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Effect of Plant Growth Regulators on Assimilation, Partitioning of Assimilates and Photosynthetic Enzymes in Cotton under Water Stress

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Objectives

determine the effects of water stress (WS) and their alleviation with the exogenous application of plant hormones such as IAA, GA3, BAP, ABA and ethrel (5 mM) on radiolabelled partitioning of photosynthates, stomatal patchiness and photosynthetic enzymes.

Materials and Methods

1. Plant materials : Cotton (Gossypium hirsutum cv. H-777)
2. Methods: Biochemical analysis, Spectrophotometery, radiolabelled isotopic analysis, autoradiography, CPM by scintillation counter

Results and Discussion

Radiolabelled studies for uptake, assimilation and allocation of 14CO2 indicated that 14CO2 uptake, assimilation into total soluble carbohydrates, starch, percentage of carbohydrate in root and leaf decreased under WS. The exogenous ABA and IAA alleviated the WS effects. Autoradiographic studies on stomatal patchiness indicated that 14CO2 uptake was extremely sensitive and significant difference of stomatal patchiness was observed. The radiolabelled isotopic studies revealed that Rubisco (EC 4.1.1.39) and PEPC (EC 4.1.1.31) activity decreased, while CA (EC 4.2.1.1) activity increased. NAD-MDH (EC 3.1.1.37), NADP-MDH (EC 1.1.1.82) and NaR (EC 1.6.6.1) activities decreased. Also, the exogenous application of BAP alleviated the WS effects.

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