

The effect of food-stimulating liquids on water sorption and solubility of nano filled and silorane based resin composites

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Abstract

Background and Aim: Composite Resins with different chemical structure are affected by lots of stimulus within mouth's environment that make them degenerated by the time, change their characteristics. The purpose of this research is to evaluate the effect of five different Food-Stimulating liquids on water sorption and the solubility of Methacrylate and Silorane based Composite resins.

Materials and Methods: In this in vitro study, twenty five discs with 1mm thickness and 6mm diameter were prepared by filling aluminum molds with two kinds of composites, Filtek Z350 and P90. Samples were light-activated from top surface, then stored in coded dishes with silica gel, and transferred to the oven with 37°C to desiccate them for 24h. Samples were weighed by digital balance (M1) after 24h, and then stored in five Food-Stimulating liquids (Acid citric %2 N, distilled water, Ethanol %75, Heptan, and artificial saliva). After one week, samples were weighed again and the result (M2) was recorded. Samples were placed in silica gel containers until the mass variation became less than ±0.1mg (M3). After last desiccation to get the V (body mass) of samples, the diameter and the thickness of discs were calculated. Results were analyzed with Tukey test.

Result: In this research, the solubility of composite Z350 in heptan was the highest (0.040 µg/ mm³) and in distilled water had the lowest solubility (0.009 µg/ mm³). Differences between distilled water, alcohol and heptan were statistically significant (p<0.05) but there was no statistically significant difference in water sorption of this composite in different solutions (p>0.05). The amount of solubility of P90 in different solutions had no statistically significant difference (p>0.05). But, water sorption in artificial saliva was higher than other solutions (P <0.05).

Conclusion: The results showed that solubility of P90 was lower than Z350 but there is no statistical difference between water sorption of two materials.

Keywords: Composite resin, Silorane Composite resin, Water sorption, Solubility