

## **Water Quality Analysis of Tap Water in Brescia, Italy using Total reflection X-Ray Fluorescence (TXRF) Spectroscopy, by Ms. Anne Mutahi, MSc Student, Thursday 15th January 2015**

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Ms. Anne Mutahi making her presentation

**WATER QUALITY ANALYSIS OF TAP WATER IN BRESCIA, ITALY USING TOTAL REFLECTION X-RAY FLORESENCE (TXRF) SPECTROCOPY.**

**BY**

**Anne Mutahi.**

Water quality is fundamental to human health and notwithstanding the fact that unsafe drinking water has become a major cause of morbidity and mortality in many parts of the world. The aim of this study was to determine any presence of chromium contamination or other heavy metal in the tap water and in the process determine the elemental composition of the water in Brescia town.

Municipal water is main source of tap water in Brescia which comes from a large catchment lake in the Eastern side of Brescia called Lake Garda. Residence had a hypothesis that tap water was contaminated with chromium which was above the EU drinking water directive and WHO set guidelines hence people avoided using the tap water for drinking and for other domestic purposes because for the fear chromium adverse health effects. This led many people to buying bottled water which they believe to be of better water quality standards while others are forced to install in-house filterers to filter and post treat water from the taps before using it their homes.

Water samples were randomly collected from different parts of Brescia province straight from the tap source and then element composition of different water samples was determined by using Total reflection x-ray fluorescence (TXRF) spectroscopy machine and the results were then analysed using the S2 Pico fox software. The different elements detected were then compared to World Health Organization and European Union set guidelines.

The chromium concentration in the samples was sparsely distributed in very low quantities and was present in 34 out of the 60 measured samples. Chromium concentration was ranging from a minimum of 0.0025 mg/l and a maximum of 0.029 mg/l and a mean of  $0.007 \pm 0.002$  mg/l which is way below the WHO set concentration of 0.05 mg/l.

Other present elements mean concentrations were as follows; elements present in 60 samples were K  $1.4 \pm 0.03$  mg/l, Ca -  $87.2 \pm 0.30$  mg/l, S -  $6.0 \pm 0.09$  mg/l, Zn -  $0.4 \pm 0.005$  mg/l, Br -  $0.02 \pm 0.001$  mg/l. Element present in more than 50 samples and the mean concentrations were Cl -  $5.4 \pm 0.07$  mg/l, Fe -  $0.07 \pm 0.003$  mg/l, Ni -  $0.02 \pm 0.001$  mg/l, Cu -  $0.02 \pm 0.001$ , and Sr -  $0.4 \pm 0.003$  mg/l. also the element present in more than 30 samples analysed were Mg -  $7.1 \pm 1.45$  mg/l, P -  $0.3 \pm 0.06$  mg/l, Cr -  $0.007 \pm 0.002$  mg/l and Ba -  $0.05 \pm 0.008$  mg/l. the highest concentration was present in Ca  $87.2 \pm 0.30$  mg/l followed by Mg -  $7.1 \pm 1.45$  mg/l and S -  $6.0 \pm 0.09$  mg/l, which would be highly associated with bed rock of the water source and also chlorine concentration of  $5.4 \pm 0.07$  mg/l was as a result of the pre-treatment of water to kill microorganism present before distribution.

It was concluded that the tap water in Brescia did not have any chromium or other heavy metals contamination and no element concentration was above the recommended guidelines by the EU drinking water directives and WHO set guideline and hence present element concentrations were very low to cause any adverse health