Remineralization of Erosive Tooth Wear by Enameguard Mouthwash

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OBJECTIVE

To evaluate the potential to remineralize eroded enamel lesions of Enameguard mouthwash containing Hydrolyzed wheat protein (HWP) as the active ingredient

INTRODUCTION

Dental Erosion:

- Loss of mineralized dental tissues, caused by the chemical action of non-bacterial acids.[1]
- Causes dental sensitivity, loss of occlusal vertical dimension, poor esthetics and susceptibility to caries and can be very destructive.[2]
- Prevalence: 5-35% in deciduous preschoolers teeth. 30.4% in permanent teeth in age 8 to 19 is 30.4%. Rise in incidence has been seen. [3,4]

Image 1

Image 2

Recent identified potential treatment for Erosion is Hydrolyzed wheat protein (HWP)

- Natural protein derivative obtained from wheat gluten.
- Promotes not only remineralization of lost tooth structure but repairs through scaffolding de novo hydroxyapatite crystallite formation as noted in the images below.[5]

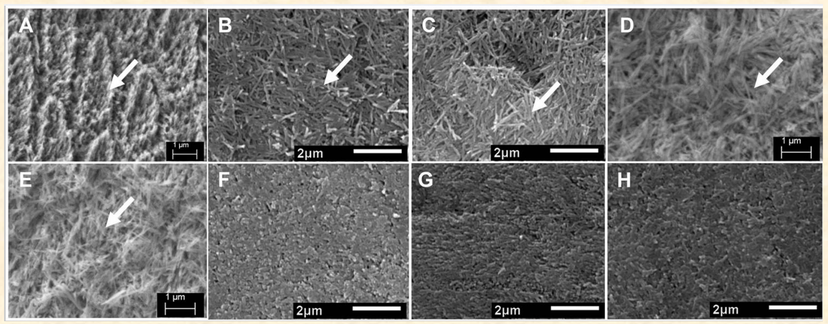


Image 3

SEM images of the enamel surface. After acid erosion showing exposed enamel prisms (white arrowed) (**A**), after biomimetic mineralization of the eroded surface by deposition of fiber-like crystals (white arrowed) with different concentrations of Hydrolyzed Wheat Protein (HWP) in mouthwashes; 0.2% (**B**), 1% (**C**), 2% (**D**), 1% + 0.05% NaF (**E**), and after remineralization with Listerine™ mouthwash (**F**), 0.02% NaF mouthwash (**G**), and Artificial saliva only (**H**). All the images were taken under the same magnification of x6000.

MATERIALS and METHODS

Surface microhardness (SMH) of enamel blocks were measured before and after eroded lesion creation and after 14 days remineralization treatments with the following products (Table 1).

4 groups tested:

- (A) 2% Enameguard pH 5.5
- (B) 2% Enameguard pH 6.7-7.2
- (C) Pro-namel pH 6.2
- (D) Placebo with the same composition as A but without Enameguard.

Table 1: pH cycling treatment sequence for the experiment

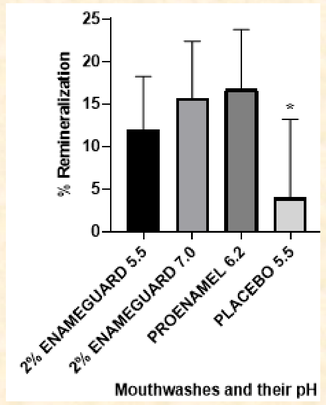
Daily Events	Treatments
Day 1 is all-day storage in Artificial Saliva. Then, subsequent days' treatment will be as follows.	
1 minute	Mouthwash treatment
4 hours	Storage in Artificial Saliva
2 minutes (12 Noon)	Acidic Challenge
1 minute	Mouthwash treatment
4 hours	Storage in Artificial Saliva
1 minute	Mouthwash treatment
Till 8:00 am next day	Storage in Artificial Saliva

RESULTS

No significant differences among the three active mouthwashes (2% Enameguard mouthwashes and Pro-namel) in remineralization efficacy (Figure 1).

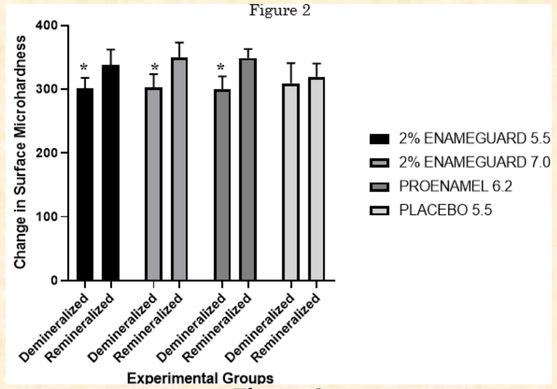
The three active mouthwashes were statistically significantly (P<.02) more efficacious than the Placebo mouthwash (Figure 1).

Figure 1



Secondary efficacy measurement (Figure 2):

Figure 2



Mean post-erosion and mean post-remineralization SMH within each product were compared using paired t-test with significance level (α) pre-chosen at 0.05. (Figure 2)

DISCUSSION

HWP-treated tooth structure not only repairs tooth structure through a dose dependent deposit in two layers but increases microhardness with no difference to fluoride treated teeth in MH.

pH of the HWP containing did not make a significant difference in micro hardness outcomes

HWP provides a potential alternative to fluoride containing mouthwashes for patients who choose not to use fluoride. Considering its repairing abilities, may be a better alternative.

Limitations: In vitro study, difficult to replicate normal variations of acid levels in mouth due to diet and other factors and Bovine Teeth.

CONCLUSION

Treatment of eroded enamel surface with Enameguard mouth wash containing hydrolyzed wheat protein resulted in remineralization of enamel as identified by increase in Surface microhardness.

Demineralized and eroded enamel tissues can be remineralized with HWP.

Clinical trials to confirm these findings are warranted.

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