

**Ministry of Higher Education
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**Effect of one year of accelerated aging on the
fluorescence stability of different composites and
dental tissues
(An in vitro comparative study)**

A thesis

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Abstract

Fluorescence is an optical property that to be taken in consideration in different applications in dentistry. Aesthetic dental composite restorations required to mimic natural dental structures hiding the tooth-filling margins where fluorescence played a major role in masking the metamerism between composite and tooth structure, thus dental composite materials chose by the clinician should fluoresced in the same manner and intensity of the teeth structures otherwise the restoration would appear dull and easily distinguished from the adjacent dental structure. The aims of this study were:

1. To evaluate fluorescence stability of composite resins, with different filler sizes: Filtek Z250, microhybrid, Filtek Z250XT, nanohybrid and Filtek Z350XT nanofilled, nanoclusters, before and after accelerated aging and compare them with human enamel-dentin specimens which will be used as controls.
2. To test the correlation between different composites and the fluorescence intensity changes.

Ten sound impacted mandibular third molars were to get enamel-dentin specimens (2 x 4 x4 mm). The thickness of the specimens was verified with a digital Vernier. Specimens were stored in lightproof containers containing 0.1% thymol for 48 hours then transferred to distilled water at room temperature. Thirty composite specimens (2 x 4 x4 mm) built up by two silicone molds of (1 x 4 x 4 mm). The specimens kept in a lightproof container and stored in distil water at room temperature for 24 hours before fluorescence intensity measurement. Baseline fluorescence measurements was carried out using a fluorescence spectrophotometer (F96 (PRO Version)). The values obtained were between wavelengths bandwidth 420-470nm where human teeth usually showed fluorescence intensity peaks. After baseline measurements, all specimens were subjected to accelerated aging by weatherometer (QUV accelerated

weathering tester. The Q-lab Company), the samples placed in the QUV weatherometer for 300 hours to age them one year in advance. After the aging process completion, all forty samples were tested again for their fluorescence intensity values as the final measurement.

Analysis of values was processed using One way ANOVA, LSD test and paired samples t-test used for statistical analysis of the results. All four tested groups showed highly significant difference from each other both before aging and after aging in addition to that they all illustrated highly significant difference in the pattern of the fluorescence deterioration after aging.

It was concluded that dental composites with different filler content had different fluorescence intensity values even if they were manufactured by the same company and the artificial UV light aging adversely affected the fluorescence stability of dental composite and according to this study dental composite fillers had an effect on the fluorescence. In general, the three filtek composites showed poor fluorescence stability in comparison with human teeth but each in different rate.