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Expression Pattern Analysis of Acc Synthase and Erebp Genes in Response to Drought Stress in Chickpea

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Abstract

Chickpea (Cicer arietinum L.) one of the most important grain-legume crop, is grown in more than 45 countries, mostly in arid and semiarid zones. Plants respond and adapt to water deficit at both the cellular and molecular levels. A large number of genes has been described that respond to drought at the transcriptional level and the mechanisms of the molecular response to water stress in higher plants has been analysed by studying the expression of genes responding to drought and other abiotic stresses. The expression pattern of ACC synthase and EREBP genes in two chickpea genotypes MCC 283 and MCC80 in the different growth stages under drought stress were investigated. For drought treatment, soil-grown 30 day-old (vegetative growth stage), 60 day-old (early pod visible) plants were subjected to progressive drought by withholding water for 2, 4, and 6 days and untreated plants were used as control. RNA was extracted from leaf and then cDNA was synthesized. RT-qPCR analysis of ACC synthase and EREBP expression using specific primers showed different expression patterns in different stages of both chickpea genotypes. Differential expression of ACC was observed in both genotypes in various phonological stages and its timing, duration and intensity of drought treatments. The expression levels of EREBP in both genotypes were increased significantly from 2 to 6 days of water deficit in vegetative and early pod visible stages. The increase in ACC synthase and EREBP expression in the drought treatment for both genotypes in the vegetative growth stage and early pod visible might be an adaptation to overcome the stress condition, supplying energy for growth and survival, thus helping the plant to survive.

Keywords: Chickpea, Drought stress, Gene expression, RT- PCR

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