Arginine Improves Fluoride Bioavailability in Child Formula Dentifrices

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Background: The study examined the effect of arginine incorporation in child formula dentifrices (CFD) on fluoride bioavailability.

Methods: L-arginine (L-Arg) and L-arginine monohydrochloride (L-Arg.HCl) at 2% w/w of dentifrices were incorporated in five tested commercial CFDs. Total, total soluble, and insoluble fluorides in CFDs were determined by modified Taves acid-diffusion method (TAD). Ionic F and MFP were estimated by modified direct method with standard addition technique. Arginine intervention study included determination of pH of toothpaste slurries, buffer capacity of the added Arg, potentially available fluorides (PAF) and 1-min PAF by TAD. Elemental analysis for Ca, P, Na, Cl was done using ICP-OES. Data was analyzed using 1-/2-way ANOVA with post-hoc tests with significance at p0.05.

Results: The insoluble F content of tested CFDs ranged from 4 to 32%. Incorporation of L-Arg and L-Arg.HCl significantly improved the fluoride bioavailability of CFDs (p0.05). Incorporation of L-Arg significantly increased pH of the toothpaste slurries (p0.05); while L-Arg.HCl decreased pH of the slurries. PCA analysis showed that L-Arg.HCl decreased pH of toothpaste slurries due to presence of Cl in the form of HCl; whereas the inherent elements/molecules – Na, P, Pi, F at different levels remain distinct with unidentified influence of arginine incorporation on the tested variables.

Conclusion: Incorporating arginine (L-arginine or L-arginine monohydrochloride) at 2% w/w enhances fluoride bioavailability of the child formula dentifrices.

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