

A COMPARATIVE STUDY OF FLUORIDE CONTENT IN COMMERCIALY AVAILABLE FLUORIDATED TOOTHPASTES IN SRI LANKA

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Fluoridated toothpastes are widely used to prevent dental caries worldwide. Fluoride (F) inhibits demineralization, promotes remineralisation, and has an inhibitory effect on cariogenic bacteria. To achieve therapeutic benefits, fluoridated toothpastes should contain at least 1000 µg/g F in soluble form. The bio-availability of F may vary with other ingredients used in toothpastes. The objective of this study was to determine the F content in commercially available toothpastes in Sri Lanka.

A convenient sample (N=11) of fluoridated toothpastes, 6 manufactured in Sri Lanka (three brands) and 5 imported brands were randomly collected from the local market and total and free ionisable (Soluble) F contents were determined. Duplicate analyses were performed for each sample. Fluoride determination was carried out by ion selective electrode method, adding an ionic strength adjuster with 0.04% w/v CDTA. Acid digested toothpaste was used to determine the total F (TF) contents. Free F ion contents in samples of locally manufactured fluoridated toothpastes were ranged from 217 – 346 µg/g and the corresponding values for the imported brands were 897–2488 µg/g. Only one sample of imported brands, showed the free F ion concentration of 71 µg/g. When monofluorophosphate (MFP) was the active ingredient (2 local, 2 imported) the soluble F concentrations ranged from 424-1008 µg/g and 225-1110 µg/g. All studied samples had high TF levels; ranging from 1952-7671 µg/g and 984-4907 µg/g, respectively. The findings of this study reveal that all locally manufactured toothpastes tested and one imported sample did not contain adequate levels of soluble F (1000 µg/g). Four samples tested had soluble F at levels between 850 -1000 µg/g. Further, all toothpaste samples with low soluble F contained CaCO₃ as an abrasive agent and the others contained silica. CaCO₃ is known to bind to free fluoride ions forming insoluble complexes thus reducing the bio-availability of toothpaste derived F in the oral environment. A discrepancy between the declared available F level on the label and the levels of soluble fluoride detected was noted indicating a reduction of soluble F levels during the period between packing and the time of testing.

This study shows that CaCO₃ which is added as an abrasive agent in toothpaste can react with soluble fluoride and reduce the availability of fluoride. Therefore, the availability of fluoride in a form conducive to promote remineralisation in the oral cavity is questionable when the CaCO₃ is used as an abrasive. However, the small sample size is a limitation of this study and a future study with a larger sample size is needed to verify the findings.