

ABSTRACT

Resveratrol for the prevention of dental caries and dental erosion: *in vitro* and *in vivo* studies

As the etiology of erosive tooth wear (ETW) and dental caries is multifactorial, there are several preventive possibilities for treating the lesions. Preliminary experiments by our group revealed that resveratrol alters the proteome of the acquired enamel pellicle, increasing acid-resistant proteins and protecting enamel against erosion. The aims of this *in vitro* study were to evaluate the protective effect of different concentrations of resveratrol on: I) the profile and viability of microcosm biofilm, as well as on the prevention of enamel demineralization; II) initial enamel erosion. In part I, bovine enamel blocks were prepared and divided into groups according to the treatments (resveratrol 50, 100, 200 or 400 µg/mL, PBS, NaF 0.05%, DMSO and Chlorhexidine 0.12%). The specimens were incubated in a pool of human saliva and McBain's artificial saliva for the formation of the microcosm biofilm. Colony-forming unit counts, resazurin and cross-sectional microradiography were performed. In part II, enamel samples were divided into 6 groups: PBS (negative control), Elmex Erosion, (positive control) and resveratrol 50, 100, 200 or 400 µg/mL. Stimulated saliva was collected from volunteers to form the acquired pellicle. Initially, the specimens were incubated for 1 h with human saliva, then the treatment solutions were applied for 1 min followed by a new incubation in human saliva for another 1 h. The specimens were subjected to an initial erosive challenge (1% citric acid pH 3.5 for 1 min) for 3 days, and enamel softening was assessed by the percentage change in surface hardness. Resveratrol 50 and 200 µg/mL reduced the metabolic activity of the biofilm and Mutans streptococci, respectively, but not reduced enamel mineral loss when compared with the negative control. Resveratrol (1, 10 and 100 µg/mL) significantly protected enamel against initial erosion, . Resveratrol appears to be promising and could be incorporated into dental products for the prevention of dental caries and dental erosion. However, studies that more closely resemble the clinical situation should be carried out to prove its efficacy.

Keywords: Dental caries; Dental erosion; Biofilm; Acquired pellicle; Polyphenols