

THE EFFECT OF NITRATE ADDITION ON NODULE AMMONIA METABOLISM IN
MEDICAGO SATIVA L.

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$N_2(C_2H_2)$ reduction activity, protein content and activities of the enzymes glutamine synthetase (GS), glutamate synthase (NADH-GOGAT) and NADH/NAD⁺-glutamate dehydrogenases (NADH/NAD⁺-GDH) from the plant fraction of root nodules of alfalfa were determined at different NO_3^- levels (0, 10, 20, 50, 100 and 200 mM). Nitrogenase, nodule content of soluble protein, NADH-GOGAT and NAD⁺-GDH (deaminating) activities steadily decreased with added NO_3^- whereas NADH-GDH (aminating) activity showed a great increase with higher NO_3^- concentrations. Nodule GS activity declined to a minimum level at 20 mM NO_3^- (62% control) but recovered to the control value when increasing NO_3^- . The results suggest a close association between NADH-GOGAT and nitrogenase activities, and support a preponderant role of GS/NADH-GOGAT pathway in the assimilation of fixed N. High activity of NADH-GDH reflects severe senescence of nodules. Increase of GS activity in these conditions could be related to levels of NH_4^+ produced by alternate sources (NO_3^- reduction and/or oxidative deamination of amino acids).