IPSSC + CMBO

STUDENTS' CONFERENCE

Jožef Stefan International Postgraduate School and Young Researchers' Day CMBO

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DETERMINATION OF FLUORINE IN VEGETATION

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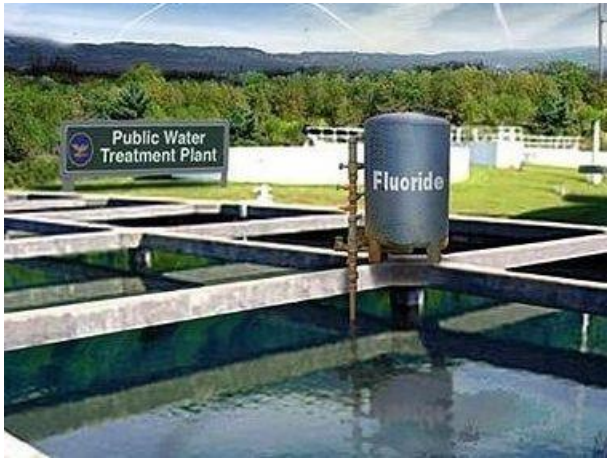
FLUORINE IN VEGETATION

The content of fluorine (F) in plants is usually lower than 10 mg/kg.

FLUORINE IN HUMANS

Small amounts of fluoride have proven benefits for dental health.

Exposure to high intakes can result in development of dental or skeletal fluorosis.



DETERMINATION OF FLUORINE

Alkali metal carbonate fusion ($NaKCO_3$)

SAMPLE DECOMPOSITION

FLUORIDE ION SELECTIVE ELECTRODE

x mg F / kg

Oxygen bomb combustion (O_2)

WHICH RESULT IS CORRECT?

?

CERTIFIED REFERENCE MATERIAL (CRM)

The content of the analyte is determined by different laboratories

National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material 2695

Fluoride in Vegetation

(In Cooperation with the Aluminum Association, Inc.)

This Standard Reference Material (SRM) is intended for use as an analytical control material for the determination of fluoride in vegetation. SRM 2695 consists of two 25 g bottles of powdered timothy grass, one each at the low and high fluoride levels. Both levels are elevated above the fluoride concentrations representative of baseline in uncontaminated plant materials.

The certified values given below are based on the determination of the fluoride content of samples randomly selected from the lot by one NIST and six cooperating laboratories. NIST determinations were made by ion-selective electrode (ISE) measurement after oxygen bomb decomposition of the dried sample. Most cooperating laboratories employed a semi-automated method (AOAC and Intersociety methods) based on colorimetric alizarin measurement following fusion and microdistillation from sulfuric acid [1,2]. One laboratory determined fluoride by titration with thorium nitrate following fusion and distillation.

Material	Fluoride, $\mu g/g$
Low level	64.0 ± 8.4
High level	277 ± 27

The uncertainties of the certified values are the 95%, 95% tolerance intervals, which include both the material variability and the measurement error. The interval formed by the certified value minus and plus the uncertainty will cover the true concentration of fluoride in 95% of the samples with 95% confidence [3].

277 ± 27 mg/kg

MY WORK

		w(F) [mg/kg]	
	Certified value	Oxygen bomb combustion	Alkali metal carbonate fusion
CRM (SRM 2695 - high level)	277 ± 27	266 ± 5	298 ± 4
CRM (SRM 2695 - low level)	64 ± 8	58 ± 2	68 ± 2
Spruce needles - high level		192 ± 2	236 ± 2
Spruce needles - low level		59 ± 1	68 ± 1
Green tea		154 ± 3	195 ± 1

- Results obtained by oxygen bomb combustion are lower than those obtained by alkali metal carbonate fusion.
- Results of analysis of certified reference material fall within the certified interval for both methods at both concentration levels.