

Abstract

To evaluate the expression of genes and traits morphology and physiology bch and pdf to choose the best level of silver nanoparticles and drought, 10 ecotypes were collected from different parts of South Khorasan. Experiment with split plot factorial in a randomized complete block design with 3 replications in 1393 at the experimental field and laboratory studies and Birjand University Institute of Molecular Biotechnology at the University of Zabol were studied. Ecotypes studied in Birjand, qain, Hashemie, Nasrabad, Ayask, Sarand, Gazar, Arian city, Sarayan and Baghestan. The characteristics such as enzyme ascorbate, catalase, polyphenol peroxidase, phenylalanine ammonia, guaiacol peroxidase, protein, chlorophyll a, chlorophyll b, carotenoids, date of germination, the mastic sprouted, tiller number, leaf length, leaf width, length pod and leaf. Bch and pds gene expression also was 18srRNA reference. Real time PCR gene expression system and calibration data were analyzed with software Gen EX. Statistical analysis included analysis of variance, mean, correlation and factor analysis with Tukey's multiple range test at 5% level of SAS software and cluster analysis was performed with NTSYS software. Results showed significant differences between the main effects ecotype, silver nanoparticles and drought at the level of one percent. Beta-carotene hydroxylase gene expression (bch), Phytoene desaturase (pds) and carotenoid production under drought stress increased at 55 ppm silver nanoparticles. Among ecotypes studied ecotypes qain, Ayask and Gazar the traits had high average.

Keywords: saffron, silver nanoparticles, gene expression, Real time PCR.



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Graduate School
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Department of Biotechnology and Plant Breeding
Thesis for a master's degree in plant breeding

Title:

**Effects of drought stress and silver nanoparticles on the
expression of *pds* and *bch* genes involved in the production
of carotenoids in Saffron**

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2015