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Enhancing Germination and Seedling Vigour in Maize by Priming with Smoke Water

Priyanka Bagri, Dr. Rakesh Pandey, Dr. Vijay Paul

Division of Plant Physiology Indian Agricultural Research Institute, New Delhi–110012

Abstract: *The biologically active compounds present in smoke are now emerging as potential growth regulators for improving seed germination, vigour and seedling growth. This is due to presence of Karrikins and cyanohydrins in the smoke derived from burning of vegetation. The smoke water solution was prepared by bubbling of smoke into water by burning plant dry matter and filter paper. In the present study, the three seed priming treatments were – imbibition with water, plant derived smoke water (1000x dilution) and filter paper derived smoke water (800x dilution) for 14 hours. It was observed that the germination percentage and seedling growth of both maize genotypes, PMH 3 and BIO 9681 was enhanced by smoke water as compared to seeds treated with water. The vigour index of smoke water treated seeds was higher due to better seed imbibition, lower base water potential, seed reserve mobilization and higher respiration. The starch and protein mobilization was higher in smoke water treated seeds. Seedling growth in relation to root length, shoot length and leaf area in genotype BIO 9681 was also enhanced in seeds treated with smoke water. In genotype PMH 3, overall seedling growth was found to be higher in smoke water derived from filter paper. Further, smoke water treated seeds treated have also shown to overcome the effect of water stress, aquaporin inhibitors and high temperature stress. This study therefore showed the physiological aspects of enhanced germination and seedling vigour in maize by priming with smoke water. Thus seed priming with smoke water can be adopted as a cost-effective and simple means of enhancing seedling vigour.*

Keywords : *Karrikins , Cyanohydrins, Aquaporin*