CFAO GRADUATE STUDENT POSTERBOARD ABSTRACTS

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Evaluation of the physico-mechanical properties of an experimental catechin-incorporated dental adhesive

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Background:
Epigallocatechin gallate (EGCG) is a green tea polyphenol that has been shown to inhibit dentinal protease activity and thereby help preserve dentin-bond strength. However, current methods of EGCG delivery involve passive inclusion of EGCG into methacrylates, leading to diffusion of EGCG into the oral environment and rapid depletion of its bioactive properties.

Objectives:
This study evaluated the physico-mechanical properties of EGCG covalently attached with methacrylates in order to ensure that changing the composition of the adhesive system with incorporation of EGCG does not interfere with its mechanical performance.

Methods:
Hydroxyl groups of EGCG were functionalized with three varying degrees of methacryloyl esters to create polymerizable double bonds. EGCG was reacted with 1/3 (E33), 2/3 (E67), and 1 molar (E100) equivalent of methacryloyl chloride. Adhesive systems were formulated with EGCG at varying concentrations (0.5, 1, 2, 5, 10 w/w%). Passively incorporated EGCG (E0) was also studied and blank monomer with no EGCG was used as negative control. Degree of conversion, flexural strength, modulus of elasticity, modulus of resilience, and microhardness were tested. Experimental samples were prepared in random sequence (n=8 for mechanical testing, n=3 for degree of conversion).

Results
In general, it appears that incorporation of EGCG into methacrylates did not interfere with degree of conversion, flexural strength, modulus of elasticity, modulus of resilience, and microhardness –except for ECGC-methacrylate ratio at 10% which experienced reduced mechanical properties.

Conclusions:
EGCG-methacrylate ratio of 0.5, 1, 2, and 5% ratio possess adequate mechanical characteristics to progress with further testing in an innate dentin matrix model.