

The impact of magnetic field applications on photosynthetic pigments of mountain maple seedlings

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Abstract: Maple tree, which increases the “species diversity” for its being a mixed species in general in different forest ecosystems in different regions of Turkey, can grow in different soil and climate conditions ranging from the sea level to the timber line. In this study, *Acer pseudoplatanus* L., which is the object of massive seedling propagation and, therefore, of afforestation practices, was used. In the study, the leaves of the seedlings germinated from cold-wet pretreatment (+4 °C and 45 days cold stratification) and from non-pretreatment seeds were prepared according to the method of Witham, Blaydes and Devlin (1971). Upon determining the absorption values of 645, 663 and 450 nm wavelength of the extract obtained from the analysis in the spectrophotometer, the amount of chlorophyll (chlorophyll a, chlorophyll b and total chlorophyll) was determined by using the photosynthetic pigment equation. To determine the carotenoid amount, the absorbance values of the extract at 450 nm wavelength in the spectrophotometer were determined, and then the values were calculated according to the carotenoid equation. For magnetic field (MF) treatment, the seeds were exposed to different application durations (20, 60 and 120 min.) and different MF intensities (200 and 400 mT). Seeds subjected to control and different MF applications were germinated on equal conditions. The results of the research revealed that application duration and intensity of magnetic field have a significant impact on photosynthetic pigment contents and carotenoid amounts. While the amount of the chlorophyll a was less in all magnetic field treatments than control treatment in un-stratified groups, in the stratified group, 120 min 400 mT treatment exhibited a positive effect compared to control and other magnetic field application procedures. While chlorophyll b and carotenoid amounts were higher in the unstratified group than in the other treatments, the highest values were found in the stratified group in the 120 min 200 mT procedure. Using magnetic field treatment could be a promising technique for forest tree seedling propagation; however, further and extensive research through the use of different levels of magnetic field doses is required to determine the optimum dose.

Keywords: Chlorophyll, Carotenoid, Seedling, Physiology, Magnetic field, *Acer pseudoplatanus*, Pre-treatment