



ENZYMES INVOLVED IN NITROGEN METABOLISM AND RESPONSE TO STRESS IN WHEAT WITH *HERBASPIRILLUM SEROPEDICAE* SMR1 ASSOCIATION

Ortolan, S.R.¹; Volpiano, C.G.²; Flores, L.V.²; Külzer, A.²; Estevam, A.²; Guimarães, V.F.¹; Costa, A.C.T.¹; Vendruscolo, E.C.G.²; Santos, M.F.²

¹ Departamento de Agronomia, Universidade Estadual do Oeste do Paraná, Marechal Cândido Rondon, Brazil; ² Departamento de Biociências, Universidade Federal do Paraná, Palotina, Brazil;

It is possible to increase sustainably the productivity of cereals associating them with plant growth promoting bacteria (PGPB) as *Herbaspirillum seropedicae* SmR1 (Hs). This interaction may change nitrogen metabolism and cause a stress response in plants. The aim of this work was evaluate the activities of the enzymes glutamine synthetase (GS), glutamate dehydrogenase (GDH-NADH), isocitrate dehydrogenase (NADP-ICDH), phenylalanine ammonia lyase (PAL) and levels of proline (Pro), ammonia (NH₄⁺) from leaves of wheat (*Triticum aestivum* L.). Plants of CD 104 were inoculated with Hs (10⁶ cells/seed) with or without ammonium sulfate nitrogen fertilizer (N) at tillering and booting stages in a greenhouse. At tillering GS activity and NH₄⁺ quantities compared with control (without Hs and N) increased in treatments with Hs and even more in Hs combined with N, indicating synergy in nitrogen assimilation between inoculation and fertilization. At booting, the levels of GS activity were the same for all treatments. The ICDH and GDH have not changed in all treatments. Pro was higher at tillering with Hs inoculation. Pro acts as an osmolyte and increases in plants by several types of stress, despite PAL indicates stressful condition and did not increase compared with controls. The increasing of Pro accumulation might have been the result of PAL high activity although at the moment of quantification they were established to normal levels. Pro levels were normalized at booting showing that in the later stages. The mechanism of interaction seems to cancel the effect of bacteria in this cultivar. The results demonstrated that the association between PGPB and wheat plant influences nitrogen metabolism. The interaction seems to have overcome in later stages, but it may help plants in the early stages of development because it might be acting as a biopriming to prevent stress.

Key Words: plant growth promoting bacteria, glutamine synthetase, proline

