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Identification of Dormancy in the Seeds of Sponge Gourd

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ABSTRACT

The present study was carried out with the objective, to identify the dormancy in the seeds of sponge gourd. Seeds were soaked in distilled water for three selected durations of 24, 48 and 72 hrs. After presoaking the observations were reported as number, weight and percentage of imbibed and intact (non-imbibed) seeds. It was observed that even after 72 hrs of imbibitions, only 66.5% seeds were uptake water properly and remains 33.5% seeds were intact. In 24 hrs of imbibitions process only 51% seeds showed good water uptake and in 48 hrs of imbibitions only 59% seeds showed good imbibitions. More than 40% seeds were become intact even after 48 hrs of imbibitions. From the observation of present study it may be concluded that the seeds of sponge gourd shows physical dormancy due to hard seed coat.

Key words: *Dormancy, Imbibitions and Sponge gourd.*

INTRODUCTION

Luffa sponge gourd (*Luffa aegyptiaca* Mill.; also *L. cylindrica*) belongs to the Cucurbitaceae along with squash and pumpkin (*Cucurbita* spp.), gourd (*Cucurbita* spp., *Lagenaria* spp.), melon (*Cucumismelo* L.), and cucumber (*Cucumis sativus* L.). It is an annual climbing vine with tendrils, growing primarily in tropical and subtropical regions. The seeds are flat, smooth, and black or white[15]. Germination percentages of several vegetable species have been shown to increase after seed treatment with chemicals and various osmotica[5,8]. Luffa seed germination has been reported to be slow and sporadic[6]. Low percentage of seed germination is a major problem in establishing a luffa crop, with typical rates of less than 75% [17]. Dormancy can be severe problem in some cucurbit species. It is comparatively easy to induce dormancy by testing the seeds for germination in unfavorable environments. In contrast to other members of the Cucurbitaceae, the germination of sponge gourd seeds is promoted by light[7]. Poor field emergence and erratic stands lead to increased variation in plant development which can result in yield reduction. Both survival and performance of seeds after sowing are affected by physical, chemical, and biotic factors. Temperature, light, drought, flooding, and gaseous (O_2 and CO_2 concentration) environments are physical factors that influence seedling emergence[10,12,16].

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If the seeds are to fulfill their role in propagating the species, their germination must occur at a time which favors seedlings survival. This time very often does not coincide with the time of seed shedding. To identify the problem of dormancy in a seed, imbibitions process may play a major role, although published information on the identification of dormancy through imbibitions is not available for sponge gourd. It would also be useful to increase the germination rate of luffa seeds, especially for those interested in commercial production of the crop. Therefore, the objective of this study was to identify the cause of dormancy in sponge gourd seeds by using imbibitions process.

MATERIAL AND METHODS

The present study was carried out in the agriculture laboratory of Quantum Global Campus, Roorkee, Uttarakhand in the year 2017, with the objective, to identify the dormancy in the seeds of sponge gourd. To conduct the experiment four replications of 50 seeds each were taken and weight separately. Seeds were than soaked in distilled water for three selected durations of 24, 48 and 72 hrs. After presoaking the observations were reported as number, weight and percentage of imbibed and intact (non-imbibed) seeds.

RESULTS AND DISCUSSION

Germination and seedling establishment are critical stages in the plant life cycle. In crop production, stand establishment determines plant density, uniformity and management options[3]. In arid and semi-arid environments, the water needed for germination is available for only a short period, and consequently, successful crop establishment depends not only on the rapid and uniform germination of the seed, but also on the ability of the seed to germinate under low water availability[9]. However, if the stress effect can be alleviated at the germination stage, chances for attaining a good crop with economic yield production would be high[1,2]. In the present study result showed in table -1 and fig. -1, it was observed that even after 72 hrs of imbibitions, only 66.5% seeds were uptake water properly and remains 33.5% seeds were intact. In 24 hrs of imbibitions process only 51% seeds showed good water uptake and in 48 hrs of imbibitions only 59% seeds showed good imbibitions. More than 40% seeds were become intact even after 48 hrs of imbibitions.

Table 1: Number, weight and percentage of imbibed and intact (non-imbibed) seeds

Average initial weight of four replication		Imbibitions Hrs.											
		24 Hrs.				48 Hrs.				72 Hrs.			
		Imbibed		Intact		Imbibed		Intact		Imbibed		Intact	
No.	Wt. (gm.)	No.	Wt. (gm.)	No.	Wt. (gm.)	No.	Wt. (gm.)	No.	Wt. (gm.)	No.	Wt. (gm.)	No.	Wt. (gm.)
50	4.09	25.5	3.65	24.50	2.11	29.50	4.54	20.50	1.60	33.25	5.30	16.75	1.62
Percentage (%) of Imbibed and Intact Seeds		51		49		59		41		66.5		33.5	

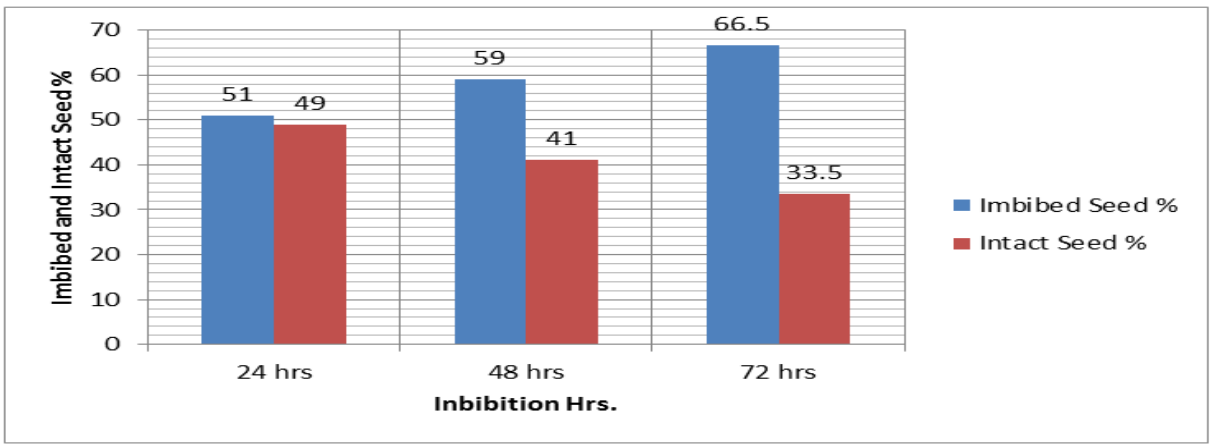

Fig. 1: Percentage of imbibed and intact (non-imbibed) seeds

Similarly some researchers have indicated that the main reason for germination failure was the inhibition of seed water uptake due to a high salt concentration[4,14], whereas others have suggested that germination was affected by salt toxicity[11,13]. The result of present study indicates that more that 40% seeds of sponge gourd were not able to uptake water and due non uptake of water, embryo remains dry, which directly affect the metabolic activities of the seeds. From the observation of present study it may be concluded that the seeds of sponge gourd shows physical dormancy due to hard seed coat.

REFERENCES

1. Ashraf, M., Rauf, H., Inducing salt tolerance in maize (*Zea mays* L.) through seed priming with chloride salts, growth and ion transport at early growth stages. *Acta Physiol. Plant*. **23:** 407-414 (2001)
2. Badoni Anoop, Mayank Nautiyal, Kiran Gusain, Manpreet Kaur, Rakhi Dhiman, Chetna Bisht and J. S. Chauhan. Effect of Water uptake on Germinability in Seeds of Some Medicinal Plants, Uttarakhand, India, *The Journal of American Science* **5(4):** 123-128 (2009).
3. Cheng, Z. and Bradford, K.J., Hydrothermal time analysis of tomato seed germination responses to priming treatments. *Journal of Experimental Botany* **33:** 89-99 (1999).
4. Coons, J. M., Kuehl, R.O. and Simons, N.R., Tolerance of ten lettuce cultivars to high temperature combined with NaCl during germination. *J. Amer. Soc. Hort. Sci.* **115:** 1004-1007 (1990).
5. Darby, R.J. and Salter, P.J., A technique for osmotically pretreating and germinating quantities of small seed. *Ann. Appl. Biol*. **83:** 313-315 (1976).
6. Davis, J. M., Commercial luffa sponge gourd production. N.C. State Univ. Agr. Ext. Hort. Info. Lflt. No. 120. North Carolina Agricultural Extension Service, Raleigh, 3 pp (1997).
7. Ellis, R.H. and E.H. Roberts. Handbook of seed technology for genebanks **2:** (1985).
8. Fieldhouse, D.J. and M. Sasser. Stimulation of pepper seed germination by sodium hypochlorite treatment. *Hort. Science* **10:** 622 (1975).
9. Fischer, R. A., N. C. Turner Plant productivity in the arid and semiarid zones. *Ann. Rev. Plant Physiol*. **29:** 277-317 (1978).
10. Hegarty, J. W., Factors influencing the emergence of calabrese and carrot seedlings in the field. *J. Hortic. Sci.* **54:** 194-20 (1979).
11. Khajeh-Hosseini, M., Powell, A.A. and Bingham, I.J., The interaction between salinity stress and seed vigour during germination of soybean seeds. *Seed Sci. & Technol*. **31:** 715-725 (2003).
12. Khan, A.A., Karssen, C.M., Leve, E.F. and Roe, C.H., Preconditioning of seeds to improve performance. In: T.K. Scott (Ed.), Plant Regulation and World Agriculture. Plenum Press, New York, pp. 395-414 (1979).
13. Leopold, A.C. and Willing, R.P., Evidence of toxicity effects of salt on membranes. In: Salinity Tolerance in Plants, (eds. R.C. Staples and G.H. Toenniessen), pp. 67-76. John Wiley and Sons, New York (1984).
14. Mansour, M.M.F. Changes in growth, osmotic potential and cell permeability of wheat cultivars under salt stress. *Biologia Plantarum*, **36:** 429-434 (1994).
15. Okusanya, O.T. The effects of light and temperature on germination and growth of Luffa aegyptiaca. *Physiol. Plant*. **44:** 429-433 (1978).
16. Inder Jeet Malik, Tammy L. Ellington, Todd C. Wehner and Douglas C. Sanders. Seed Treatment Effects on Emergence of Luffa Sponge Gourd. *Cucurbit Genetics Cooperative Report* **24:** 107-109 (2001)
17. Wehner, T.C. and Ellington, T. L., Seed treatment effects on emergence of luffa sponge gourd. *Cucurbit Genetics Cooperative Rpt.* **20:** 63-64 (1997).