Drought stress response in enzymatic activities of cowpea nodules

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Abstract

The response to drought stress of several nodule enzymes in cowpea (Vigna unguiculata (L.) Walp.) cv IPA 204 at different stages of N2 fixation development, as well as their changes during the period of stress recovery are described. Stress was applied continuously by the control of water potential through a porous cup. Stress applied during the P2 stage (15-30 d) interfered most. The recovery in nodule metabolic activity at the P1 stage (0-15 d) was higher than at other stages. There was a slight reduction in PEPC activity with increased stress. NADH-GOGAT activity was the enzyme most sensitive to drought stress and most closely associated with N2ase (ARA in closed systems). The coupling between GS and NADH-GOGAT activities was lost as drought stress progressed. GDH activity remained not only insensitive to the stress but its activity even increased, indicating that cowpea nodules maintain sufficient activity of some assimilatory enzymes under drought stress.