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Investigation of metal contens of (*Helichrysum arenarium*) growing on hydrothermaly alterated areas in Gumushane, Turkey

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Alteration areas (especially hydrothermally alterated ones) are important target areas for mineralization and ore exploration; at the same time, this kind of sites are risk areas for heavy metal pollution, especially natural origin beings. Alteration which is especially originated from hydrothermal process and sometimes weathering originated, is most important factor for metal/elements mobilizations. Mobilized elements in this kind of environments sometimes move away from these environment and also sometimes enrich *in situ*. Therefore, it was seen especially naturally originated heavy metal pollution in soils, vegetations and aquatic environments which are exposed alteration. The aim of this study is to investigate heavy metal contents of plant yellow flower (*Helichrysum arenarium*) commonly observed at the area. The plant yellow flower (*Helichrysum arenarium*) is grown widely in Gumushane and its near vicinity and is consumed as herbal tea. The study area is the alteration area which is situated at Demirören and its near vicinity, approximately 50 km east of Gumushane (Vural 2013b). Thirty two plant samples were collected from the study area and then their flowers are separated from the bodies. Flower of plant samples were cleaned thoroughly with fresh-water in order to remove soil and dust particles, rinsed with ultra-pure water and then dried at room temperature for two weeks. After waiting, air-dried samples were dried in an oven at 60oC to a constant weight for at least a day. After dried samples were powdered homogenously, were sent to ACME laboratory (Canada) to determine some heavy metal contents such as Mo, Cu, Pb, Co, As and Sb by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) and Inductively Coupled Plasma-Mass Spectrometry (ICP-MS). All data were assessed with IBM SPSS 19 statistical software package. Contents of the elements in flowers of plant yellow flowers (*Helichrysum arenarium*) were determined and obtained between; 0.13 and 1.51 ppm with mean 0.5 for Mo; 4.74 and 8.25 ppm with mean 6.24 for Cu; 0.03 and 2.26 ppm with mean 0.33 for Pb; 17.3 and 27.9 ppm with mean 21.12 for Zn; 0.56 and 29.4 ppm with mean 3.48 for Co; 0.1and 0.9 ppm with mean 0.21 for As and Sb is 0.02 and 0.12 ppm with mean 0.04. Although, no study was found in literature about heavy metal contents of plant yellow flower, when it was statistically evaluated element contents of the plant, values of Mo, Pb, Co, As and Sb in flowers were not normal distribution, so they were negatively affected from alteration process. It was also seen that, flowers of plant yellow flower have higher concentration of elements than flowers of plant flower growing on control points.

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Potential applications of metallic, semiconductors, magnetic nanoparticles in environmental applications

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The potential use of solar energy with metallic, semiconductors, magnetic nanoparticles and *Eichhornia crassipes* systems as a cheap and convenient process for in environmental applications will be studied. The study will focus on polluted water and textile industry. In this method, electrons and holes generated from band gap excitation of under irradiation with sunlight will be utilized for photochemical degradation of water pollutants. The presence of metallic as well as magnetic nanoparticles is expected to enhance the photo degradation. The selection of the type of metallic, semiconductors and magnetic nanoparticles to be used will be based on the characteristics of the hazardous products produced and their efficiency.

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