



ORIGINAL RESEARCH PAPER

Biology

EFFECT OF SALINITY STRESS ON GERMINATION OF VIGNA RADIATA L., VIGNA MUNGO L., TRIGONELLA FOENUM-GRACUM L.

KEY WORDS: : Vigna radiata L., Vigna mungo L., Trigonella foenum-graecum L., Salinity.

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ABSTRACT

Soil Salinity is one of the major problems for the plant. It is abiotic stress which affect the growth of plant therefore it is necessary to check the effect of salinity on plant, germination experiment was performed on three seeds, which belongs to plant fabceae family i.e. Vigna radiata L., Vigna mungo L., Trigonella foenum-graecum L. These three seeds are grown at different concentration of sodium chloride i.e. 0.1, 0.5, 1% and control were also taken in Petri-dish and different growth parameter were checked. According to the study, 1% sodium chloride shows less germination in case Vigna radiata L. and Vigna mungo L. were as the fenugreek shows no germination at 1% concentration of sodium chloride.

INTRODUCTION

Salt stress is one of the harmful abiotic stress factors. Salinity in soil occurs due to the lack of drainage, improper irrigation and excessive accumulation of soluble salts. The salinity shows the negative effect on the plant growth such as the decrease growth rate of root and shoot, germination, stop development of seedling, deterioration of photosynthetic activity. On the other hand, plants show positive effect also by developing tolerance mechanisms for these kinds of adverse conditions (Munns R, 2002). Plants have tendency to protect themselves from salinity with osmotic protectants synthesized by them such as sugars, proline, amino acids, glycine betaine (Mustafa Yildiz., 2020). Vigna radiata, Vigna mungo and Trigonella foenum-graecum is an important plants which are belongs to the family Leguminosae. These plants contain high amount of proteins, vitamins and some minerals too (Subroto pobber et al., 2020.) The plant Trigonella foenum-graecum L. leaves were used as vegetables and the seeds and leaves were also use for different diseases like anti-diabetic, antimicrobial and also use for anti-cancer (Basch et al., 2003) Fenugreek is very useful legume crop which can be use for short- term rotation plant to induce the fertility of soil (Moyer et al., 2003). Vigna radiata L. (Moong), Vigna mungo L. (Black gram) is widely cultivated for their high protein content. So the main objective of the present work was to study the impact of salt stress on germination of Vigna radiata L. (Moong), Vigna mungo L. (Black gram) and Trigonella foenum-graecum (Fenugreek).

MATERIALS AND METHODS

MATERIAL: Vigna radiata L., Vigna mungo L., Trigonella foenum-graecum L. (seed), different concentration of sodium chloride i.e., 0.1%, 0.5%, 1%, Petri dish, Blotting paper, Distilled water, 70% ethanol (for sterilization).

METHOD: PREPARATION OF SEED: The seed were surface sterilized by using 70% ethanol for 5 minutes and then wash with distilled water 2-3 times, after that seed is soaked in distilled water for 10 hours.

PREPARATION OF SALT SOLUTION: Prepare three different concentration of salt solution i.e., 0.1%, 0.5%, 1%, for preparing 0.1% of solution use 0.1g of salt (NaCl) in 100 ml of distilled water; similarly prepare other concentration of solution.

PREPARATION OF PETRI DISH: To prepare different Petri dish for their respective concentration by soaking the filter paper in their above concentration and lived in Petri dish then in each Petri dish 20 seeds were kept and kept in dark condition along with this, control Petri dish is also prepared by using distilled water, here triplicate Petri dish is kept for all concentration and keep adding the small amount of salt solution in respective Petri dish. Continue this process for 4 days after that observation were made.

Germination Percentage: - The total germination percentage was calculated at 4 day of experiment by

following formula. (Subroto pobber et al., 2020.)

$$\text{Germination Percentage (\%)} = \frac{\text{No. of seed germinated}}{\text{Total No. of seed in petri dish}} \times 100$$

Root and shoot length: - After 4 days the length of shoot and root were measured in cm.

RESULT AND DISCUSSION

In the present study an attempt was made to check the effect of different salinity level on three different seed i.e. Vigna radiata L., Vigna mungo L., Trigonella foenum-graecum L. So as mentioned in table no. 1. Vigna radiata L., Vigna mungo L. shows less germination at 1% concentration compare to control Petri-dish. According to Subroto Podder et al., 2020, the germination was affected by salinity as the concentration increases the rate of germination reduces. Whereas, in case of Trigonella foenum-graecum L. is highly affected by salinity, the higher concentration is not showing the shoot formation only the control Petri-dish showed shoot formation and according to Ali Ghorbanpour et al. 2011, as the salt concentration increases it decrease the osmotic potential of roots.

Table no. 1.

Concentration	Vigna radiata L.			Vigna mungo L.			Trigonella foenum-graecum L.			Germination%
	Root (cm)	Shoot (cm)	Germination%	Root (cm)	Shoot (cm)	Germination%	Root (cm)	Shoot (cm)	Germination%	
CONTROL	13.45±0.01	3.74±0.05	100%	12.76±0.10	3.75±0.11	100%	0.23±0.12	2.43±0.10	96%	
0.1%	8.57±0.02	2.32±0.02	100%	8.25±0.02	1.43±0.02	100%	2.15±0.02	0	10%	
0.5%	6.68±0.11	1.25±0.01	100%	4.97±0.02	1.25±0.02	98%	1.22±0.14	0	10%	
1%	0.97±0.02	0.22±0.01	97%	1.25±0.02	0.21±0.01	97%	0	0	0	

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