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Determination of Cu Contamination in Some Spring and Mineral Waters Around Van by AAS after Enrichment of Activated Carbon

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Abstract: Some trace metal contamination in water is a major component in the determination of water quality. In order to supply qualify water for health of human being, terrestiral and aquatic animals is very important. Apparently, tap water and spring water qualities in many countries are effected by industrilization and over population. The main aim of this study was to detect copper metal concentration in some spring and mineral water around Van by means of Atomic Absorption Spectrometer after enrichment of activated carbon. Spring and mineral water samples were collected some different parts of city. These mineral and spring water samples were determined by a simple preconcentration method which is called activated carbon enrichment. The metal analysis was done to detect copper element. It was compared the results with standarts for drinking water quality of World Health Organization (WHO) and Europian Union drinking water standarts. As a result, copper level in the spring and mineral water around Van were generally suitable for the both criterias of World Health Organization (WHO) and Europian Union drinking water.

Key words: Water pollution, copper level, activated carbon, AAS, spring population, Turkey

INTRODUCTION

Animals and man cannot live without water so it is the most important species in life (Akagi *et al*., 1987). All the civilizations are based on water during the years and they settled down and lived near the water owing to need of water (Ekpo and Ibok, 1999). It covers almost 75% of the earth's surface. There have seen dangerous threaten tohuman life and nature at the end of the second half of the 20th century because of development of technology and increasing in population. Main part of drinking water comes from the ground sources such as groundwater. The quantity and the quality of water are equally important (Nalatambi, 2010). We can dissolve many types of substance by water so it is always referred to as universal solvent (Tokalioglu *et al*., 2002).

Drinking water and natural water come from ground sources such as ground water and aquifers (Uzun *et al*., 2001). They can also be obtained from surface water such as rivers, sterams and lakes. Other sources including rain, hail and snow, biological sources such as plants and sea throug desalinations (Nalatambi, 2010). There are many impurities in water such as microorganism, dissolved organic salts, metal salts and harmful bacteria. However, in most cases natural waters are not directly drank by human. It has to go through some treatment before it reaches to consumer. Industrial development and increasing in population causes many problems about pollution of water in crowded cities (Kartal *et al*., 1992).

As a result of this development, seas, sterams and rivers are polluted by waste come from factories and industrial zones. The main pollution in water comes from soil and trace toxic metals which comes from, fuels, industrial waste and home waste (Akagi *et al*., 1987).

The main aim of this study was to detect Copper (Cu) metal concentration in some spring and mineral water around Van by means of atomic absorption spectrometer after enrichment of activated carbon.

MATERIALS AND METHODS

Experimental

Apparatus: In this studies a Thermo Solar model flame atomic absorption spectrometer was used. Atomic absorption measurements were carried out using air/acetylene flame (Narin *et al*., 2000). The operating parameters for working elements were set of as recomended by the manufacturer (Uzun *et al*., 2001).

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Reagents: All solutions were prepared with double distilled water. The chemicals that used in this study obtained from Merck, Germany (Tokalioglu *et al*., 2002).

The calibration curve was established using the standard solutions prepared in 2 M HNO_3 by dilution from 1000 mg L^{-1}stock solution (Merck).

Experiment: All water samples were filtered before treatment and 3 g of activated carbon put into column then it washed 10% (v/v) water and HNO_3 (Nitric acid) mixture, these steps were repeated for each measure, 35 mL 5% Dietilydithiocarbamat (DEDTC) added to 1 L water sample to perform complexes of trace metals and pH of samples were adjusted to 3.2±0.2 by means of pure HNO_3 and phtalat buffer (Kilicel and Gokalp, 2005).

After waiting 2 h, filtering treatment was performed and trace toxic metals were collected on solutions 20 mL 1 M HNO_3 and this solutions were measured by AAS to obtain the concentrations of metal in terms of ppb (Gokalp, 2002).

Sample places:

Sample	Sample places
1	Spring water in Van Casttle
2	Spring water in Kalecik
3	Erek spring water in Bostanici
4	Spring water in Coravanis
5	Faruk mineral water in Kosebasi village
6	Mineral water in Ercis Ilica
7	Mineral water in Kapikoy
8	Spring water in Bahcesaray
9	Minaral water in Guzelsu
10	Sehitlik mineral water in Gurpinar

RESULTS AND DISCUSSION

Cu levels in spring and mineral waters around Van by AAS after enrichment of activated carbon were shown in Table 1 and Fig. 1.

Table 1: The concentration of Cu element in ten different points around Van for four seasons in a year

Sample number	Spring	Summer	Autumn	Winter	Mean±SD
1	2.98	1.16	2.25	2.21	2.15±0.65
2	3.68	1.12	2.72	3.52	2.76±1.01
3	0.35	1.06	0.70	1.81	0.98±0.54
4	4.03	1.68	1.53	2.10	2.34±1.00
5	2.25	1.55	5.36	1.42	2.65±1.60
6	4.46	3.93	2.25	5.20	3.96±1.09
7	5.48	3.01	9.93	4.18	5.65±2.62
8	2.73	2.00	1.68	0.38	1.70±0.85
9	6.66	1.08	4.30	1.06	3.28±2.36
10	4.30	3.58	5.45	1.23	3.64±1.54
Mean±SD	3.22±1.33	2.05±1.43	2.84±1.87	1.90±1.30	2.91±1.31

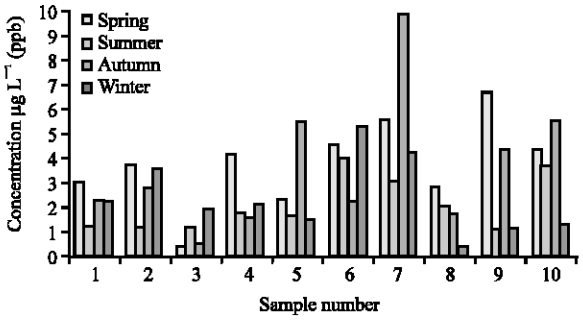

Fig. 1: The concentration of Cu element in ten different points around Van for four seasons in a year

CONCLUSION

The copper level during the year was acceptable and stable in spring and mineral waters around Van. The relative standard deviation of results were <10%. Similar to previous studies, there was no important differences among the samples in terms of Cu level. Early researchers suggest that the extraction method, preconcentration of activated carbon was fast and reliable especially in copper determination in water (Kilicel and Gokalp, 2005; Narin *et al*., 2000). It is noticed that the highest Cu concentration in Saray Kapikoy mineral water and lowest Cu concentration in Erek natural water (spring season). As a result of these measurements we also noticed that the result of all the samples were suitable with standard values of both World Health Organization (WHO) and Europian Union drinking water standards.

REFERENCES

Akagi, T., C.J. Cheng and H. Hareaguchi, 1987. Simultaneous multi-element analysis for trace metals in sea water by inductively-coupled plasma/atomic emission spectrometry after batch preconcentration on a chelating resin. Analytica Chimicia Acta, 198: 173-181.

Ekpo, B.O. and U.J. Ibok, 1999. Temporal variation and distribution of trace metals in freshwater and fish from Calabar River, S.E. Nigeria. Environ. Geochem. Health, 21: 51-66.

Gokalp, F., 2002. Determination of some heavy metal levels in Lake Van water. Master Thesis, Yüzüncü Yil University, Van, Turkey.

Kilicel, F. and F. Gokalp, 2005. AAS determination of some trace heavy metals in Lake Van water after preconcentration by complexation with surface functional groups on activated carbon. Fresenius Environ. Bull., 14: 124-129.

Kartal, S., L. Elci and M. Dogan, 1992. Investigation of lead, nickel, cadmium and zinc pollution of traffic in Kayseri. Fresenius Environ. Bull., 1: 28-33.

Nalatambi, S., 2010. Determination of metals in tap water using atomic abrosption spectrometry: A case study in Bandar Sunway residential area. Sunway Acad. J., 6: 33-46.

Narin, I., M. Soylak, L. Elci and M. Dogan, 2000. Determination of trace metal ions by AAS in natural water samples after preconcentration of pyrocatechol violet complexes on an activated carbon column. Talanta, 52: 1041-1046.

Tokalioglu, S., S. Kartal and L. Elci, 2002. Determination of trace metals in waters by FAAS after enrichment as metal-HMDTC complexes using solid phase extraction. Bull. Korean Chem. Soc., 23: 693-698.

Uzun, A., M. Soylak and L. Elci, 2001. Preconcentration and separation with amberlite XAD-4 resin; Determination of Cu, Fe, Pb, Ni, Cd and Bi at trace levels in waste water samples by flame atomic absorption spectrometry. Talanta, 54: 197-202.