

Effect of Seed Priming on Reserve Mobilization and Oxidative Damage in the Germinating Seeds of Groundnut under Salinity Stress

Apurba Pal¹, A.K. Pal² and S.K. Gunri^{*3}

Department of Plant Physiology

* Department of Agronomy

Faculty of Agriculture, Bidhan Chandra Krishi Viswavidyalaya

Mohanpur, Nadia-741252, West Bengal

E-mail: apapurbapal@gmail.com

Abstract—Groundnut is called as the ‘King’ of oilseeds. India is the second largest producer of groundnut after China. Different growth stages of this crop are often subjected to various types of abiotic stress like drought, salinity, high temperature etc. which may cause yield loss. Among many reasons ascribed for the lower productivity of groundnut, salinity is an important abiotic stress which significantly affects seedling, vegetative and reproductive growth, seed quality and yield. Other than genetic option, some management techniques have sometimes been found to be effective in mitigating salt stress. Among various strategies, pre-sowing priming of plant seeds are easy, low cost, low risk and effective approaches to enhance plant tolerance to the stressful environment. Such priming treatments include seed soaking with osmotic, inorganic salts or hormones. The present experiment was envisaged to evaluate the effect of different seed priming treatments on germination behavior of groundnut cultivar (TG-51) under salinity stress. For this purpose, seeds of groundnut cv. TG 51 were soaked for 14 hours with solutions of GA₃ 50ppm, hydrogen peroxide 60mM, Ascorbic Acid 100ppm, Salicylic Acid (SA) 25ppm; Mannitol 2.5% and NaCl 50mM and were subjected to germination under salinity stress induced by 200 mM NaCl. The results indicated beneficial effects of seed priming in respect of seed germination percentage, germination speed, reserve mobilization and uniformity of seedling growth and development and antioxidative enzyme activity for scavenging ROS over unprimed seeds under the salinity stress. Seeds primed with 60mM H₂O₂, 2.5% Mannitol and SA 25 ppm reached hundred percent germination at 24 hours of germination under salinity stress and recorded high germination speed whereas treatment with 50ppm GA₃ registered high rate of reserve depletion and translocation of reserve food material towards site of active growth. The Lipid peroxidation in unprimed seeds recorded high mean values at all stages of study indicating higher rate of membrane damage under stress condition. On the contrary, seed priming with H₂O₂ (60mM), GA₃ (50ppm) and Mannitol (2.5%) showed the minimum change of TBARS content in the embryonic axis indicating least damage under oxidative stress. The seeds soaked with different priming agents also registered the higher means for catalase activity over unprimed seed in all the cases.