

COLOUR CHANGES IN NANO-FILLED AND MICRO-HYBRID COMPOSITE RESINS ON EXPOSURE TO SPICES

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HSU ZENN YEW
DDS (UKMALAYSIA)



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ABSTRACT

Colour changes in composite resins after immersion in beverages such as coffee, tea, alcohol beverage and carbonated drinks have been reported. Although much work has been done to determine the staining susceptibility of composite resins to various liquid beverages, effects of spices on colour stability of composite resins have not been fully researched.

Objectives: The aim of this study is to evaluate the colour stability of nano-filled (Filtek Supreme™) and micro-hybrid (Gradia Direct™) composite resins finished with either Sof-Lex™ discs or mylar strips upon exposure to turmeric, paprika and tamarind.

Materials and methods: Twenty cylindrical specimens were fabricated from two commercially available composite resins; Filtek Supreme XT™ (3M ESPE, St Paul, MN) and Gradia Direct X™ (GC AMERICA). The top surfaces of the specimen were polished with Sof-Lex™ aluminium oxide discs (3M/ESPE, St Paul, MN USA) while the bottom surfaces were mylar strips finished. All samples were subjected to 500 thermocycling rounds between 5 and 55 °C with 20 seconds dwell time prior to immersion in staining solution. Twenty specimens from each type of composite were then randomly divided into 4 groups (n=5) and immersed in each staining solutions (0.1% turmeric, paprika and tamarind) and distilled water (control) at 37 °C. Colour measurement at baseline, after thermocycling, 24 hours (1 day), 72 hours (3 days) and 168 hours (7 days) of immersion in staining solutions were recorded with a reflection spectrophotometer under the D65 (daylight) illuminant using CIE L* a* b* parameters. Repeated measures analysis of variance (ANOVA) and Bonferroni post hoc tests were used to determine the significance and possible interactions of each factor.

Results: Among all the staining solutions tested, the highest colour deviation was obtained in the turmeric group, with mean colour change (ΔE) ranging between 17.92 and 55.25. Paprika recorded mean colour change (ΔE) ranging between 1.28 and 3.72, while tamarind produced mean colour change (ΔE) ranging between 1.12 and 5.42. The effect of finishing method on colour stability of composite resins appeared to be dependent on the type of composite resin. Filtek Supreme™ with mylar strips finished generally resulted in significantly more colour changes compared with specimens polished Sof-Lex™ discs, while Gradia Direct™ finished with mylar strips were found to be more resistant to colour changes. Colour change (ΔE) values were significantly influenced by the staining solutions, types of materials and finishing methods.

Conclusion: Within the limitations of this study, all spices used (turmeric, paprika and tamarind) have a potential to stain composite resins; with turmeric causing the most severe discolouration regardless of the type of composite resin or finishing technique employed. The result of this study also suggests that different materials respond differently to staining by spices when either finished with mylar strips or polished with Sof-Lex™ discs. Also, contemporary composite resins available in the market e.g. nano-composite and micro-filled hybrid composite are still susceptible to discolouration by exogenous factors despite advancement in the development of resin based restorative material.

DECLARATION

I, Hsu Zenn Yew certify that this work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text.

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Date:

Date:

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