



Study on Seed dormancy and Seed Germination Procedures in Some Medicinal Plant Species.

Ashish Lambat¹, Rajesh Deotale², Rajesh Gadewar³, Sanjiv Charjan⁴, Prachi Lambat

¹ and ³ Sevadal Mahila Mahavidyalay and Research Academy, Nagpur.

² and ⁴ PDKV's College of Agriculture, Nagpur.

⁵ Shri Mathuradas Mohota College of Science, Nagpur

ABSTRACT :

The study was conducted to find out the requirements for seed germination in medicinal plant species viz. Ashwagandha (*Withania somanifera*), Sabja (*Ocimum pallens*), Dawana (*Artenisia Pallens*), Sonamukhi (*Cassia angustifolia*) and Wild brinjal (*Solanum viarum*). The seeds of the above species may be germinated on top of paper (TP) except Ashwagandha, which germinated better in between paper (BP) method. Maximum germination (92%) could be obtained at 20°C in Ashwagandha seeds while seeds of Dawana showed maximum germination at 30°C. The seeds of Sonamukhi, Sabja and Wild brinjal showed poor germination due to dormancy. The soaking of seeds in water for 24 h and germinating at 20°C gave maximum germination in Sonamukhi. The treatment of Seeds with 25% Nitric acid for 10 min. and germination at 30°C was found ideal for Sabja. For wild brinjal treatment of 12.5% Nitric acid for 15 min. followed by 1000 ppm GA3 for 24 h with alternate temperature of 20-30 is recommended.

Keywords: Medicinal plant, seeds germination, *Withania somanifera*, *Ocimum pallens*, *Artenisia pallens*, *Solanum viarum*

INTRODUCTION :

The procedures for germination and dormancy breaking treatments for seeds of Ashwagandha (*Withania somanifera*), Sabja (*Ocimum pallens*), Sonamukhi (*Cassia angustifolia*) and Wild brinjal (*solanum viarum*) is not available in ISTA rules (1). The Central Seed Committee has not yet fixed a minimum standards for these medicinal species. The information on above aspects is a prerequisite to understand the germination ecology. The low germination percentage and longer duration for germination could create problem to breeder, seed analyst and nursery men. Therefore, the present investigation was planned.

MATERIALS AND METHODS

Fresh seeds of Ashwagandha, Dawana, Sabja, Sonamukhi and Wild brinjal were in the month of October 2014. The seeds were dried in the shade for 3-4 days and stored in polythene bags in the laboratory at room temperature.

For germination studies, the seeds of all five species were tested with four replication 100 seeds each at three temperature regims i.e. 20°C, 30°C and 20-30°C (alternate temperature). The 1000-seed weight of Ashwagandha (1.85 g) Dawana (0.58 g), Sabja (1.80 g), Wild brinjal (2.60 g) and Sonamukhi (19.03 g) was recorded. The seeds of all the species except Sonamukhi were germinated on top of paper (TP) media in petri dishes while those of Sonamukhi in between paper (BP) medium. The seeds were observed daily for radical and plumule emergence and counts of such seeds were taken till maximum germination was attained. The percentage

germination was computed on the basis of normal seedlings at final count day. The seeds of those species which failed to germinate or exhibited very low germination were subjected to dormancy breaking treatment viz. (i) water soaking for 24 h (ii) soaking in GA3 1000 ppm solution for 24 h (iii) seed treatment with 25% nitric acid for 10 min. and (iv) seed treatment with 12.5% nitric acid for 15 min. followed by soaking in 1000 ppm GA3 for 24 h depending on kind of species. After the treatment, the seeds were tested for germination at 20°C, 30°C and 20-30°C temperature. The percentage germination based on normal seedling.

RESULTS AND DISCUSSION

The data presented in table 1, revealed that the differences in germination due to temperature regimes were highly significant. The mean germination percentage was highest in Ashwagandha (88%) and Sonamukhi (65%) at 20°C temperature, whereas it was 80 % in Dawana at 30°C temperature. Both 20°C and 20-30°C appeared favourable for Ashwagandha. Initiation of germination started in Dawana on 3rd day, Ashwagandha, Sonamukhi and Sabja at 4th day and in wild brinjal at 5th day. The maximum percentage of germination was observed on 8th day in Dawana, 11th day in Ashwagandha, 13th day in sonamukhi and Sabja and 20th day in wild brinjal. This suggested that first and final count of germination could be taken on these days in the species studied. Among the five species, only Dawana and Ashwagandha showed above 75 percent germination and the remaining species i.e. Sonamukhi, Sabja and wild brinjal exhibited less than 75 percent

germination which may be due to dormancy. The lower attributed to existence of impermeability in seeds coat to water and dissolved gases or presence of inhibitory substrates (2). Earlier, in Sonamukhi (*Cassia angustifolia*) seeds dormancy were reported by Dube (3) and Wagh (4).

The effect of seed treatments on germination was significant (Table 2). Among the treatments, seeds of Sonamukhi soaked in water for 24 h and germinated at 20°C temperature exhibited highest germination (91%) and at 30°C temperature 80 while soaking in with 1000 ppm GA₃ for 24 h recorded 84 and 74 percent germination at 20°C and 30°C temperature respectively. These results are in conformity with the findings of Dube (3) Suryawanshi et.al(6). The improvement in germination by water soaking could be attributed to release of germination inhibitors from seed coat. Earlier, Hari Singh et al (5) reported that the soaking of seeds in gibberellic acid resulted improvement in germination over control and indicated that exogenous gibberellic acid treatment achieved the balance of growth promoter and inhibitor.

The germination in Sabja could be improved (70%) only by treating the seeds with 25% Nitric acid for 10 min, and germination at 30°C. the germination probably increased due to burning of outer thin layer of seed coat making it permeable to water. Also it is noted that germination temperature of 30°C is very critical for the germination of sabja seeds as no other treatment combination could improve germination (Table 2). Other treatments like GA₃ and water soaking had no effect to improve germination in this species.

Alternate temperature of 20-30°C along with pretreatment with GA₃ (80%) and 12.5% Nitric Acid followed by GA₃ treatment significantly improved germination (90%) in wild brinjal. ISTA (1) also recommended 20-30°C temperature for *Solanum melongena* (L)

species, which also belong to the genus *Solanum*.

CONCLUSION:

From the present study it can be inferred that among the five medicinal species investigated, germination above 70 percent could be obtained in the species *Withania somanifera* (Ashwagandha) and *Artemisia pallens* (Dawana) without any pretreatment at 20 and 30°C respectively. For *Cassia angustifolia* (Sonamukhi) soaking of seed in Water for 24 h as pretreatment and germination temperature of 20°C and for *Ocimum pallens* (Sabja) pretreatment of seed with 25% nitric acid for 10 min. and germination temperature of 30°C is recommended. However, for *Solanum viarum* (wild brinjal) combined treatment of 12.5% Nitric acid for 15 min. followed by soaking for 24 h in 1000 ppm GA₃ with alternate temperature of 20-30°C is recommended.

REFERENCES

1. ANONYMOUS (1985). International rules for seed testing (Rules & Annexes). Seed Sci & Technol. 13 (2) : 299-512.
2. CRROKER, W. (1953) . Physiology of seed. Cronica Botanica, Co Walthon.
3. DUE, S.B. (1995). Seed cormancy and germination studies in com emedicinal plant species, M.Sc. (Agri) Thesis submitted to MPKV, Rahuri.
4. WAGH, R.D. (1995). Seed dormancy and germination studies in some medcianl plant species. M.Sc. (Agri) Thesis submitted to MPKV, Rahuri.
5. HARI SINGH, JAGMEET KAUR & GURMEET SINGH(1995). Improvement of germination in Guinea grass (*Panicum maximum Jacq*) seed. Seed Res. 23 (2) : 132-133.
6. Suryawanshi Y.B. , R.B. Patil, and N.D. Moholkar (2001) Studies on seed germination procedures in some medicinal plant species. Seed Research, 29 (2) 141-144.

Table 1. Effect of various temperature regimes on germination behavior of five medicinal plant species.

Species	Temperature			Days of final count
	20°C	30°C	20-30°C	
Ashwagandha	88	21	86	11
Dawana	70	79	71	8
Sonamukhi	65	60	59	13
Sabja	35	46	25	13
Wild Brinjal	00	00	12	20

Table 2. Effect of pretreatments and temperature on germination

	Temperature

Species	Treatments	20°C	30°C	20-30°C
Sonamukhi	Control	60	55	54
	Water Soaking	91	80	70
	GA3 (1000 ppm)	84	74	78
Sabja	Control	20	43	18
	GA3 (1000 ppm)	27	12	5
	25% Nitric acid	15	70	12
Wild brinjal	Control	00	00	15
	GA3 (1000 ppm)	00	00	80
	12.5% Nitric acid + GA3 (1000 ppm)	70	76	90

