for the control group was 336.003  $\pm$  25.052 MPa, Beer group yields 336.003  $\pm$  10.392 MPa, Vermouth group was 215.065  $\pm$  34.855 MPa, Rum group was 194.880  $\pm$  27.687 MPa and tequila group showed 175.483  $\pm$  33.581 MPa. Post hoc LSD showed that Beer group was not significantly decreased in flexural strength when compared with control group. Vermouth group, Rum group and Tequila group were significantly decrease in flexural strength compared with control group. The conclusion for this research was the concentration of alcohol influenced the decrease of flexural strength of polyethylene FRC.

Keywords: FRC, polyethylene fibers, concentration of alcohol, flexural strength

## INTISARI

*Fiber-reinforced composite* (FRC) di kedokteran gigi antara lain digunakan pada mahkota dan jembatan gigi. Minuman alkohol menjadi minuman harian di beberapa negara. Beberapa penelitian menyatakan alkohol yang terdapat dalam minuman dapat menyebabkan kelemahan resin komposit. Penelitian ini bertujuan mengetahui efek beberapa jenis minuman beralkohol terhadap kekuatan fleksural *Polyethylene FRC*.

Bahan penelitian yang digunakan yaitu FRC dengan matriks resin komposit tipe *flowable*(i-FLOW<sup>N</sup> i-dental, Lithuania) dan *fiber Polyethylene* (Vactrise, USA). Sampel FRC disediakan dengan dimensi 2 mm x 2 mm x 25 mm dan disinari selama 20 detik menggunakan *light curing unit*. Sampel berjumlah 20 dibagi menjadi 5 kelompok (n=4) yaitu Kelompok 1 (kontrol- akuades), Kelompok 2 (bir - 4,5% alkohol), Kelompok 3 (Vermouth - 15% alkohol), Kelompok 4 (Rum - 21% alkohol) dan Kelompok 5 (Tequila - 40% alkohol). Semua sampel direndam dalam minuman dengan suhu 37°C selama 5 detik kemudian dicelup akuades 5 detik untuk satu siklus. Sepuluh siklus dilakukan setiap hari selama 28 hari. Kekuatan fleksural diukur dengan *three-point bending test*. Data kekuatan fleksural dianalisis secara statistic menggunakan *one-way ANOVA* dilanjutkan dengan *post hoc LSD*.

Hasil penelitian menunjukkan rerata kekuatan fleksural ± s.d. kelompok kontrol adalah 336,003 ± 25,052 MPa, kelompok beer adalah 308,250 ± 10,392 MPa, kelompok Vermouth adalah 215,065 ± 34,855 MPa, kelompok rum adalah 194,880 ± 27,687 MPa dan kelompok tequila adalah 175,483 ± 33,581 MPa. *Post hoc LSD* menunjukkan kelompok beer tidak menurunkan kekuatan fleksural dengan signifikan; kelompok Vermouth, rum dan tequila menunjukkan penurunan kekuatan fleksural yang signifikan. Kesimpulan dari penelitian ini adalah konsentrasi alkohol dapat mempengaruhi penurunan kekuatan fleksural.

Kata kunci: FRC, *polyethylene fiber*, alkohol konsentrasi, kekuatan fleksural