Available on line www.jocpr.com

Journal of Chemical and Pharmaceutical Research

ISSN No: 0975-7384
CODEN(USA): JCPRC5

J. Chem. Pharm. Res., 2011, 3(1):732-736

Evaluation of germination power of *Aegle marmelos* seeds

Ganesh N. Sharma*[1], Susheel K. Dubey[1]and Nitin Sati[2]

[1]*School of Pharmaceutical Sciences, Jaipur National University, Jaipur, Raj., India*
[2]*Dept. of Pharmaceutical Sciences, HNB Garhwal Central University, Srinagar, Uttarakhand*

ABSTRACT

The aim of present study was to evaluate the best possible temperature and humidity affect on germination power of Aegle marmelos seeds Invitro. The study was conducted by placing seeds in desicator, to maintain moisture contents (18.9, 13.8, 6.3 and 4.47 %) and at temperature range of 30^o, 20^o, 10^o, 0^o -20^o and -196 ^{o}C, for 15 days. On sixteenth day germination power of seeds was evaluated by keeping in seed germinator at 30^o C / 80 % RH in dark. It was observed that high moisture content (18.9 %) and high temperature (30^o) showed maximum germination (about 97%) within shortest time period (about 9 days).

Key words: Aegle marmelos seed, Germination, Moisture content.

INTRODUCTION

Bael (Aegle Marmelos (Linn), family Rutacae, is also known as Bale fruit tree, is a moderate sized , slender, aromatic tree, 6.0 -7.5 m in height, and 90 to 120 cm in girth, with a some what fluted bole of 3.0-4.5 meter growing wild throughout the deciduous forests of India, ascending to an altitude of 1200 meter in the western Himalayas and also occurring in Andaman island.[1] Leaves, fruits, stem and root of this tree at all stage of maturity are used as ethno medicines against various human ailments.[2] Embedded in the pulp are 10 to 15 seeds, flattened oblong, about 1 cm long, bearing woolly hairs and each enclosed in a sac of adhesive, transparent mucilage that solidifies on drying. [3] Seed germination of each seed is considered as one of the first and most fundamental life stages of a plant, so that the success in growth and yield production is also dependent on this stage. A seed certainly looks dead. It does not seem to move, to grow, nor do anything. even with various biochemical tests for the metabolic processes

it is diffuclut to determine that they are alive or dead. The germination properties of durum wheat genotypes under osmotic stress conditions of laboratory have been already evaluated. [4] The thermogenetic curves of seed germination of *Robinia pseudoacacia* have been measured by conductive microcalorimeter and the relationship between germination thermogenetic regulation and seed germination physiology have been established.[5] The current status and future aspects of various seed treatment materials and their application methods have been described.[6] The research have evident that there is high influence of chemical treatment, length of storage and type of substratum on seed germination energy.[7] The prediction of germination percentage (GP) and germination speed (GS) of the seeds for some cucurbits (watermelon, melon, cucumber, summer squash, pumpkin and winter squash) was investigated by mathematical model based on temperature, and it was found that that minimum (Tm), optimum (To) and maximum (TM) germination temperatures varied among species and cultivars.[8] The effects of desiccation and temperature on the storage of Aegle marmelos seeds also have been reported.[9]

***Aegle marmelos* seeds**

EXPERIMENTAL SECTION

Plant material:

The fresh, unriped seeds of *Aegle marmelos* were collected from healthy well growing tree of very hygiene and polluted free area in the month of may- June, from various regions of the Jaipur, Rajasthan. The seeds and plant were identified and authenticated from the department of botany, University of Rajasthan, Jaipur, Rajasthan, and herbarium was deposited, viz no. RUBL:20866.

Collection of Seeds:

To evaluate germination power, about 100 gm of Aegle marmelos seeds were collected from fresh fruits of trees. For this, Seeds were extracted by breaking the shell and macerated with water for 48 hours, to remove the pulp and extracted seeds were dried on keeping room temperature at 22 ±3 ^{o}C for one day.

Evaluation of Germination Power:

The dried seeds of Aegle marmelos (1200 in Numbers) were selected for this studied and weighed (89.6 gm). They were randomly divided into 6 groups, each containing 50 seeds for study at different moisture content levels i.e. 18.9, 13.8, 6.3 and 4.47 %. Each groups were then

divided into 6 subgroups and effect of temperature on germination was recorded at different temperature range Viz. 30^o, 20^o, 10^o, 0^o -20^o and at -196 ^oC.

Just before the study, seeds were moist with distilled water and again weighed (Weight A). The excess of moisture content was soaked with the help of filter paper. After that seeds were dried in desicator by using $CaCl_2$ for 4 hours and again weighed (Weight B). The moisture content was calculated by using formula:

$$\text{Percentage moisture content} = \frac{[A-B]}{[B]} \times 100$$

Where;
A = Weight of prewashed fresh seeds
B =. Weight of seeds after placing in desicator

24 Polycarbonate bottles (capacity of 50 seeds each) were thoroughly washed with good surfactant and 50 seeds were placed in each clean bottle at hermetically sealed condition. They were placed in desicator and moisture content was maintained i.e. 18.9, 13.8, 6.3 and 4.47 %, at different storage temperature range i.e. 30^o, 20^o, 10^o, 0^o -20^o and -196 ^oC for 15 days. On sixteenth day germination power of seeds was evaluated by keeping in seed germinator at 30^o C / 80 % RH in dark. When sprouts / seedling all seen 0.5 cm minimum in length, seeds were considered as viable.

RESULT AND DISCUSSION

At 30 ^0C storage condition, Aegle marmelos seeds showed 97, 92, 74 and 42 % germination at moisture level of 18.9, 13.8, 6.3 and 4.47 % respectively. Similarly, at the same variations in moisture level i.e.(18.9,13.6, 6.3 and 4.47 %) at 20 ^0C; 92, 89, 67 and 0 % germination was observed, where as at 10 ^0C and the moisture level which was maintained same as in other temperature conditions germination was 85, 76, 61 and 0 % , while at temperature 0^0C, only 18.9 and 13.8 % moisture level was able to germinate the seeds of same quality as was germinated upto 97 ± 4.06 % under 30 ^0C and 18.9 % RH. It was also observed that below freezing point viz. -20 ^0C and -196 ^0C; none of the provided and maintained moisture, was found capable to germinate any of the single seed.

Another observation was made that high moisture and more temperature i.e. 18.9 % and 30 ^0C initiated germination quickly at about 9.76 days and decline in germination period (in days) was observed when reduced temperatures was applied at the same moisture level, also. Sudden more demand for days, was also observed when the moisture level becomes one third i.e. 6.3 % and took almost 60 % more time, also at the same moisture level almost 50 % more time was taken in germination.

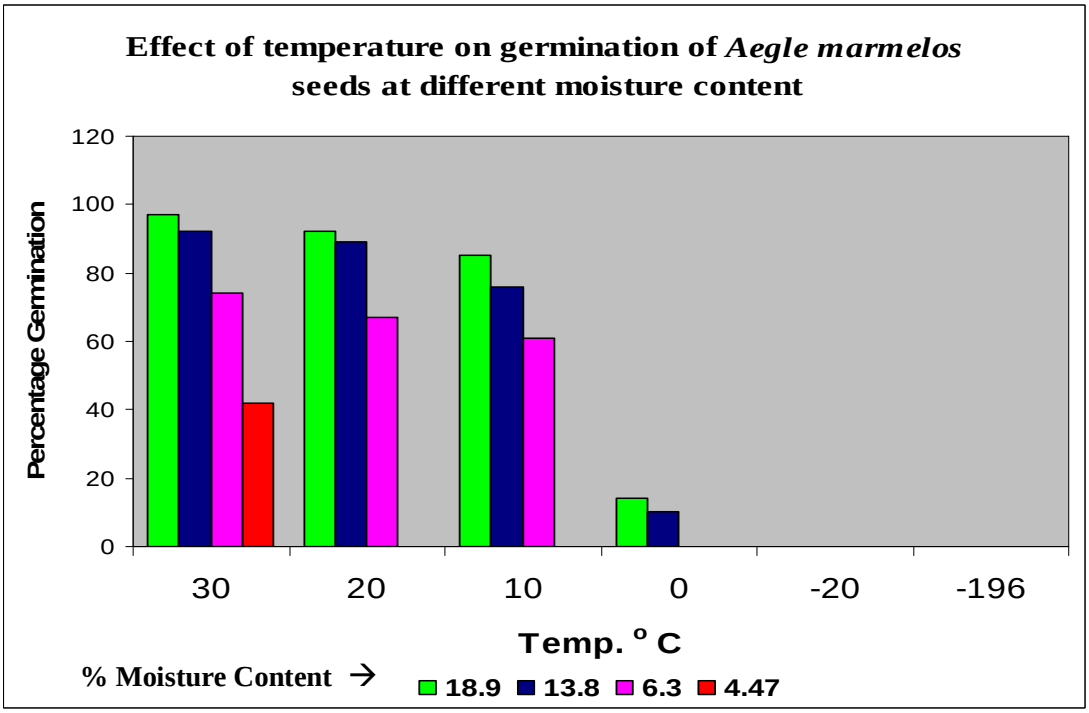

Figure.1

Table no.1 : Effect of different storage temperature on one fort night old hermetically sealed pre moisturized and desiccated *Aegle marmelos* Seeds

Prestorage Moisture Content	Storage Temperature ^{0}C	Germination %	Germination Period (Days)
18.9 %	30^0	97 ± 4.06	9.76 ± 0.19
	20^0	92 ± 5.09	10.01 ± 0.17
	10^0	85 ± 6.13	11.73 ± 0.27
	0^0	14 ± 1.17	12.19 ± 0.23
	-20^0	0	----------
	-196^0	0	----------
13.8 %	30^0	92 ± 7.77	11.2 ± 0.61
	20^0	89 ± 8.10	11.2 ± 0.64
	10^0	76 ± 3.16	12.6 ± 0.61
	0^0	10 ± 6.79	13.1 ± 0.72
	-20^0	0	----------
	-196^0	0	----------
6.3%	30^0	74 ± 9.08	14.7 ± 0.81
	20^0	67 ± 4.74	15.0 ± 0.83
	10^0	61 ± 3.64	15.9 ± 0.79
	0^0	0	---------
	-20^0	0	---------
	-196^0	0	--------
4.47%	30^0	42 ± 8.81	17.7 ± 0.79
	20^0	0	---------
	10^0	0	--------
	0^0	0	-------
	-20^0	0	-------
	-196^0	0	-------

CONCLUSION

On behalf of this study we can conclude that 0 ^{0}C, -20^{0}C and -196 ^{0}C with any of the applied moisture level does not produce any favourable results. It may be also concluded that temperature above 0^0 C provide germination, but percentage germination positively depends on difference in humidity. Therefore, it is strongly recommended to store the fresh and untreated seeds of Aegle marmelos at 30 ^{0}C with 18.9 % RH to make them more viable.

REFERENCES

[1] C.S.I.R.(**1985**), " The wealth of India" National Institute of Science communication and Information Resources", Volume- I (A), 86
[2] Maity P., Hansda D., Bandyopadhyay U. & Mishra D.K., (**2009**) *Indian Journal of Experimental Biology*, Vol 47, p.p. 849-861
[3] P. P. Joy J. Thomas Samuel Mathew Baby P. Skaria, *Aromatic and Medicinal Plants Research*, **1998**, 48-50
[4] Moslem Alaei, Mohammad Zaefizadeh, Majid Khayatnezhad, Zahra Alaei and Yousef Alaei (**2010**), *Middle-East Journal of Scientific Research* 6 (6): 642-646,
[5] Hu Yun-chu, Zhou Pei-jiang, Wang Cun-xin and Qu Song-sheng (**2010**), *Journal of Forestry Research* , Volume 12, Number 3, 176-178,
[6] Denis C. McGee (**1995**) "Advances in seed treatment technology" *Asian Seed* '95, 27-29.
[7] Jelena Mrda, Jovan Crnobarac, Vladimir Miklic,(**2010**), *Research Journal of Agricultural Science*, 42 (1), 201-207.
[8] Ertan Sait Kurtar (**2010**), *African Journal of Biotechnology* Vol. 9 (9), 1343-1353.
[9] C.A.Kumar, C.R. Chitra, P.N. Krishnan, N. Salim and G.M. Nair (**2007**), *Journal of tropical forest science*, 19(4), 236-239.