

EVALUATION OF THE FLUORIDE STABILITY & AVAILABILITY OF TOOTHPASTES AND DEVELOP A REMEDY FOR FLUORIDE DEGRADATION

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Fluoride is a known requirement for caries prevention. An effective concentration of fluoride should be present in oral environment for anti caries activity. The most proven mode of fluoride supplier is dentifrice. This study was designed to evaluate the availability and stability of fluoride in toothpastes in the presence of various abrasive systems. In addition to this, fluoride availability and stability of major toothpastes in the Sri Lankan market were also studied. The concentrations of total available fluoride of four toothpaste formulations with four different abrasives and three market samples were analyzed accordingly. The analyses were carried out when the dentifrices were prepared/ purchased. Study for the formulations with four different abrasive agents was conducted for six months of storage at room temperature (28.9 ± 1.16 °C), at oven 45 °C and under refrigerator and study for market samples was conducted for four months of stability. All the analyses were performed using an ion specific electrode, Orion 9609 BNWP. At the time of preparation/purchase, all the dentifrices analyzed for the level of total available fluoride were in accordance with the Sri Lankan legislation (650 – 1150 ppm). However, in most of them, this form of fluoride was not shown to be stable with the time. Abrasive agents hydrated alumina; ground calcium carbonate and silicon dioxide allow the fluoride concentration in a dentifrice to remain stable. The highest loss of total available fluoride was found with the abrasive, precipitated calcium carbonate. Two possible solutions were identified to address this issue and accordingly two new formulations were developed. In the first formulation, the level of sodium monofluorophosphate was increased by 0.10% and the second formulation was done using sodium fluoride as an additional source of fluoride. The results suggest that the second formulation can maintain the required level of total available fluoride throughout the shelf life of a precipitated calcium carbonate system.

Key Words: fluoride, toothpastes, caries prevention, stability