Behavior of Medicinal Species of *Cichorium intybus* against Salinity on Different Developmental Stages

M. Ghavam Arabani
University of Tehran, Iran

H. Azarnivand
University of Tehran, Iran

A. Tavili
University of Tehran, Iran

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

M . Ghavam Arabani[1] , *H . Azarnivand*[2] , *A . Tavili*[2]
[1] *MSc Student of Range Management , Natural Resources Faculty , University of Tehran , P .O .Box :* 31585 -4314 , *Karaj , Iran . E-Mail :mansurehg@ yahoo .com .* [2] *Assistant Profs . , Natural Resources Faculty , University of Tehran , P .O .Box :* 31585 -4314 , *Karaj , Iran*

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 ofVariation	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 .

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