Influences of UV-A radiation on antioxidant capacity, cynarin content and some morphophysiological properties of three genotypes of artichoke (*Cynara scolymus* L.)

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Abstract

Artichoke (*Cynara scolymus*) is peculiar among the vegetables due to its medicinal properties. Previous studies have been shown that Ultraviolet (UV) radiation stimulates the production of some secondary metabolites in the plants. In the present study, the effects of UV-A (360 nm) radiation on total phenolic content, total flavonoid content, antioxidant capacity, cynarin content and some morphophysiological properties of Artichoke leaves were investigated. The greenhouse experiment was carried out on one cultivated type from Isfahan and two varieties from USA (Green Globe) and Italy (White Giant), with four treatments of UV-A radiation (0, 1, 2 and 4 hours per day). Radiation treatments were applied once every 2 hours during the 16 hours of daylight. Results showed that exposure to UV-A increased the fresh and dry weight of plants. Chlorophyll a, b and total chlorophyll contents decreased under the UV-A radiation. Maximum and minimum contents of chlorophyll a were observed in White Giant cultivar (control treatment) and 4 hours per day treatment, respectively. UV-A radiation had a significant effect on total phenolic content, total flavonoids content and antioxidant capacity of the three cultivars of Artichoke. The highest and the lowest total phenolic content were observed in White Giant cultivar (4 hours per day treatment) and control, respectively. The highest and the lowest amounts of antioxidant capacity were recorded for Green Globe variety and Isfahan cultivar, respectively. However, the results showed that the leaf cynarin content was decreased by increasing the UV-A radiation. Due to the increase in total phenolics and flavonoids in the mentioned conditions, the amount of other phenolic compounds may have increased in the leaves.

Keywords: Artichoke, UV-A, Total phenol, Phenolic compounds, Total flavonoid.

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