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Seed pretreatment and salt tolerance of dill: osmolyte accumulation, antioxidant enzymes activities and essence production

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Abstract

A Factorial experiment based on randomized complete block design with three replications was carried out to evaluate performance of dill (*Anethum graveolens* L.) plants under a non-saline (control) and three saline (4, 8 and 12 dS.m⁻¹ NaCl) conditions in response to seed polymer coating and priming with SA and GA₃. The dill plants accumulated high Na⁺ in roots rather than in leaves. Whereas, higher K⁺ content was recorded in leaves, compared with roots. Proline, glycine betaine and soluble sugars of dill leaves were enhanced by increasing salinity. Leaf water content did not change up to 8 dS.m⁻¹, mainly due to the maintenance of K⁺ and accumulation of osmolytes. Seed coating with hydrophilic polymer resulted in holding more Na⁺ ions around the seeds, leading to higher absorption of this ion by roots and leaves, thereby limiting K⁺ content. The reduction in K⁺ content of the plants limited the activity of antioxidant enzymes such as SOD, AXP and POX, leading to the reduction of essential oil content and yield of dill organs under severe salinity. However, application of GA₃ and SA in particular enhanced K⁺/Na⁺ ratio,

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