Effects of magnetically treated water on vegetative growth period, development of gynoecium and anther, and ultrastructure of pollen grains of lentil (Lens culinaris L.)

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Abstract

Water is the most abundant component of plant cells and as a diamagnetic molecule can be affected by magnetic field. The present study was conducted in order to evaluate the effects of magnetically-treated water on speed of vegetative growth and stages of reproductive organs development and ultrastructure of pollen grain of lentil (Lens culinaris L.). For this aim lentil seeds were cultured in green house and were irrigated either with tap water (control group), or magnetically-treated water (tap water which was passed through a magnetic field of 110 mT). Growth and development of male and female generative organs were studied via cytological and histological routine methods and the ultrastructure of pollen grains was studied by scanning electron microscopy. Results showed irrigation with magnetically-treated water increased the speed of lentil flowering. In developmental stages of anther and gynoecium showed no difference between control and treated plants. The apparent shape of the megaspor mother cell and egg cell, was the same in both groups. Lentil pollen grain is tricolpate with reticulate architecture. The decorations of pollen grains were thicker and wider in the plants irrigated with magnetically-treated water, compared to the control plants. Number of pollen grain had no difference between groups. Totally irrigation with magnetically-treated water increases the speed of flowering and thus reduces the growth period is in lentil. Therefore, irrigated with magnetically-treated water can be a big help to reduce the water used to irrigate the crops.

Keywords: Lens culinaris L., magnetically-treated water, stage of development, vegetative growth