

## ABSTRACT

Properly controlled in vitro fluoride (F) uptake studies are used to predict the anticaries efficacy of toothpastes. Such studies are submitted by manufacturers to the American Dental Association requesting their Seal of Acceptance to confirm a product is an effective anticaries formulation. The purpose of this study was to compare a new multi-benefit whitening toothpaste, containing a modified silica abrasive system that provides superior cleaning benefits, along with sodium fluoride (NaF) and pyrophosphate to a clinically proven, ADA accepted standard which contains similar levels of NaF and pyrophosphate. Artificial lesions were prepared according to White (Caries Res.1987). A pH cycling protocol (Faller, et al: Caries Res. 1991) was used. Two dentifrices containing 1100ppm F (NaF) + 3.3% soluble pyrophosphate were tested: a) Crest Tartar Protection; b) Crest MultiCare Whitening; c) Placebo (0ppm F). F Uptake (Mobley: J.Dent.Res.1981) was measured for each specimen. F Uptake values ( $\mu\text{g}/\text{cm}^2$ ) were: a)  $11.9 \pm 2.8$ ; b)  $11.4 \pm 1.7$ ; c)  $3.0 \pm 0.7$ . ANOVA analysis (LSD,  $p < 0.05$ ) confirmed  $a=b > c$ . These results demonstrate the new multi-care toothpaste provides a level of bioavailable fluoride that is not significantly different from the clinically proven benchmark. **We conclude the use of a silica that has been modified to provide the enhanced cleaning benefit delivered by this formula has no adverse impact on the anticaries potential of the base formula.**

## INTRODUCTION

In the late 1980's tartar control toothpastes were introduced with some researchers expressing concern that the addition of pyrophosphate, a crystal growth inhibitor, might have a negative effect on enamel remineralization, and thus anticaries efficacy. Clinical studies have since verified the anticaries efficacy of such formulations, and these early concerns have been eliminated.

Today, many compounds are added to toothpaste to provide additional consumer benefits such as whitening or enhanced cleaning. Well-controlled in vitro "profile" tests are often used to gauge whether or not these new ingredients allow products to perform at levels consistent with other

formulations that have proven to be clinically effective in the control of caries. The in vitro pH cycling study is a generally accepted method to verify the anticaries efficacy of new formulations. Any negative impact on anticaries efficacy resulting from the addition of new ingredients would be expected to be evident in this model.

## PURPOSE

The objective of this study was to compare a new multicare whitening toothpaste to a clinically proven, ADA accepted standard in an accepted in vitro pH cycling model. Both toothpastes contain similar levels of NaF and pyrophosphate; however, the new multicare whitening product contains a modified silica abrasive system.

## PRODUCTS TESTED

Test Code	Product
A	Crest Tartar Protection Toothpaste
B	Crest MultiCare Whitening Toothpaste
C	Placebo (0 ppm F) Toothpaste

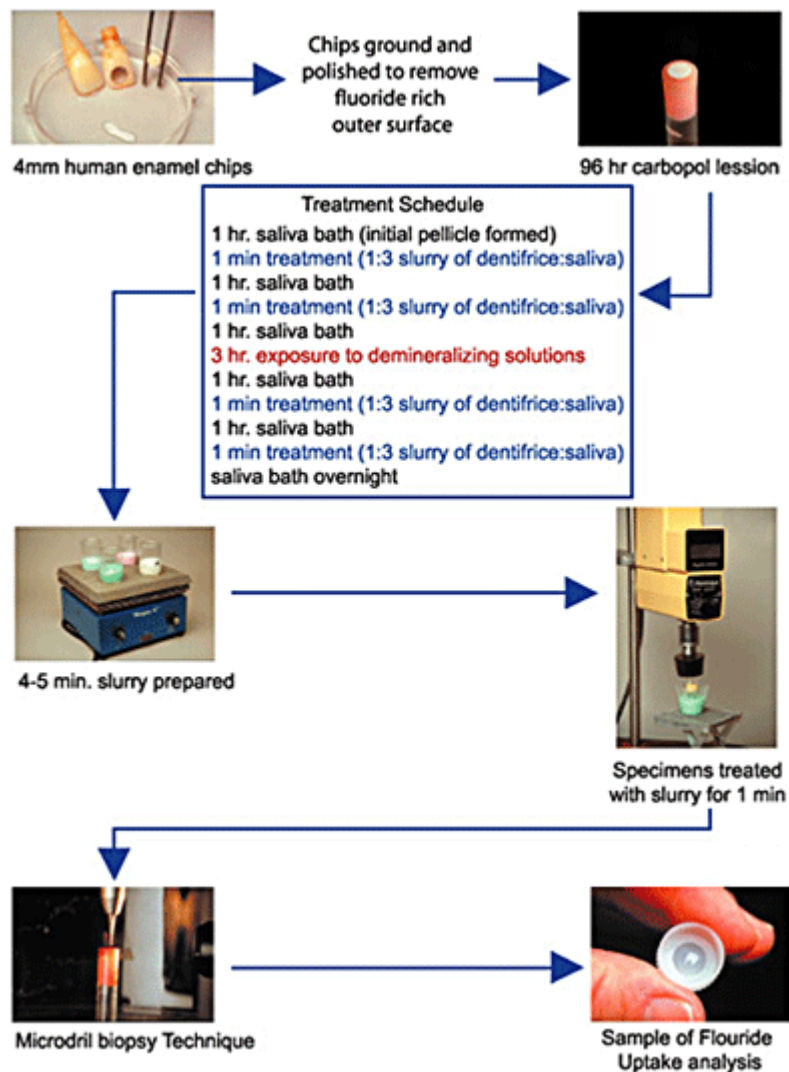
## RESULTS

Product Tested	F Uptake ( $\mu\text{g}/\text{cm}^2$ )
Crest Tartar Protection Toothpaste	$11.9 \pm 2.8$
Crest MultiCare Whitening Toothpaste	$11.4 \pm 1.7$
Placebo Toothpaste	$3.0 \pm 0.7$

## DISCUSSION

Demonstration of equivalency between product formulations with respect to their ability to fluoridate demineralized enamel is an important consideration in determining anticaries potential of new formulations. The model systems used to demonstrate such equivalence have been the subject of a number of conferences over the past fifteen years. The result of these conferences has been an overwhelming recommendation to ensure that each model system demonstrates sensitivity to fluoride dose, and that the model is able to statistically separate the performance of 250 and 1100ppm F controls. The model system included in the current comparison is one that has been demonstrated to be highly sensitive to fluoride dose, both from the standpoint of fluoride uptake as well as remineralization (Faller, et al., 1997). Results from this study are consistent with previous studies that suggest a high level of anticaries efficacy for products formulated with NaF, pyrophosphate and fluoride compatible, silica based abrasives.

## MATERIALS AND METHODS



## CONCLUSION

These results confirm the anticaries efficacy of a new multicare whitening toothpaste. The use of a silica that has been modified to provide the enhanced cleaning benefit delivered by this formula has no adverse impact on the anticaries potential of the base formula.

## REFERENCE

1. Faller RV, Pfarrer AM, Eversole SL, Cox ER, Landrigan WF, Wang Qin. The comparative anticaries efficacy of Crest toothpaste relative to some marketed Chinese toothpastes results of in vivo pH cycling testing. *Int Dent J* 1997;47:313-320.