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Short Note

Influence of Seed Priming Techniques on Seed Quality of Sesame (*Sesamum indicum* L.)

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Priming is one of the pre sowing seed management technique recommended for better field emergence. In the present study, fresh seeds were haloprimed with 10 and 15 per cent of KNO_3, NaCl and osmoprimed with -1.0 and -1.5 bars PEG solution for 24, 36 and 48 h for evaluation of the suitable priming technique for invigourating sesame seeds. The results revealed that halopriming with NaCl 10 per cent for 48 h followed by NaCl 15 per cent for 24h improved the seed and seedling quality characters. Upon storage the primed seeds recorded 88 per cent germination upto 4 months which was 13 per cent higher than control.

Key words: Priming, seed quality characters, sesame

Partial soaking and subsequent drying back, known as priming has shown to deliver invigourating effect on seeds of a number of species (Hegarty, 1970 and Corleto and Mallik, 1974). Evidence suggests that this treatment may improve the velocity of germination and seedling emergence (Austin, 1969 and Berrie and Drennan, 1971), the performance of seeds and seedlings under sub - optimal environmental conditions (Henckel, 1967) and seed production (Corleto and Mallik, 1974). The effect of pre-soaking will be enhanced if solutions of micro nutrients, which are deficient or unavailable in the soil, are infused at concentrations high enough to meet subsequent plant needs (Barthakur *et al.* 1973). Sesame is one of the popular oilseed crop of India, grown majorly grown as a rainfed crop and thus requires invigourative seed treatment for better filling. Hence studies were made to evaluate the influence of seed priming on seed and seedling quality characters along with storability of treated seed for better practical utility of the treatment.

Materials and Methods

Genetically pure seeds of sesamum (*Sesamum indicum.*) cv. CO1 obtained from Department of oilseeds, TNAU, Coimbatore, formed the base material for the study. The field experiments and laboratory experiments were conducted at Department of Seed Science and Technology, Tamil Nadu Agricultural University, Coimbatore (11°N latitude and 77°E longitude with an altitude of 427 m MSL) during 2004-2005. Sesame seeds were haloprimed with 10 and 15 per cent of KNO_3 NaCl and osmoprimed with -1.0 and -1.5 bars PEG solution for 24, 36 and 48 h. The bar solution of PEG were perpared adopting the formula,

$$P = gRT / mV$$

Where,

P = osmotic pressure in atmosphere
g = grams of solute (x)
R = 0.08205 litres atmosphere per degree per mole.
T = absolute temperature (273°K)
m = molecular weight of solute (y)
V = volume in litre

$$P = \frac{Xx\ 0.08205x273}{Yx1} \qquad X = \frac{P \times Y \times 1}{0.0205x273}$$

The primed seeds along with hydroprimed seeds in equal volume of water for 8 h and untreated control were evaluated for the seed and seedling quality characters *viz.,* 100 seed weight (mg) germination (%) (ISTA, 1999), root length (cm) shoot length (cm), drymatter production (mg 10 seedlings-1) (Gupta, 1993), vigour index (Abdul-Baki and Anderson (1973) and electrical conductivity (dSm-1) (Presley, 1958). The primed seeds were dried back to original moisture content before conducting the germination test. The seeds invigourated were stored in cloth bag upto a period of 4 months and were evaluated for the germination percentage as per ISTA (1999). The data gathered were statistically analysed as per Panse and Sukhatme (1985).

Results and discussion

In the present study, the seeds primed with NaCl 10 per cent for 48h recorded the maximum germination of 90 per cent which was followed by NaCl 15 per cent for 24h, KNO_3 10 per cent for 36 and 48 h, KNO_3 15 per cent for 48h and PEG 1 bar for 24 h (88 per cent). (Table 1) The vigour index values were the maximum with NaCl 10 per cent for 48 h (1962) followed by NaCl 15 per cent for 24h.

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Table 1. Influence of seed priming on seed and seedling quality characteristics of sesame variety CO 1

Priming treatments with duration (h)		100 seed weight (mg)	Germination (%)	Root length (cm)	Shoot length (cm)	Drymatter production 10 seedling^{-1} (mg)	Vigour index	Electrical conductivity (dSm^{-1})	Germination after 4 months (%)
NaCl 10%	24	308	76 (60.67)	13.7	7.4	44.5	1603	0.16	74 (59.34)
	36	307	84 (66.42)	13.7	7.1	42.4	1814	0.17	82 (64.90)
	48	309	90 (71.57)	14.7	7.9	46.0	1962	0.17	88 (69.73)
NaCl 15%	24	309	88 (69.73)	14.1	7.5	40.3	1900	0.23	86 (68.03)
	36	308	86 (68.03)	13.4	6.7	42.5	1728	0.23	85 (67.21)
	48	308	84 (66.42)	13.3	7.4	42.0	1738	0.24	82 (64.90)
KNO_3 10%	24	305	84 (66.42)	13.2	7.4	42.0	1730	0.23	82 (64.90)
	36	306	88 (69.73)	12.0	7.5	44.0	1716	0.23	86 (68.03)
	48	306	88 (69.73)	10.6	7.4	46.1	1584	0.24	86 (68.03)
KNO_3 15%	24	307	76 (60.67)	11.3	7.0	46.1	1390	0.13	72 (58.05)
	36	304	84 (66.42)	11.8	7.0	44.1	1579	0.17	82 (64.90)
	48	305	88 (69.73)	8.7	7.3	44.7	1408	0.19	86 (68.03)
PEG -1.0 bar	24	308	88 (69.73)	13.6	7.8	46.0	1883	0.08	86 (68.03)
PEG -1.5 bar	24	307	84 (66.42)	11.8	7.4	41.0	1612	0.08	82 (64.90)
Water	8	308	79 (62.73)	10.1	7.1	42.0	1358	0.19	77 (61.34)
Control		305	80 (63.43)	9.5	7.1	34.6	1328	0.07	75 (60.00)
CD (P=0.05)		NS	1.606	0.869	0.877	1.791	1.663	0.012	1.628
SED			0.803	0.434	0.438	0.895	0.831	0.006	0.814

(Figures in parentheses are arc sine transformed values)

But as in other experiments the treated seeds recorded higher electrical conductivity than control seeds. Upon storage, the seeds primed with NaCl 10 per cent for 48 h could be stored with 88 per cent germination upto 4 months which was 13 per cent higher than control seed. Similar hike in germination and vigour characters with halopriming including storability was reported by Venkata subramaniyam (2004) in vegetable seeds.

Mechanism by which seed priming treatment improves germination may be due to increased B-tubulin accumulation in the radicle tip during priming which is the main functional protein tubules that is necessary for mitotic spindle formation (Bino et al. 1992).Wilson (1971) also reported that increase in hydrolytic enzyme activity especially α amylase, super oxide dismutase and catalase activities promoted germination. Thus the study revealed that priming with NaCl improved the germination by 11 per cent and the treated seed also could be stored well upto 4 months. The vigour parameters evaluated in terms of root length, shoot length and drymatter production were higher with NaCl 10 per cent for 48h, but varied widely with other treatments. The vigour index values were maximum for NaCl 10 per cent for 48 h followed by NaCl 15 per cent for 24h. On storage the seeds primed with NaCl 10 per cent for 48 h could be stored with 88 per cent germination upto 4 months which was 13 per cent higher than control seed.

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