

Effect of sugarbeet bagasse on biochemical characteristics, photosynthetic pigments and antioxidant activity of leaf extract of peppermint (*Mentha piperita* L.) under drought stress

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Abstract

To study the effects of drought stress and soil application of sugarbeet bagasse on biochemical characteristics, photosynthetic pigments' content and antioxidant activity of peppermint (*Mentha piperita* L.) leaf, a pot experiment was conducted in 2015 in Research Greenhouse of Ferdowsi University of Mashhad. The factorial experiment was based on completely randomized design with four treatments of drought stress (30, 50, 70 and 90% of field capacity) and three levels of soil application of sugarbeet bagasse (0, 10, 20% v/v) with three replications. Results showed that the highest amount of chlorophyll *a*, chlorophyll index, ratio of chlorophyll *a/b*, carotenoid and relative water content was obtained in 90% stress of field capacity and 20% application of sugarbeet bagasse, so that increasing stress level reduced the aforementioned characteristics. Furthermore, application of bagasse caused significant changes in the above characteristics. The highest content of chlorophyll *b*, total chlorophyll, antioxidant activity and electrolyte leakage was obtained in 30% drought stress and without the use of sugarbeet bagasse treatment, so that they were equal to 47.19 and 49.48 mg/kg fresh weight, 91.2% and 75.93%, respectively. Application of sugarbeet bagasse at this level of drought stress caused a significant reduction in these traits. Based on the obtained results, it is clear that application of sugarbeet bagasse in the medium, due to high water adsorption and retention, improves biochemical traits and the amount of photosynthetic pigments in the peppermint.

Keywords: Culture medium, Oxidative stress, Chlorophyll, Water uptake.

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