

Effect of CO₂ enrichment on leaf characteristics and changes in pigments of two varieties of *Eustoma grandiflorum* cut flower under hydroponic conditions

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(Received: 16 Aug. 2015 ; Accepted : 25 Apr. 2016)

Abstract

One of the signs of climate change is variation of the amount of greenhouse gases in the earth's atmosphere. It is expected that addition of carbon dioxide could affect on radiation-energy balance and thus change global climate. The aim of this study was to investigate the effect of CO₂ enrichment on leaf characteristics and change in pigments of two varieties of *Eustoma grandiflorum* cut flower under hydroponic conditions. The experiment was carried out as split plots, based on completely randomized design with three replications, in Research Greenhouse of College of Agriculture, Ferdowsi University of Mashhad, Iran. Treatments consisted of three concentrations of carbon dioxide (380 as control, 750 and 1050 mg/L) as main plot and two cultivars of lisianthus cut flower (Yodel White and GCREC-Blue) as subplot. Results of analysis of variance showed that only the simple effect of CO₂ treatment was significant on number of leaves, carbohydrate, and carotenoids at 5% probability level and on other traits at 1% probability level. Interaction effect of cultivar and CO₂ was only significant on anthocyanin content ($p < 0.01$). In general, with increasing the CO₂ concentration from 380 to 1050 mg/L, the number of leaves increased by 86%, leaf area (27%), carbohydrate content (64%), carotenoids (2.43%), anthocyanin (13.67%) and total chlorophyll (0.9 %), whereas, stomatal conductance and chlorophyll a and b showed reducing trend.

Keywords: Anthocyanin, Carotenoid, Carbohydrate, Chlorophyll.

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