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Proteome analysis of sorghum (*Sorghum bicolor* L.) leaf in response to waterlogging stress

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Abstract

Growth related to morphological and proteome response under waterlogging stress in sorghum has not yet been elucidated. Understanding how plants respond to waterlogging, the present study was conducted in seedlings leaf of the Nam-pung chal cultivar. Regarding 3-leaf stage of sorghum, stem length and plant height were slightly decreased in the treatments during ten days of waterlogging, and chlorophyll contents were also significantly different from 7 days of waterlogging treatment. The results observed from the present study were considered to be influenced by the waterlogging stress more in the 5th leaf stage of the growth period of the sorghum, and as the waterlogging treatment progressed, the waterlogging stress gradually influenced the growth difference between the control and the treatment respectively. Using 2-DE method, a total of 74 differentially expressed protein spots were analyzed using LTQ-FT-ICR MS. Of these proteins, 45 proteins were up-regulated in the treatment group, and 32 proteins were down-regulated. Analysis of LTQ-FI-ICR MS showed that about 50% of the proteins involved in carbohydrate metabolic process, metabolic process, and cellular metabolic compound salvage were affected by stress. Malate dehydrogenase protein and Glyceraldehyde-3-phosphate dehydrogenase protein related to carbohydrate metabolic process increased the level of protein expression in both 3 and 5-leaf stage under waterlogging stress. The increased abundance of these proteins may play an active role in response to waterlogging stress. These results provide new insights into the morphological alteration and modulation of differentially expressed proteins in sorghum cultivar.

Keywords: waterlogging stress, growth characteristics, proteome, leaf, sorghum

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