



Techniques to Overcome Hardseededness in Lentil

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Abstract:

The findings of the present study indicate that concentrated sulphuric acid, hot water, sand scarification and hot air oven methods are effective for reducing percentage of hard seeds in five varieties of soybean. All the above mentioned treatments showed injurious effects by increasing the abnormal seedlings except concentrated sulphuric acid. In general, concentrated sulphuric acid treatment for 60 seconds has been found most effective for breaking seed coat Dormancy compared to the above mentioned treatments undertaken in the present investigation.

Keywords: Soybean, sulphuric acid, sand scarification, hard seeds, abnormal seedling, dormancy.

Introduction:

Seed of most of the species of leguminosae are dormant. The dormancy in these seeds have been attributed to their water impermeable seed coat. It is assumed that the uptake of water is prevented by the testa, and rupture of this layer is promptly followed by swelling due to water uptake, and germination commences almost immediately. Hardseededness creates problems in testing for germinability under laboratory conditions. Due to this state of affair there is great problem in securing uniform germination and good crop stand. Thus the seed require a pretreatment for softening of hard seed coat for improving germination.

Material and Methods:

To overcome the hard seededness three varieties of soybean viz. L-4076, K-75 and local obtained from state seed testing Laboratory Nagpur. Hard seeds which did not imbibe water were sorted out from the normal seeds which imbibe water. To evolve a quick method for breaking hardseededness in three varieties of lentil, hard seeds were subjected to concentrated sulphuric acid (for 60 and 90 seconds), hot water (100°C for 180 and 240 seconds), sand scarification (100°C for 240 and 480 seconds) and hot air oven (140°C for 15 and 30 seconds).

The germination medium used was rolled towels (BP) under controlled conditions (i.e. temperature at $25 \pm 2^\circ\text{C}$ constant and relative humidity 90%). For acid treatment, the seeds were soaked in concentrated sulphuric acid for the specified duration with constant stirrings (Dharmalingam et al, 1973), seeds were thoroughly washed in running water after the acid treatment and the germination was tested in quadruplicate with 100 seeds each. The count was taken on the 8th day and germination percentage was recorded. Normal seedlings were evaluated following International rules for seed testing (ISTA, 1985).





Results and Discussion:

The data for the three varieties of soybean to different methods of breaking the hardseededness are presented in Table 1. The overall comparisons of means among and within varieties, and treatments for both normal seedling and hard seed percentage showed that concentrated sulphuric acid for 60 seconds was the most effective treatment for reducing hard (seed content. It was followed by hot water for 180 seconds, sand scarification for 480 Seconds, hot water 120 seconds, hot air oven 30 seconds, sand scarification 240 seconds, sulphuric acid for 30 seconds and hot air oven 10 seconds. All the treatments showed injurious effect by increasing the abnormal seedlings except concentrated sulphuric acid for 60 seconds. There was no germination in control under laboratory condition.

The results obtained in the present investigation indicate that concentrated sulphuric acid treatment for 60 seconds has been found most effective for breaking seed coat dormancy in lentil.

Effectiveness of concentrated sulphuric acid, hot water and hot air oven treatment for breaking hardseededness was also reported in related crops by Agarwal and Vyas (1970), Karivartharaju et al. (1974), Brolmann (1975), Hayakawa and Maki (1976), Subburamu and Sridhar (1977), Mott et al. (1981), Kaur et al (1982), Mckean and Mott (1982), Borikar et al (1985), Radhakrishnan et al (1989), Rana and Nautiyal (1989), Tomer and Maguire (1989) and Verma and Singh (1989).

Table. 1- Effect of treatments on germination (%) of lentil varieties.

Sr. No.	Treatments	L-4076			K-75			Local		
		N	Ab	H	N	Ab	H	N	Ab	H
1	Control under laboratory condition	0.00	0.00	100.00	0.00	0.00	100.00	0.00	0.00	100.00
2	Concentrated sulphuric acid treatment									
	(i) 30 seconds	65.75	2.75	31.50	69.00	4.00	27.00	66.75	3.25	30.00
	(ii) 60 seconds	96.25	2.25	1.50	98.25	1.00	0.75	95.50	2.50	2.00
3	Hot water treatment (100°C)									
	(i) 120 seconds	80.25	8.00	11.75	82.50	8.25	9.25	84.75	7.25	8.00
	(ii) 180 seconds	66.25	6.25	7.50	86.00	6.00	8.00	87.50	5.50	7.00
4	Sand scarification (100°C)									
	(i) 240 seconds	76.50	12.50	11.00	76.00	13.25	10.75	78.75	12.00	9.25
	(ii) 480 seconds	84.50	14.50	1.00	83.25	15.75	1.00	87.00	13.00	0.00
5	Hot air oven (140°C)									
	(i) 15 seconds	64.75	10.25	25.00	68.25	12.75	19.00	66.75	10.75	22.50
	(ii) 30 seconds	78.75	14.25	7.00	81.50	12.50	6.00	80.25	14.25	5.50

N = Normal Seedling, Ab : Abnormal Seedlings; H : Hard Seed.





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