Fluoride (F), an atmospheric pollutant highly phytotoxic due to its high electronegativity, enters the leaves through the stomata, trichomes, and cuticle reacting with biomolecules. The F accumulation in the leaves can change vital physiological process such as water transport and metabolism of carbohydrates, but little is known about its effects on the model species Arabidopsis thaliana, and that was the aim of this study. Plants of A. thaliana, ecotype Col-0, were exposed to fogs with 0, 1, 2, and 4 mM of KF for ten consecutive days, applying 15 mL of solution twice-daily (DIC, n=20). The control received distilled water. In the end of the experiment, the F was determined in dry matter (DM) of the leaves with specific electrode. The relative water content (RWC) was measured in leaf discs, and solubles sugars extracted from the roots and leaves was quantified by enzymatic method. The data were submitted to ANOVA and the means were compared by Tukey test (p<0.05). The F content in leaves of plants exposed to 1, 2, and 4 mM were about 76, 188, and 576 times greater than that determined in control (18 µg g⁻¹ DM). This suggested that A. thaliana is a hyperaccumulator species, since the content of F in the leaves was higher than 1 % of its dry weight. All F treatments caused water deficit in plants of A. thaliana, with a reduction of 11 % in RWC in the treatment with 1 mM, and 14 % in the others F treatments. After exposed to concentration of the 4 mM, a reduction of the glucose (-70 %) and an increase of fructose (+107 %) content in the leaves were detected. In the roots, the glucose content didn’t differ between treatments, while the fructose decreased (-64 %). Sucrose wasn’t detected in the analyzed samples. It’s known that some organic compounds, as sugars, are key osmolytes contributing toward osmotic adjustment and avoiding excessive water loss. Probably, the production of sugars mediated by sucrose synthase (SuSy), an energetically more favorable route, has been benefited. The production of sugars by sucrose synthase in A. thaliana plants under stress caused by F was favored to be, while decrease of this sugar concentration in the roots may be related to the inhibitory effect of F in the transport of carbohydrates by the phloem. The results show new insights of F action on plants, with A. thaliana being a new hyperaccumulator species that can be used for future studies to better understand the mechanisms involved in F tolerance. (CAPES, FAPEMIG, CNPq)

Keywords: Fluoride accumulation, water deficit, sugars.