

# Violet LED associated to bleaching agents and the effect over dental enamel

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## Abstract

A violet LED device was introduced as a promising alternative to perform dental bleaching, associated or not with bleaching agents under different concentrations. This study evaluated the effect of different dental bleaching protocols by means of Knoop microhardness, mineral content, color changes, and surface morphology. Bovine specimens ( $n = 104, 4 \times 4 \times 2$  mm and  $n = 80, 8 \times 8 \times 2$  mm) were obtained, and after staining in coffee solution one half did not receive the bleaching procedure (control) and the another one received the treatment. Different protocols were tested: G1: HP Maxx; G2: HP Maxx + Twin Flex Evolution; G3: HP Maxx + Bright Max Whitening; G4: 10% hydrogen peroxide; G5: 10% hydrogen peroxide + Bright Max Whitening; G6: 22% carbamide peroxide; G7: 22% carbamide peroxide + Bright Max Whitening, and G8: Bright Max Whitening. The possible changes on the surface (S) and subsurface (SB) by Knoop microhardness, Raman spectroscopy and SEM as well as color changes (S) were evaluated. Statistical analysis was performed using analysis of variance (ANOVA) and Tukey's test at significance level of 5%. A significant effect of the bleaching protocols was observed for the microhardness, mineral content, color changes ( $p < 0.05$ ), and morphology. The absence of the gel can lead to minor changes on the enamel surface after dental bleaching.

**Key words:** dental bleaching, hydrogen peroxide, dental enamel, LED

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