

THE EFFECTS OF AHANGARAN MINE OF MALAYER ON PHOTOSYNTHETIC PIGMENT RATE AND CAROTENOID IN TWO EUPHORBIAECEAE SPECIES

shokufe enteshari and atefe moniri

Department of Biology, Payame-Noor University, najaf abad, esfahan

www.atefem85@yahoo.com

Introduction: The soil pollution by heavy elements is one of the major problems that developing and industrial countries are faced to it (Kabata-pendias, 2000). The existence of these elements in atmosphere, soil and water even in minor rates may lead to problems for living beings (B.Dhir et al, 2012). Because of potential toxicity and high resistance of metals, the soils that are polluted by these elements are considered as an environmental problem that need to an effective procedure (Nascimento et al, 2006). It is obvious that some of terrestrial plants collect a high amount of heavy metals so they can have an important role in cleaning of metal pollutants (Ali, 2003). One of the methods with high potential for elimination of heavy metals of polluted sites is using of resistant living beings to these metals that have ability and capacity of collecting and attraction. This method is named Phytoremediation. The mine of lead and zinc of Ahangaran is one of the pollutant resources of environment by heavy metals in an area that is placed in 25km east of Malayer in a conserved area of Lashgardar. In the present research two plant species of Euphorbiaceae namely *E.cheiradenia* and *E.macroclada* that were grown in this region were examined and after sampling and identify of collected species pigment rate from polluted environment and abserver were compared.

Material and methods: Ahangaran lead and zinc mine with geographical $35^{\circ} 59' 48''$ latitude in the form of eighteen gonal and with an area of $25/29\text{km}^2$ in the west of Iran and east south of Hamedan province in 23km of east of Malayer. The plant samples of two polluted area in mine and control region near Jozan village were collected. The first stage was recognition of *E.cheiradenia* and *E.macroclada* species that in order to recognition we used of the book of 'coloured flour' the work of Dr.ghahreman. The measurement of chlorophyll and carotenoids was done by means of the method of Arnon (1976). The analysis of data was done with ANOVA (analysis of variance) by means of SPSS software, the comparison of average was done by means of Dankan test in probability level 5%, diagram drawing was done by Excel software and the number that showed its are the average of three repetition.

Results and discussion: The result of this research indicate that existence of heavy elements can decrease the plant pigments substantially. there is a miningful reduction in the amount of chlorophyll(a) and (b) and whole chlorophyll in leaf and stem in two species because of the existence of heavy elements in a level of $P \leq 5\%$. The present of chlorophyll reduction in the stem of *E.macroclada* species is more than the other species. The result of this research is in agree with the result of other researcher (Ewaise, E.A., 1997; Jeliaskova, E.A. et al, 2006). Boyer et al (1987) said that decrease in chlorophyll rate in the plant under stress may accure after the action of chlorophyllase anzym in addition the chlorophyll(a) is more sensitive and is more destructed. Sairam et al (1998) said that different kind of oxigens that are produced under stress condition can lead to decrease in photosynthetic pigments. Stobart in 1985 introduced the reason of chlorophyll concentration reduction as preventative agent of chlorophyll synthesis under heavy metals effects. The chlorophyll synthesis reduction can lead to the stop of electron transmission chain and finally can lead to disturbtion of Kelvin cycle that couse decrease of stomatal opening because of decrease of need to carbon dioxide, photosynthesis and reduction in production of carbohydrates can lead to decrease in growth. The reduction in water attraction can lead to decrease in turgor stress in protection cell of stomata and close it and plant withering. According to experiment following reduction of chlorophyll and carotenoid in two species decrease. This finding were in agree with coments of Jeyaramraja et al in 2005 that observed that the heavy metals element s mild stress can lead to increase of carotenoids while the strong stress of heavy elements can cause decrease of carotenoids in addition to decrease of chlorophyll that is observer in *E.macroclada*. Decrease in stress rate can help to increase of



The 1st International Conference on New Ideas in Agriculture
Islamic Azad University Khorasgan Branch
26-27 Jan. 2014, Isfahan, Iran



carotenoids. Lawlor and Cornic(2002) said that carotenoid as a pigment has an important role in protection of thylakoid membrane and prevent from photooxidation of chlorophyll .

Key Words: Heavy metal accumulators; Ahangaran mine; Phytoremediation, Euphorbiaceae



The 1st International Conference on New Ideas in Agriculture
Islamic Azad University Khorasgan Branch
26-27 Jan. 2014, Isfahan, Iran

