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EFFECT OF SEED TREATMENTS ON DORMANCY OF BLACKGRAM

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ABSTRACT

Blackgram or urdbean is a widely cultivated pulse crop in India in different seasons. These seeds show dormancy and are not able to grow as and when required. So keeping this idea in mind, the present experiment was planned to study the effect of different seed treatments with some chemicals and growth regulator to break the dormancy of seeds. Effect of these seed treatments was studied on dormancy of four different varieties of blackgram. Nine different treatments viz. 0.1N, 0.2N, 0.3N H_2SO_4 and KNO_3 along with 100ppm,200ppm and 300ppm of gibberellic acid were applied. Seeds of all the four varieties were soaked in different solutions for different time periods. It was observed that soaking seeds in 300ppm gibberellic acid was recorded to be most useful method for breaking seed dormancy by showing high rate of germination with respect to control followed by KNO_3 and then by H_2SO_4.

Keywords: ***Blackgram, dormancy, germination, Gibberellic acid (GA), Potassium nitrate (KNO_3), Sulphuric acid (H_2SO_4),Urdbean***

I. INTRODUCTION

In India, blackgram or urdbean (*Vigna mungo ssL.*) is widely cultivated pulse crop throughout plains. This crop is grown in different seasons i.e. rainy (kharif), winter (rabi) and spring and summer (zaid). In general, this crop is grown in rainfed condition during rainy season and residual moisture in winter season in eastern and southern parts of country. In spring season, this is cultivated after the harvest of Indian rape (*Brassica napus*) and potato (*Solanumtuberosum*) in Northern India. It is also grown in Pakistan, Bangladesh, Sri Lanka and Myanmar [1]. This pulse crop is consumed by all the people of India. Dormancy in pulses like lentils, urdbean, mungbean poses problems to the seed analysts because such seeds fail to germination test. For seed quality evaluation either under seed certification program or for predicting the germination potential quite oftenit becomes necessary to determine the seed viability as quickly as possible. Seed dormancy also offers a setback to plant breeders who would like to grow plant generations in rapid succession. The present study was therefore undertaken to find out quick and reproducible methods for breaking seed dormancy in pulses.

II. MATERIALS AND METHODS

1.Collection ofseeds : The seeds of urdbean for study were collected from Agriculture Research Station, Sri Ganganagar, Rajasthan, India. These varieties are PDU-1, Pant U19, UG218 and Mash1-1 and were labelled as V_1,V_2,V_3 and V_4 respectively.

2.Treatments : Freshly harvested seeds of blackgram were selected for present investigation. Nine different treatments were applied for breaking the dormancy of four varieties of urd bean seeds. Seeds were soaked in three different concentrations of H_2SO_4 i.e. 0.1N, 0.2N and 0.3N and similar concentrations of KNO_3 for one minute, while for gibberellic acid, it was 100ppm,200ppm and 300ppm and the time period for soaking was 24 hour. These treatments were labelled T_1,T_2-----T_9. One control sample for each variety was also kept and was labelled as T.

3.Germination test :Following the seed treatments, these seeds were tested for standard germination test. Four replications of 100 seeds each were placed between germination paper which were then kept at 26^0C in germinator for eight days according to rules of ISTA[2]. The normal seedlings recorded for each treatment has been reported.

4.Statistical Analysis : Each treatment was studied for the effect of H_2SO_4, KNO_3 and GA in 3 way ANOVA (Factorial CRD). For determining significant differences between treatments, Critical Difference (C.D.) was used. All statistical analyses were done following [3].

III. RESULTS AND DISCUSSION

Seeds of all the four varieties differed in their number of dormant seeds ranging from 17-45%. The variety PDU-1 had highest percentage of dormant seeds (45) followed by Pant U19, UG218 and Mash1-1 respectively. The maximum germination percentage (95) was recorded after300ppm treatmentsin case of GA and KNO_3 followed by 94 for H_2SO_4 as compared to 67 for control. There was no significant difference in germination percentage between 200ppm and 300ppm solutions. Soaking of seeds in GA was found to be effective for breaking seed dormancy [4]. Similarly soaking of seeds in 0.1 N HNO_3 solution for 12 hour has been found to overcome dormancy [5].

In all the four varieties across all the three treatments and for all the doses, there was an increase in germination percentage with time from third to fifth to eighth day after seed treatment. Even after third observation on the eighth day after seed treatments, in none of the experiments, 100% germination was achieved, still indicating the presence of dormant seeds in all the varieties. Between all the treatments applied, GA and KNO_3 were found to be more effective. This finding is in close agreement with the observations in other pulse crops [6].

A clear cut difference at varietal level for response to various treatments was also observed in the present study. The variety PDU-1 showed best response to all chemicals expect for Mash1-1 and the germination percentage was far better than the control. Other varieties showed mixed response but better than control. Lower concentration of treatments also showed result but had less difference with control. Major benefits of seed treatments may lie only in highly germinable vigorous seed lots [7] and results of this experiment coincide with the results already shown by various scientists.

IV. TABLE: Seed germination as influenced by dormancy breaking treatments in blackgram(urd bean).

Treatments	Varieties				Mean
	V_1	V_2	V_3	V_4	
GA(100ppm)	76(94)	64(81)	66(83)	65(82)	68(86)
GA(200ppm)	75(93)	76(94)	76(94)	77(95)	76(94)
GA(300ppm)	79(96)	77(95)	75(93)	78(96)	75(95)
KNO_3(0.1N)	68(86)	65(82)	65(82)	65(82)	66(83)
KNO_3(0.2N)	70(88)	69(87)	72(90)	71(89)	71(89)
KNO_3(0.3N)	79(96)	76(94)	78(96)	76(94)	77(95)
H_2SO_4(0.1N)	79(86)	65(82)	66(83)	67(85)	69(84)
H_2SO_4(0.2N)	74(84)	77(83)	75(85)	78(86)	76(84.5)
H_2SO_4(0.3N)	76(84)	64(81)	66(83)	65(82)	68(82.5)
Control	66(83)	48(55)	53(64)	51(60)	55(67)
C.D. at 5%					
Treatment(T)	2.21	2.18	1.66	1.36	2.29
Dose(D)	1.71	1.69	1.28	1.05	1.78
(T X D)	3.83	3.78	2.87	2.35	3.98
Control vs rest	2.36	2.33	1.77	1.45	2.45

*Figures in parentheses indicate the actual germination percentages.

V. CONCLUSION

From these results, it is therefore concluded that dormancy can be broken most effectively either by soaking the seeds in GA 300 ppm solution for 24 hours or also by treating with KNO_3 0.2 N or 0.3 N or with H_2SO_4 solution having 0.2 or 0.3 N concentration for one minute. In the present study also, the difference in response between varieties may be attributed to the initial vigour status of the seeds. Major benefits of seed treatments may lie only in highly germinable seed lots.

REFERENCES

[1].Singh,D.P. and P.S. Ahlawat. Greengram(*Vignaradiata*) and Black gram (*Vigna mungo*) improvement in India : Past, Present and Future prospects. *Indian Jour. Agri. Sci.* (2005)*75(5): 243-250.*

[2]. ISTA. International rules for seed testing. *Seed Sci. & Technol.3,*(1993)*: 322-341.*

[3].Chandel,S.R.S.. *A hand book of Agricultural Statistics*,(2004) *B68-B97.*

[4].Agrawal,P.K.. Genotypic variation in seed dormancy of paddy and simple methods to break it. *Seed Res.*,(1981)*9 : 20-27.*

[5].Jalote,S.R and C.P.Vaish. Dormancy behavior of paddy varieties in U.P. *Seed Res.4*,(1976)*: 187-190.*

[6].Oswal,M.C. and J.C.Sharma. Effect of different presoaking treatment and different day times of sowing on germination of gram (*Cicer arietinum*) and taramira (*Eruca sativa*). *Indian Jour. of Agri. Res.* (1975)*9(4): 187-191*.

[7]. Mathew,S. and A.A.Powel. Environmental and physiological constraints on field performance of seeds. *Hort. Science* (1986)*21(5): 1125-1128.*