Amino acids status in Iranian rice (Oryza sativa L.) as affected by different salt compositions

ABSTRACT

Salinity is one of the major problems to increasing rice production in paddy field. The role of free amino acids as compatible solutes is controversial and the different salt compositions effect on rice response to salinity stress is not completely clear. Therefore a glasshouse experiment was carried out to determine free amino acid/acids which are involve in defense mechanism under salt stress conditions and different salt compositions effects on free amino acids status at seedling stage. Two rice genotypes differing in salinity resistance were grown hydroponically. The rice seedlings were exposed to salinity stress at EC 7 dS.m-1 by NaCl and mixture of NaCl:Na2SO4 at 1:2 and 2:1 molar ratios. Free amino acids in shoot and root tissue of rice seedlings were measured using high performance liquid chromatography (HPLC). The rice seedlings significantly showed amino acids accumulation in their shoots greater than in their roots. Khazar, a salt sensitive genotype, demonstrated higher total free amino acids and aspargine than Fajr, a salt tolerant genotype. A positive correlation between aspargine accumulation and water content percentage in shoot tissue was recorded. Likewise the results revealed that there was a significant difference across salt compositions. It was suggested that SO42 decreased Cl toxicity effects on rice seedlings growth.

Keyword: Rice; Salinity; Salt composition; Free amino acids; Aspargine; Proline