

Abstract

In order to investigate some physiological and biochemical responses, and pattern of DNA methylation change of two native wheat cultivars: “Brown Bolani” (drought-tolerant) and cultivar “Sistan” (drought-sensitive), the factorial experiment was conducted based on a Completely Randomized Design (CRD) with three replications under drought stress, including 90% field capacity (control), 50% field capacity (mild stress) and 25% field capacity (severe stress) in greenhouse conditions. Increasing the transcript levels and activity of antioxidants and phenylalanine ammonia-lyase along with phenylpropanoid compounds, including total phenolic compounds, flavonoids and anthocyanins improved relative tolerance to drought-induced oxidative stress, particularly in Bolani cultivar, results which may be confirmed by a significant decrease in damage indices including hydrogen peroxide, electrolyte leakage and malondialdehyde. The biosynthesis of phenolic compounds was more active than the lignin- biosynthesis pathway under severe drought stress, possibly indicating an early response to drought stress. These results may be confirmed by the negative significant correlation of lignin with damage indices as well as a positive non-significant correlation of lignin with most enzymatic and non-enzymatic antioxidants in cultivars. Lower decrease in total chlorophyll and significant increase in carotenoids in Bolani cultivar compared to Sistan one indicated the relative stability of photosynthetic pigments under drought stress. The pattern of DNA methylation in tolerant and sensitive cultivars was significantly different from each other. The number of unchanged bands decreased with increasing drought stress, particularly in Bolani cultivar. Under drought stress, the methylation and demethylation levels (31.15% and 18.02%, respectively) in tolerant cultivar were higher than its values (26.01% and 25.73%, respectively) in sensitive one. Also, under these conditions, the change in demethylation bands in tolerant cultivar (6.84%) was higher than that of the



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**The study of physiological, biochemical
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