# Leached components from dental composite in oral simulating fluids and then resultant composite strengths.

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## Abstract

The aim of this study was to analyse the leached moieties of dental composites after storage in ethanol and organic acids of plaque and further evaluate the resultant effect on the diametral tensile strength (DTS) of the composites. Three commercial composites were used: Bis-GMA-based Z100, Bis-GMA/UDMA-based Heliomolar, and Bis-MPEPP-based Marathon One. The solutions used were: 99.9% acetic acid, 99% propionic acid and 75% ethanol. Specimens (4 mm diam. x 2 mm thick) were stored at 37 degrees C in 3 mL of solution for up to 30 days. Gas chromatography/mass spectrometry was used to characterize the leached moieties and DTS of the specimens after immersion was evaluated. Data were analysed using ANOVA and Tukey LSD test. The eluted substances were not all the same in different solutions and composites but mostly increased with immersion time, and included diluents (TEGDMA and decamethacrylate) and some additives, such as an ultra-violet stabilizer (TINUVINP), plasticizers (dicyclohexyl phthalate and bis(2-ethylhexyl) phthalate), initiator (triphenyl stibine), coupling agent (gamma-methacryloxypropyl trimethoxysilane), and phenyl benzoate. The chief polymerizing monomers were not found. More kinds of components were found in the acetic acid and ethanol groups studied. The fewest kinds and quantities of leached moieties were found for Bis-GMA specimens and then Bis-GMA/UDMA ones, most of which are diluent agents. Bis-MPEPP specimens leached the most substances, which were composed mostly of a short phenyl group chain structure. The BisGMA composite showed the highest DTS (54.8 +/- 5.7 MPa), which was not greatly affected by the length of storage. Bis-GMA/UDMA (36.2 +/- 6.8 MPa) and Bis-MPEPP (26.1 +/- 4.5 MPa) composites were significantly reduced ($P < 0.05$) after 30 days storage in the ethanol (35-50%), in the propionic acid (25-30%), and in the acetic acid (40-60%). Irreversible processes such as the leaching of components occur in fluids simulating an oral environment, which may contribute to irreversible material degradation, especially for non-Bis-GMA-based composites.