

## ABSTRACT

Charles University

Faculty of Pharmacy in Hradec Králové

Department of Analytical Chemistry

Candidate: Mgr. Zuzana Barvínková

Consultant: Doc. PharmDr. Hana Sklenářová, Ph.D.

Title of Thesis: Determination of fluoride in toothpaste using SIA system

Determination of fluorides was tested in the toothpastes using the SIA system. For determination of fluorides reaction of aluminium ions with aluminon that forms a red complex was used. After addition of a fluoride solution, aluminium ions were released from this complex. Spectrophotometry was used for the detection. The calibration range for sodium fluoride was linear over the range of  $3 \times 10^{-3}$  to  $1 \times 10^{-2}$  mol.l<sup>-1</sup>. The repeatability of the measurement was tested for blank solution (water) and for the solutions of sodium fluoride  $5 \times 10^{-3}$  mol.l<sup>-1</sup> and  $6.25 \times 10^{-3}$  mol.l<sup>-1</sup>. The repeatability was in the range of 1.19 – 3.70 %, that was found acceptable. Then, potentially interfering ions were identified, which may effect determination of fluorides. Following the composition of usual toothpastes interferents could be: Cl<sup>-</sup>, Br<sup>-</sup>, I<sup>-</sup>, Ca<sup>2+</sup>, PO<sub>4</sub><sup>3-</sup>, Zn<sup>2+</sup>, CO<sub>3</sub><sup>2-</sup>, Al<sup>3+</sup>, CH<sub>3</sub>COO<sup>-</sup>, Sn<sup>2+</sup>, tartrate anion, citrate anion, lauryl sulphate anion, sorbitol and methylparaben. Among interfering ions, which influence the determination in low concentration, belong: Ca<sup>2+</sup>, CO<sub>3</sub><sup>2-</sup>, Al<sup>3+</sup>, Sn<sup>2+</sup>, citrate anion, lauryl sulphate anion and methylparaben. In the tested toothpastes following interferents occur: sodium laurylsulfate, citrate and calcium carbonate. In the literature, optimal preparation of samples of toothpastes was found. Content of fluorides can be determined from non-linear part of the calibration curve, but toothpastes contain different forms of fluorides with other active substances and excipients, which can cause interferences. And thus the determination of fluorides in toothpastes was found to be problematic.