Evaluation of a Dentifrice Containing 8% Arginine, Calcium Carbonate, and Sodium Monofluorophosphate to Repair Acid-Softened Enamel Using an Intra-Oral Remineralization Model

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Abstract

• **Objective:** An intra-oral remineralization study was conducted to compare the ability of a dentifrice containing 8% arginine and calcium carbonate (Pro-Argin™ Technology), and 1450 ppm fluoride as sodium monofluorophosphate (MFP) to remineralize acid-softened bovine enamel specimens compared to a silica-based dentifrice with 1450 ppm fluoride as MFP.

• **Methods:** The intra-oral clinical study employed a double blind, two-treatment, crossover design, and used an upper palatal retainer to expose the enamel specimens to the oral environment during product use and periods of remineralization. The retainer was designed to house three partially demineralized bovine enamel samples. The study population was comprised of 30 adults, ages 18 to 70 years. The study consisted of two treatment phases with a washout period lasting seven (± three) days preceding each treatment phase. A silica-based dentifrice without fluoride was used during the washout period. The Test Dentifrice used in this study contained 8% arginine, calcium carbonate, and 1450 ppm fluoride as sodium monofluorophosphate (MFP). The Control Dentifrice was silica-based and contained 1450 ppm fluoride as MFP. The treatment period consisted of a three-day lead-in period with the assigned product. The panelists brushed two times per day during the three-day lead-in period with the assigned product. On the fourth day, the panelists began brushing with the assigned product with the retainer in their mouth. The panelists brushed for one minute, followed by a one-minute swish with the slurry and a rinse with 15 ml of water in the morning, in the afternoon, and night with the retainer in the mouth. The panelists brushed only their teeth and not the specimens directly. Changes in mineral content before and after treatment were measured using a Knoop microhardness tester.

• **Results:** The results of the study showed that percent remineralization values for the Test Dentifrice and Control Dentifrice were 14.99% and 8.66%, respectively. A statistical analysis showed that the Test Dentifrice was statistically significantly more effective at remineralizing acid-softened enamel in comparison to the Control Dentifrice (p < 0.05).

• **Conclusion:** This study demonstrated that the Test Dentifrice with 8% arginine, calcium carbonate, and 1450 ppm fluoride as MFP is highly effective treatment for promoting remineralization of enamel that has been softened by an erosive challenge.

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