# Seed quality enhancement in redgram and greengram by polymer mating

K. SUJATHA* AND K. RAMAMOORTHY
Department of Plant Breeding and Genetics, Seed Science and Technology Unit, Agricultural College and Research Institute, MADURAI (T.N.) INDIA

## ABSTRACT

**Seeds coated with polymer @ 3 g Kg$^{-1}$ with 5 ml water were effective against ageing damage in both redgram and greengram crops as could be observed through higher germination, seedling growth and reduced electrical conductivity.**

**Key words :** Polymer, Germination, Root length, Shoot length, Electrical conductivity.

## INTRODUCTION

Seeds need to be stored from the day of harvest till the time of next sowing. It is also a general practice in India to carry over a small quantity of seeds as a safe guard against natural calamities. Physiological deterioration of seeds during storage is considered to be one of the major factors preventing seeds from normal germination and vigorous growth. The deterioration of physiological quality of seeds during storage is mainly attributed to periods of storage (Delouche and Baskin, 1973) containers (Kumar and Singh, 1984), seed moisture content (Roberts, 1986) and. seed treatment (Basu and Rudrapal, 1980). Seed coating is a mechanism of applying needed materials in such a way that they affect the seed or soil at the seed soil interface. Though there are number of published results which indicate varied effect of polymer coating on seed vigour, it bas been imperative to explore the effect of polymer coating on seed quality in redgram and green gram during storage.

## MATERIALS AND METHODS

Bulk seeds of redgram var. VBN 1 and greengram var. VBN (Gg) 2 were collected from National Pulses Research Centre, Vamban colony, Pudukottai, during 2006 and was coated with pink colour polymer for redgram and green colour polymer for greengram @ 3 g / kg dissolved in 5 m1 of water ($T_1$) and seeds treated with captan @ 3 g kg$^{-1}$ ($T_2$). The treated seeds were dried under shade and then in a drying chamber (30 $\pm 5^0$ C) for 4 days to reach the original moisture content of eight percent and stored in cloth bags for 4 months under ambient conditions at Madurai (mean temp 27 $\pm$ $4^0$ C and RH 74 $\pm$ 0.4 %) along with control ($T_0$). The germination test was conducted using 4 replicates of 100 seeds each in roll towel method (ISTA, 1999). Final count on normal seedlings was recorded on seventh day and per cent germination computed and seedling length was measured and expressed in centimeter. The electrical conductivity test was measured by soaking 25 seeds in 50 ml of deionized water for 8 hr using conductivity meter (Presley, 1958). The data were statistically analyzed after Snedecor and Cochran (1967). The percentage values were transformed to arc sin values wherever necessary .

## RESULTS AND DISCUSSION

Polymer coating did not show any significant improvement immediately in germination, root length, shoot length and electrical conductivity, however, polymer coated seeds had higher germination after natural ageing (88.0 per cent both in redgram and greengram) over control (79.00 in redgram and 80.00 per cent in greengram). In redgram after 4 months of storage polymer coating exhibited higher root length (19.8 cm) followed by fungicide seed treatment (18.5 cm) over control (14.8 cm) (Table 1). In greengram polymer coated seeds was effective in minimizing the deterioration recording higher values (18.2 cm, 17.9 cm for before and after natural ageing ). Similar findings was observed by Sherin Shusan and Bharnthi, 2006 in maize and Kunkar *et al.*, 2006 in cotton and Nisar *et al.*, 2006 in soybean.

Seeds treated with polymer coating also had the highest shoot length (23.5 and 20.3 cm for before and after natural ageing) while the control seeds recorded least value (20.5 and 16.0 cm) in redgram. In greengram polymer coated seeds enhanced shoot length (24.7 and 22.5 cm for before and after natural ageing) over control (21.6 and 16.7 cm ).

In redgram minimal electrical conductivity (0.170 and 0.189 before and after ageing) was observed with polymer coating in redgram. Similar trend was observed for greengram (0.184 and 0.188 before and after ageing).

Damage to membrane, one of the suggested

*** Author for correspondence.** Present Address : Krishi Vigyan Kendra, Agricultural College and Research Institute, MADURAI (T.N.) INDIA

**Table l :Polymer coating for seed quality maintenance in redgram and greengram during storage**

| Treatments | Germination (%) | | Root length (cm) | | Shoot length (cm) | | Electrical Conductivity ($dsm^{-1}$) | |
|---|---|---|---|---|---|---|---|---|
| | BA | NA | BA | NA | BA | NA | BA | NA |
| Redgram | | | | | | | | |
| Control | 86 (68.00) | 79 (62.73) | 18.0 | 14.8 | 20.5 | 16.0 | 0.205 | 0.253 |
| Captan @ 3 g $Kg^{-1}$ | 89 (70.64) | 83 (65.45) | 19.8 | 18.5 | 21.6 | 19.8 | 0.183 | 0.192 |
| Polymer coating @ 3 g $Kg^{-1}$ | 91 (72.56) | 88 (66.53) | 20.2 | 19.8 | 23.5 | 20.3 | 0.170 | 0.189 |
| C.D. (P=0.05) | NS | 2.01 * | NS | 1.1* | NS | 1.6* | NS | 0.019* |
| Greengram | | | | | | | | |
| Control | 88 (66.53) | 80 (63.43) | 16.0 | 13.2 | 21.6. | 16.7 | 0.188 | 0.203 |
| Captan @ 3 g $Kg^{-1}$ | 90 (71.65) | 84 (67.22) | 17.0 | 16.5 | 24.2 | 20.6 | 0.185 | 0.190 |
| Polymer coating @ 3 g $Kg^{-1}$ | 92 (73.94) | 88 (69.73) | 18.2 | 17.9 | 24.7 | 22.5 | 0.184 | 0.188 |
| C.D. (P=0.05) | NS | 20.20* | NS | 1.5* | NS | 3.0* | NS | 0.012* |

NS- Non significant, * indicates significance of value at P=0.01. Figures in parenthesis arc sin values.
BA: Before Ageing, NA: Natural ageing for four months under ambient conditions (mean tempetature 21 $\pm 4^0$ C mean RH 74 $\pm$ 0.4 %).

explanations for loss of vigour and viability during ageing (Roberts, 1972) is the reflection of seed deterioration accompanied by alterations in the membranes of aged seeds. (Parrish and Leopold, 1978).

In the present study the electrical conductivity in general was minimum in polymer coated seeds and the highest in control and after ageing. This implies the operation of repair mechanism brought out by treatment with polymer coated. seeds.

Present investigations revealed that, the polymer coated seeds in general have deteriorated at slower phase when compared to control that has been manifested in higher germination over control. This is mainly because the coated seeds maintained high vigour due to slower deterioration compared to control. In conclusion, both in redgram and greengram polymer foaling @ 3g $kg^{-1}$ with 5 ml water was found to be effective in preventing deteriorative senescence.

## REFERENCES

**Basu, R.N. and Rudrapal, A.B. (1980).** Iodination of mustard seed for the maintenance vigour and *Indian J. Experiment Bio.*, **18**: 491-494.

**Delouche, J.C. and Baskin, C.C. (1973).** Accelerated ageing techniques for predicting the relative storability of seed lots. *Seed Sci. &Technol.*, **12**: 427-452.

**ISTA (1999).** International Rules for seed testing. *Seed Sci& Technol.*, **13**: 209-355.

**Kumar, K. and Singh, J. (1984).** Effect of fungicides on seed borne fungi in sesame during storage. *Seed Rese.*, **12**: 100-111.

**Kunkur, Vijayakumar, Ravi Hunje, Biradar Patil , N.K. and Vyakarahal ,B.S (2006).** *Abstr XlI- National Seed Seminar* 24-26 Pg. no. 90 *ANGRAU, Hyderabad*

**Nisar, K, Anmkumar, Balraj, M., Parmar, B. and Sushil Pandey (2006).** Seed quality enhancement of soybean by polymer coating. *Abstr XII- Nationpl Seed Seminar* 24-26 *Pg. no. 100 ANGRAU, Hyderabad* .

**Parrish, D.J and Leopold, A.C. (1978).** On the mechanism of ageing of soybean seeds *Pl. Physiol.*, 61: 365-368.

**Presley, J.T.(1958).** Relationship of protoplast permeability of cotton seed viability and predisposition of seedling disease. *Pl. Dis. Reptr.*, **42** (7) : 582.

**Roberts, E.H. (1972).** *Viability of seeds* (ed. Roberts, E.H.. Chapman and Hall, London), Pp.24-28.

**Roberts, E.R. (1986).** Quantifying seed deterioration In: *Physiology of seed deterioration* (eds. M.B. McDonal Jr and CJ Nelson).Vol.l1,Pp.l01-123 Crop Science Society America Special Publication CSSA, Madison, WI.

**Sherin Shusan and Bharathi, A, (2006).** Film technology on seed quality and shelf life of maize. *Abstr XlI- National Seed Seminar* 24-26 *Pg. no.* 84. *ANGRAV, Hyderabad*

**Snedecor, G.W. and Cochran, W.G. (1967).** *Statistical methods* AMES, IOWA State university press.

*Received : June, 2008; Accepted : December, 2008*