HBRP PUBLICATION

Research and Reviews: Journal of Environmental Sciences
Volume 4 Issue 2

Effect of Different Solutions on Seed Germination and Physiological Changes in Seeds of *Lepidium sativum* and *Miscanthus sinensis*

Priyanka Zala*
Department of Botany, Bioinformatics and Climate Change Impacts Management, University School of Sciences,Gujarat University, Ahmedabad, India.

***Corresponding Author**
E-mail Id:-*zaladharmistaba259@gmail.com*

ABSTRACT

"The garden cress seeds which scientifically known as Lepidium sativum which is a fast growing annual herb and Miscanthus sinensis comprises perennial grasses used as ornamental plants these both are important grass species from phylum Poaceae. And highly pharmaceutical important, used in human diet plans. The purpose of this study was to investigate the effects of different treatments on seed germination in the plant species Lepidium sativum and Miscanthus sinensis. This species is known to have long time for seed germination considering arid region condition and short time of access moist. An experiment was performed with 13 treatments and 4 replications in a completely randomized design. Treatments included with concentrations of 5%, 10%, and 15 % immersion in water for five min, Tap water was used as the control. These were the most effective treatments for improvement of seed germination properties in this species in a comparison of the two seeds of Lepidium sativum and Miscanthus sinensis." Always remember seed of grasses which is very delicate, acid and salts effects very fast, that"s why we gets results good in water for seed germination.

Keywords:- *Seed germination, Physiological changes, different solutions, Lepidium sativum, Miscanthussinensis.*

INTRODUCTION

Lepidium sativum L. comes under the family Brasiccaceae family fast growing annual herb, medicinal plant, Garden cress seeds commonly referred to the "alsi" in gujrati , "Aliv" in Marathi, "Halim" in Hindi [1] is equivalently distributed in India, United States and Europe and widely cultivated in hot temperature climates throughout the world as shown in Table 1. Garden cress seeds are small, pointed, oval- shaped, triangular at one end, smooth, about 3-4mm long, and 1-2 mm broad, reddish brown in color Garden cress seeds are harvested and sown several times throughout the year but mainly sown and harvested in the months of January, February and November during winter season [2].

Table 1:-*The Taxonomic classification*

Kingdom	**Planate**
Division	Magnoliophyta
Order	Magnoliophyta
Family	Poaceae
Genus	*Lepidium*
Species	*sativum*

 All Rights Reserved

Miscanthus sinensis comprises perennial grasses used as ornamental plants but also energy crops and also called "Silver Chinese grass" Flowering plant in grass family Poaceae as shown in Table 2. It is a Natives of China Japan, Taiwan and Korea. It is used in bioenergy production due to its high yield, stress environment, easy propagate. Leaves are 18-75 cm tall and broad. Flowers are purplish white in color [3].

Table 2:- *The Taxonomic classification*

Kingdom	**Planate**
Division	Magnoliophyta
Order	Magnoliophyta
Family	Poaceae
Genus	*Miscanthus*
Species	*sinensis*

MATERIALS AND METHODS

Seeds of *Lepidium sativum* and *Miscanthus sinensis*, petri disc, different solution.

Mineral Content, pH and Salt Concentration: Our analyses also determined the content of N, P, K, Ca and Mg. pH and salinity were measured in the substrates before planting and at the end of the growing season. The dose in the series of 5%, 10% and 15% the solutions were used are water, vinegar, sodium bicarbonate, and salt for different pH. In second series salt concentration in manner of 5%, 10% and 15%, for both plants. After 4 week, checks the final results [4, 5].

Statistical Analysis: The study investigated two seeds of *Lepidium sativum* and *Miscanthus sinensis*, objects representing different doses of Mineral Content, pH and Salt Concentration. Mean germination time (MGT) was calculated to assess the rate of germination

$$MGT = \frac{\sum D.N}{n}$$

Where, *N* is the number of seeds which in *D* day grow, the total number of seeds grown. The results of this research showed that germination percentage of in different concentrations by using this equation.

RESULTS

After 4weeks of treatments in the *Lepidium* petri disc shows a positive results in water, less in salt and base, none in acidic. As like in *Miscanthus* in the water positive results and in acid and in base less effective. In acidic seed covers are raptured and start decaying, positive results, In basic seeds are as it is and only few is germinated. 2 weeks for seed germination and other weeks for plant growth and physiology.

During soaking in water seed coat swells up and coats gets covered with transparent colorless, mucilage wit mucilaginous taste. Its oil, seeds and there powder contain proper amount of fat , minerals, protein, photochemical and fibers which are used in many functional beverages and foods the garden cress seeds is having many pharmacological properties like antioxidant [5].

 All Rights Reserved

Table 3:-*Analysis of treatments on germination properties of Lepidium sativum*

Germination properties	Source of variation	Degree of freedom	*Lepidium sativum*			
			Acid	**base**	**salt**	**water**
Germination percentage	Between groups	12	80%	50%	79%	80%
Mean germination time	Between groups	12	97.5%	59%	89%	76%
Germination rate	Between groups	12	75.69%	60%	40%	80%

Above results we finds out the germinations *Lepidium sativum* of the seed in a 5% more 10% less and in 15% none for acid, base and salt solutions for water solution 80% germination found and rate of germination is 80% of all seed an average. In water seed germination increases, and 5%of acid can also beneficial as shown in Table 3 above.

Table 4:-*Analysis of treatments on germination properties of Miscanthus sinensis*

Germination properties	Source of variation	Degree of freedom	*Miscanthus sinensis*			
			Acid	**base**	**salt**	**water**
Germination percentage	Between groups	12	76%	50%	33%	80%
Mean germination time	Between groups	12	40%	40%	12%	97.55%
Germination rate	Between groups	12	56%	55%	10%	79.69%

Above results we finds out the germinations *Miscanthus sinensis* of the seed in a 5% more 10% less and in 15%none for acid, base and salt solutions for water solution 80% germination found and rate of germination is 79.69% of all seed an average. So, acid water and 5%of salt are increases the seed germination as shown in Table 4 above.

PLANT GROWTH AND FLOWERING

The experiment Matuszak and Brzostowicz [7] claimed that plant response to excess substrate salinity depends on the species, developmental stage, and type of salt and environmental conditions.

Both pH and salinity decreased considerably during the growing season in the first and second week of the study. Plants were more sensitive to high salinity at a seedling stage immediately after planting even though no leaf damage was found. [8-10]

Miscanthus sinensis the most beneficial dose was 5%. Plants growing in such a substrate developed longer inflorescence shoots, greater number of lateral branching and the greatest number of inflorescence shoots as compared with control increasing the dose up to 15%.

For plant growth 5% and 10% of acidic solutions shows a beneficial results as compared two basic and salt. And salts concentration benefited at a seed germination stage after seed germination put them into a soil and 3 weeks of results shows a good growth of both plants.no flowering foundto entire 3week period

CONCLUSION

Processing is rich in such macronutrients

as N, P, K, Ca and Mg, and is characterized by an alkaline pH and high salinity. The substrate salinity considerably limited plant height and the number of shoots, and we found *Miscanthussinensis* to be more sensitive to such conditions. In the second week, when the salinity level dropped, stimulated plant growth and shoot development. *Lepidium sativum* high salinity helps in seed germination and acid soil helps to grow plant height.

FUTURE DIRECTION

- *Lepidium sativum* and *Miscanthus sinensis* both are health beneficial grains.
- Conservation of the grass species by different methods.
- Transplanting them and seed banks use to save them
- Need more scientific studies to identification and pharmacology.
- Need further studies in photochemistry

REFERENCES

1. Singh, C. S., & Paswan, V. K. (2017). The potential of garden cress (Lepidium sativum L.) seeds for development of functional foods. *Advances in Seed Biology*.
2. Falana, H., Nofal, W., & Nakhleh, H. (2014). A review article Lepidium sativum (Garden cress). *Pharm-D Program, College of Nursing, Pharmacy and Health Professions; Birzeit University: Birzeit, Palestine*, 1-8.
3. Naznin, R. (2005). Extraction of chitin and chitosan from shrimp (Metapenaeus monoceros) shell by chemical method.
4. Munns, R. (2002). Comparative physiology of salt and water stress. *Plant, cell & environment*, *25*(2), 239-250.
5. Shail, M. D., Neeraj, K., & Gupta, L. N. (2016). Nutritional importance of Lepidium sativum L.(Garden cress/Chandrashoor): A review. *Int J Pharm Anal Res*, *5*(1), 152-60.
6. Żurawik, P. (2020). Growth, Development and Ornamental Value of Miscanthus sinensis (Andersson) Species Depending on the Dose of Shrimp Biowaste. *Agriculture*, *10*(3), 67.
7. Matuszak, R., & Brzóstowicz, A. (2006). Evaluation of nacl influence on growth of two barley cultivars. *Acta Agrophysica*, *7*(4), 977-982.
8. Chen, C. L., Van der Schoot, H., Dehghan, S., Alvim Kamei, C. L., Schwarz, K. U., Meyer, H., ... & Van der Linden, C. G. (2017). Genetic diversity of salt tolerance in Miscanthus. *Frontiers in plant science*, *8*, 187.
9. Verma, D., Mahima, R. (2020). A Review: Garden Cress (Lepidium Sativum) Seeds – An Important Seeds of Medicinal Purpose. *IJCR,8* (3): 2320-2882.
10. Falana, H., Nofal, W., & Nakhleh, H. (2014). A review article Lepidium sativum (Garden cress). *Pharm-D Program, College of Nursing, Pharmacy and Health Professions; Birzeit University: Birzeit, Palestine*, 1-8.