

Changes in Foliar Proline Concentration of Osmotically Stressed Barley

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The amino acid proline is accumulated in plant tissues in response to a variety of stresses. The existence of two routes for its biosynthesis is well documented. However, little is known about the contribution of each pathway to the accumulation of free proline under stress conditions. In the present study young barley plants were subjected to osmotic stress by treating their roots with 25% polyethylene glycol. Prior to stress imposition roots were incubated for 24 h in nutrient solution containing proline or one of its metabolic precursors: glutamate and ornithine. Free proline quantity in the leaves was measured before and after stress. Relative water content (RWC) was used as a measure of the plant water status. Foliar proline levels showed a significant increase in ornithine- and proline-pretreated plants compared to the control. Nevertheless, no considerable changes in leaf RWC were observed. It was shown that before stress application only ornithine but not glutamate was immediately metabolized to proline. Under stress conditions, however, both precursors were converted into proline. The possible role of this amino acid in the processes of post stress recovery is discussed.

Key words: Barley, Osmotic Stress, Proline Precursors