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EFFECT OF PRE-SOWING SEED TREATMENTS ON SEED QUALITY IN REDGRAM

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ABSTRACT

Studies carried out to find out the effect of pre-sowing treatments on seed quality in redgram revealed that the seeds treated with Trichoderma (@4 g kg^{-1}) followed by *Rhizobium* culture inoculation at 24 h interval and subsequently pelleted with $ZnSO_4$ (100 mg kg^{-1}) using gypsum (300 g) as carrier and 10% maida (50 ml) as adhesive and air drying of seeds in shade recorded higher germination, seedling growth, vigour index, field emergence and germination after accelerated ageing.

KEY WORDS: Red gram, Pre-sowing treatments, *Tridhoderma*, *Rhizobium*, Germination, Vigour index

Pulses or food legumes are the cheapest and rich source of quality protein and amino acids. They play a major role in crop rotation because they keep the soil alive and productivity by enriching the soil fertility in terms of nitrogen and organic matter. Among pulses, redgram or pigeonpea occupies an unique place for its use as seed and foodgrains. The main constraint in raising the productivity levels in pulses is that pulses are grown on marginal lands mostly in rainfed areas. Application of nutrients to the dry land is a problematic one. By giving the nutrients to the seed itself will improve the viability and vigour of the seed that will give good yield (Vijaya, 1996). By this materials can be used less wastefully and there is both reduced exposure of non-target organisms and greater control over application. Seeds of cowpea and black gram fortified with $ZnSO_4 + MnSO_4 + NaMO_4$ registered maximum field emergence seedling growth, vigour index, seed weight and seed yield $plant^{-1}$ (Vijaya, 1996). With this background, an investigation was taken up to study the effect of pre-sowing seed treatments on seed quality in redgram.

MATERIALS AND METHODS

Genetically pure seeds of redgram CV Co.5 was obtained from the Department of Pulses, School of Genetics, Tamil Nadu Agricultural University, Coimbatore. The bulk seeds were cleaned and dried to eight percent seed moisture content. Seeds were size graded using BSS 5x5 metal sieve. The retained seeds were used for the study during 1996.

The following treatments were given to seeds in various sequences.

T_1.. $ZnSO_4$ (100 ppm) 3 h soak + Thiram @ 2 g kg^{-1} + Rhizobium @ 4 pockets ha^{-1}

T_2.. $ZnSO_4$ soak + Trichoderma @ 4 g kg^{-1} + Rhizobium

T_3.. $ZnSO_4$ soak + Thiram + Rhizobium + pelleting with pungam leaf powder

T_4.. $ZnSO_4$ soak + Trichoderma + Rhizobium + pelleting with pungam leaf powder

T_5.. Thiram + Rhizobium + $ZnSO_4$ pelleting (100 mg kg^{-1})

T_6.. Trichoderma + Rhizobium + $ZnSO_4$ pelleting

T_7.. Dry seeds (control)

For leaf powder pelleting 250 g of pulverised pungam leaf powder was used per kg of seeds. For nutrient pelleting 100 mg of $ZnSO_4$ kg^{-1} of seeds with 300 g of gypsum as carrier material was used. Maida 10 per cent solution at 50 ml kg^{-1} of seeds was used as adhesive. An interval of at least 12 h was maintained between each treatment.

The treated seeds were evaluated for germination test (ISTA, 1993), root length, shoot length, vigour index (Abdul-Baki and Anderson, 1973), rate of germination (Maguire, 1962), field emergence and accelerated ageing test (Woodstock and Feeley, 1965). The results are presented in tables 1 and 2.

RESULTS AND DISCUSSION

All the parameters studied exhibited significant variation due to treatments. The

Table 1. Effect of seed treatments on seed quality in redgram

Treatments	Germination (%)	Root length (cm)	Shoot length (cm)	Vigour index
T_1	87.5 (69.36)	17.1	28.4	3978
T_2	88.5 (70.43)	17.7	28.6	4096
T_3	87.5 (69.58)	17.5	28.6	4032
T_4	89.5 (71.15)	17.1	28.9	4113
T_5	86.5 (68.54)	17.4	29.7	4006
T_6	98.0 (81.87)	18.2	31.4	4687
T_7	84.0 (66.42)	17.0	28.7	3906
CD (P=0.05)	3.45	2.19	4.65	249.9

(Values in parentheses indicate arcsine values)

Table 2. Effect of seed treatments on seed quality in redgram

Treatments	Rate of germination	Field emergence (%)	Germination after ageing (%)
T_1	10.40	84.0 (66.44)	64.0 (52.85)
T_2	10.55	85.0 (66.84)	65.0 (53.45)
T_3	10.35	85.0 (66.84)	63.0 (52.25)
T_4	10.00	84.0 (66.44)	60.0 (50.48)
T_5	9.93	84.0 (66.44)	58.0 (49.61)
T_6	10.73	91.0 (71.11)	61.0 (51.06)
T_7	10.10	83.0 (65.29)	55.0 (47.58)
CD (P=0.05)	0.41	3.16	2.67

(Values in parentheses indicate arcsine values)

maximum germination was recorded in T_6 (98.0%) and minimum in T_7 (84.0%). The root length of seedlings was the longest in T_{11} (18.2 cm) while the shortest root length was recorded in T_7 (17.0 cm). Similar trend was observed in shoot length also. The vigour index was maximum in T_6 (4687) and minimum in T_7 (3906). Among the treatments, the rate of germination was the highest in T_{11} (10.73) and it was on par with T_2 (10.55), T_1 (10.40) and T_3 (10.35). T_5 recorded the minimum value (9.93). Maximum field emergence percentage (91.0%) was observed in T_6 whereas minimum was noted in T_7 (83.0%). The germination percent after accelerated ageing registered maximum in T_6 (61.0%) while T_7 recorded minimum germination (55.0%) after ageing. Among the different sequences of pre sowing seed treatment adopted, *Trichoderma* treated seeds inoculated with *Rhizobium* followed by $ZnSO_4$ pelleting sequence recorded the highest germination, maximum seedling growth and vigour index over control. The increased germination obtained may be due to the reduction in fungal infection in the seed and seedlings. Lokesh *et al.*, (1987) obtained increased germination due to *Trichoderma* treatment. Because of Rhizobium seed treatment, there are possibilities for increased vigour index.

Prabakaran and Srinivasan (1995) in redgram obtained increased vigour index by coir-dust application with *Rhizobium* seed inoculation. After accelerated ageing, the combination of Trichoderma + Rhizobium + $ZnSO_4$ pelleting sequence recorded maximum germination percentage over other treatments. Vijaya (1996) observed similar results in seeds pelleted with micronutrients in blackgram and cowpea.

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