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Salinity tolerance of cumin (*Cuminum cyminum* L.) genotypes during germination

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Abstract

A laboratory experiment was conducted to identify cumin (*Cuminum cyminum* L.) genotypes tolerant to salt at germination stage. Four salinity levels having electrical conductivity of 2.61 (control), 5.17 (low), 8.10 (medium) and 12.15 (high) dSm^{-1} were tested. There is an increase in the suppression of seed germination with increase in salinity in all the genotypes tested. The genotype UC-208 showed maximum salt tolerance, followed by UC-209 and UC-218.

Key words: cumin, *Cuminum cyminum*, germination, salt tolerance

Soil salinity causes substantial reduction in crop yield and varietal differences to salt tolerance during germination have been observed in various crop species (Jadhav 1985; Singh & Prakash 1984; 1986). The present investigation was undertaken to study the salt tolerance of nine elite genotypes of cumin (*Cuminum cyminum* L.) under laboratory conditions during 1994-95. Soils with different ECe were collected from saline patches (developed by mixing salts in the soil) at Jobner. The ECe of the soil was determined by using a direct reading conductivity bridge (Systronix model). The ECe of the soils utilized in the experiment were 2.61 dSm^{-1} (control), 5.17 dSm^{-1} (low), 8.10 dSm^{-1} (medium) and 12.15 dSm^{-1} (high). These soils were filled in 15 cm long plastic bags and ten seeds were sown in each bag. The bags were kept in a seed germinator at 20° C. The bags were irrigated with water having ECe 2.79 dSm^{-1} and pH 7.9 as and when required. For each genotype three replications were maintained. The number of seedlings that survived were counted on fifth day after germination.

Significant differences were observed among the genotypes at all salinity levels and the interaction between genotype and salinity level was also significant (Table 1). Increase in the level of salinity resulted in decreased germination; however, the genotypes responded differentially to the salinity levels. Under normal conditions, there was 96.66% to 100.00% germination, except in two genotypes, may be due to poor seed quality. At low salinity level, minimum germination (50%) was observed in UC-216 and maximum (100 %) in local and UC-208, which were at par with UC-209, UC-218, UC-89 and RS-1. At medium salinity level, the decrease in germination was more pronounced; minimum germination was observed in UC-198 (16.66%) and maximum (70.00%) in UC-208, RS-1 and UC-209 which were on par with local, UC-218 and UC-89. At high salinity level,

Table 1. Germination (%) of cumin genotypes at different salinity levels

Genotype	Control (ECe 2.61 dSm^{-1}, pH 8.0)	Low (ECe 5.17 dSm^{-1}, pH 9.0)	Medium (ECe 8.1 dSm^{-1}, pH 9.2)	High (ECe 12.15 dSm^{-1}, pH 9.4)	Mean
UC-217	83.33	66.66	33.33	26.66	42.21
UC-198	86.66	56.66	16.66	13.33	28.88
UC-216	100.00	50.00	23.33	20.00	31.41
UC-209	100.00	90.00	70.00	63.33	74.44
Local	100.00	100.00	63.33	33.33	65.55
UC-218	100.00	93.33	63.33	60.00	72.22
UC-89	100.00	96.66	60.00	43.33	66.66
RS-1	96.66	90.00	70.00	40.00	66.66
UC-208	100.00	100.00	70.00	66.66	78.88
Mean	96.29	82.59	52.22	40.73	
SEm±	4.54	5.85	8.38	7.14	
CD at 5%	NS	17.50	25.14	21.04	

minimum germination was recorded in UC-198 (13.33%) and maximum germination in UC-208 (66.66%) followed by UC-209 (63.33%) and UC-218 (60%) which were on par. The mean germination percentage was highest in UC-208 followed by UC-209 and UC-218, thus showing maximum salt tolerance. The results of the study indicated the existence of tolerance to salinity in cumin genotypes and also suggest the possibilities of further improvement through selection and hybridization.

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