

Behavior of medicinal species of *Cichorium intybus* against salinity on different developmental stages

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Introduction Salt tolerance is important in medicinal plants because of the cash value of these crops. The idea of using medicinal plants to treat human beings and livestock is not new, and in many developing countries their use is still in vogue. Despite the fact that in developed countries modern development in allopathic medicine is at climax, there is a renewed interest in using medicinal plants to treat humans, pets and livestock. Medicinal plants are being used for therapeutic purposes in several ways. In modern medicine, many drugs are used that are mainly derived from plants, e.g. digitalis, morphine, atropine, cinchona and vinblastine (Joshi, 2000). Many people are turning to alternative medicine, due largely to the fact that there are frequent side effects to be faced by taking powerful synthetic allopathic drugs (Rojhan, 2003). Because of salinity problems, researchers are trying to get the salt resistant vegetables and medicinal plants on which human's food and healthy depend. The present study was carried out to investigate the extent of salinity on the germination and early seedling growth of *Cichorium intybus* from Compositae.

Materials and methods The seeds of *Cichorium intybus* were used in this study. Experiment was conducted to examine the effect of different NaCl concentrations on germination percentage, germination velocity, root and shoot length and seed vigor. To evaluate salt tolerance during germination, 20 seeds were placed on filter paper (top of paper procedure) and submerged in 5 ml of NaCl. Solutions of NaCl were used at concentrations of 0 (control), 100, 200, 300, and 400 mM. Experiments were performed in a completely randomized design with 4 replicates. Germination counts were made daily and were considered to have germinated when the radicle emerged. At the end of the germination period, the germination percentage, germination velocity, length of the stem and root and seed vigor were calculated.

Results and discussion Table 1 shows the results of NaCl salt effects on germination percentage, germination velocity, length of stem and root and seed vigor. As it is shown in the table, all of understudy characteristics decrease with increase of salinity levels.

Table 1 Different NaCl salt concentration on early developmental stage in *Cichorium intybus*.

Source of Variation	Germination percentage	Germination velocity	Seed vigor	Length of stem (cm)	Length of radicle (cm)
0 (mM)	97a	23.4a	85.84a	1.52a	7.3a
100	96a	22.5a	66.96b	1.22b	5.8b
200	88b	17.95b	26c	0.62c	2.3c
300	46c	3.64c	2.34d	0.32d	0.18d
400	10d	0.09d	0d	0e	0d

Means within a column that have a different small letter are significantly different from each other.

In this study, extension of NaCl resulted in unsuitable condition for seed germination of medicinal plant. Decrease of germination associated with salt concentration increase could be related to accumulation of different ions around seeds which subsequently leads to less water absorption by seeds. Water, as well as temperature is of high importance in seed germination. Grieve and Suarez (1997) suggest that high levels of soil salinity can significantly inhibit seed germination and seedling growth, due to the combined effects of high osmotic potential and specific ion toxicity.

References

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