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**KD Dadmal**
Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

**TS Kamdi**
Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

**NS Bhagat**
Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

**Corresponding Author:**
**KD Dadmal**
Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

# Effect of seed coating treatments on storability of soybean (*Glycine Max* (L.) Merrill)

**KD Dadmal, TS Kamdi and NS Bhagat**

**Abstract**
A laboratory experiment was carried out during *Kharif* season of 2011-12 at the laboratory of Seed Technology Research Unit, Dr. PDKV, Akola (MS) to study the effect of seed coating treatments viz. polymer coating @ 3 ml/kg of seed, flowable thiram @ 2.4 /kg seed, polymer + flowable thiram, vitavax 200 * @ 2 g/kg, polymer + vitavax 200* @ 2 wg/kg of seed and Control stored in two packaging materials *i.e.* Gunny bag and HDPE bag upto 8 month with or without combination at ambient condition on storability of soybean. The results revealed that the polymer @ 3 ml/kg + vitavax 200 *@ 2 g/kg of seed stored in HDPE bag were higher germination percentage (93.40 %), higher seedling length (28 cm), seedling dry weight (0.79 g) and vigour index (73.82). However, lowest moisture content (7.1 %), electrical conductivity (1.20 mmhos/cm/g) and lower seed infection (2.7 %) were found in polymer + vitavax treated seed stored in HDPE bag. Hence, polymer @ 3 ml + vitavax 200* @ 2 g/kg in combination seed stored in HDPE bag was most beneficial for enhancing the seed quality.

**Keywords:** Soybean, seed coating, polymer, fungicide coating

## Introduction
Soybean (*Glycine max* (L.) Merrill) is an important grain crop legumes in India. Being a legumes, it is a unique crop of versatile nutritional attribute, yielding both oil and protein. In World, soybean is grown over an area of 103.00 lack ha With a production of 103.37 lack ha And with average productivity 24 q ha.The annual soybean area in Vidarbha is 18.49 lack ha with production of 20.25 lack ha and productivity 10.39 q/ ha.

It has been establish that under tropical condition, rapid loss of seed viability and vigour takes place during storage at ambient temperature. Seeds can store satisfactorily under control condition with low temperature and low moisture. The major problem in soybean cultivation is the delicate nature of seed coat (8 µm), which is fragile and is prone to damage embryo during various stages viz. harvesting, threshing, processing, seed treatment, transport and storage. To overcome such problem, seed technologies like seed enhancement and seed treatment include priming, pelleting, coating and artificial seeds are some important methods to enhance seed and seedling performance, through addition of chemical to protect seed from pathogens and to improve germinations. The soybean seed coated with polymer and fungicide showed significant effect on storability. The seed coating with polymer @ 3 ml/kg of seed + vitavax 200 *@ 2g/kg seed stored in HDPE bag maintains higher seed quality compared to untreated seeds and other seed treatments during storage. The Storing seeds in HDPE bag maintain higher seed quality compared to storing in Gunny bag.

## Materials and Methods
The experiment was conducted at the laboratory of Seed Technology Research Unit, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during Kharif season of 2011-2012. The soybean seeds treated with polymer coating (polycot @ 3 ml/kg seed diluted in 5ml of water), flowable thiram (royal flow 40 SC) 2.4ml/kg, polymer + flowable thiram (royal flow 40 SC) @ 2.4 ml/kg, vitavax 200 * (containing thiram and carboxyl 37.5 %) @ 2 g/kg and polymer + vitavax 200 * @ 2 g/kg of seed. Treated seeds stored in two packaging material *i.e.* Gunny bag and HDPE bag under ambient condition .The experiment was laid out in Factorial Complete Randomized Design with two factor and three replication consisting twelve treatments in combinations. The bimonthly observations were recorded replication wise in each treatment from stored seeds.

Germination percentage (%), seed dry weight (g), vigour index, moisture content (%), Electrical conductivity (mmhos/cm/g) and Diseases infection (%).

## Results and Discussion

The data revealed that the higher germination percentage (93.40 %) shows significant effect. higher seedling length (28 cm), seedling dry weight (0.79 g
) and vigour index (73.82). However, lowest moisture content (7.1 %), electrical conductivity (1.20 mmhos/cm/g) and lower seed infection (2.7 %). All above parameters was not influenced significantly or non-significantly due to different seed treatments and interaction effect. The present results on above seed quality parameters are in accordance with findings of Savitri *et al* (1998) [6], Chachalis and Smith (2001) [1], Vangamudi *et al*. (2003) [8], Wilson and Geneve (2004) [9], Keshavulu and Krishanasamy (2005) [3].

Significantly higher germination percentage and vigour index and electrical conductivity were found in polymer @ 3 ml/kg of seed + vitavax 200 * @ 2 g/kg of seed Interaction effect also found significant and observed maximum due application of polymer plus vitavax seed treatment. The present results are an accordance with research conducted by Struve and Hopper (1995) [11], Ranga Rao (1996) [5], Chikkanna *et al*. (2000) [2], Larissa *et al*. (2004) [4], Win *et al*. (2009) [10].

From results it was showed that polymer @ 3 ml/kg seed + vitavax 200 * @ 2 g/kg of seed treatment stored in HDPE bag recorded highest seedling length (cm), seedling dry weight (g), and lowest seed moisture (%), seed infection (%).

Hence, polymer @ 3 ml + vitavax 200* @ 2 g/kg in combination seed stored in HDPE bag was most beneficial for enhancing the seed quality.

**Table 1:** Effect of seed coating treatments on Germination percentage (%), seedling length (cm), seedling dry weight (g), Vigour index, Moisture content (%), Electrical conductivity (mmhos/cm/g) and seed infection (%)

| | Germination per cent | | | | Seedling dry weight (g) | | | | Vigour index | | | | Moisture content (%) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | 4 | 6 | 8 | 2 | 4 | 6 | 8 | 2 | 4 | 6 | 8 | 2 | 4 | 6 | 8 |
| P1T0 | 81 (64.16) | 80.06 (68.92) | 77.00 (61.34) | 74.60 (59.78) | 0.85 | 0.77 | 0.76 | 0.72 | 68.85 | 62.06 | 58.52 | 53.71 | 9.4 (17.56) | 8.0 (16.46) | 7.5 (15.93) | 7.2 (15.67) |
| P1T1 | 83.60 (66.19) | 82.30 (65.13) | 83.00 (65.65) | 82.00 (64.91) | 0.87 | 0.79 | 0.82 | 0.74 | 72.73 | 65.02 | 68.06 | 61.34 | 8.3 (16.74) | 7.7 (16.11) | 7.3 (15.74) | 7.1 (15.45) |
| P1T2 | 92.3 (73.91) | 92.00 (73.65) | 89 (70.64) | 86.90 (68.73) | 0.89 | 0.82 | 0.81 | 0.75 | 82.15 | 75.44 | 72.09 | 65.17 | 8.5 (16.95) | 7.6 (16.07) | 7.4 (15.82) | 7.1 (15.61) |
| P1T3 | 93.1 (74.79) | 92.40 (74.01) | 89.40 (71.02) | 86.90 (68.73) | 0.91 | 0.83 | 0.81 | 0.76 | 84.72 | 76.69 | 72.41 | 66.04 | 8.6 (17.05) | 7.6 (16.07) | 7.2 (15.67) | 7.1 (15.45) |
| P1T4 | 94.30 (76.21) | 93.50 (75.28) | 92.00 (72.56) | 86.30 (68.34) | 0.91 | 0.81 | 0.82 | 0.76 | 85.81 | 75.74 | 75.44 | 65.59 | 8.6 (17.05) | 7.7 (16.03) | 7.4 (15.85) | 7.2 (15.56) |
| P1T5 | 96 (78.52) | 96.00 (78.72) | 90.30 (71.92) | 87.10 (68.99) | 0.92 | 0.84 | 0.85 | 0.78 | 88.32 | 80.04 | 78.45 | 66.61 | 8.7 (17.17) | 7.6 (16.07) | 7.5 (15.96) | 7.2 (15.67) |
| P2T0 | 82.30 (65.13) | 82.00 (64.90) | 81.30 (64.41) | 80.00 (63.45) | 0.87 | 0.79 | 0.82 | 0.73 | 71.60 | 64.78 | 66.67 | 58.40 | 9.2 (17.65) | 8.3 (16.74) | 7.4 (15.85) | 7.2 (15.56) |
| P2T1 | 85.30 (67.48) | 83.60 (66.18) | 83.00 (65.65) | 82.00 (64.91) | 0.89 | 0.80 | 0.85 | 0.74 | 75.92 | 66.88 | 70.55 | 62.68 | 9.0 (17.46) | 8.3 (16.75) | 7.3 (15.78) | 7.1 (15.45) |
| P2T2 | 93.30 (75.02) | 92.70 (74.40) | 92.00 (73.59) | 91.00 (72.56) | 0.91 | 0.84 | 0.85 | 0.76 | 84.90 | 77.86 | 78.22 | 69.16 | 9.1 (17.56) | 8.3 (16.77) | 7.5 (15.96) | 7.1 (15.56) |
| P2T3 | 94.0 (75.85) | 93.00 (74.68) | 92.00 (73.59) | 91.70 (73.55) | 0.91 | 0.85 | 0.84 | 0.77 | 85.56 | 79.05 | 77.28 | 70.61 | 9.2 (17.65) | 8.3 (16.78) | 7.5 (15.89) | 7.2 (15.45) |
| P2T4 | 94.0 (76.32) | 94.10 (75.95) | 93.00 (74.68) | 92.00 (73.26) | 0.90 | 0.82 | 0.85 | 0.76 | 84.96 | 81.86 | 79.05 | 69.92 | 9.2 (17.65) | 8.2 (16.63) | 7.5 (15.89) | 7.1 (15.45) |
| P2T5 | 96.70 (79.61) | 96.10 (78.72) | 94.00 (75.85) | 93.40 (75.20) | 0.92 | 0.87 | 0.87 | 0.79 | 88.68 | 83.60 | 81.78 | 73.82 | 9.2 (17.66) | 8.2 (16.64) | 7.1 (15.45) | 7.1 (15.45) |
| SE(m)± | 0.58 | 1. 20 | 0.58 | 1.23 | 1.76 | 0.007 | 2.56 | 0.005 | 0.76 | 0.69 | 0.99 | 0.79 | 0.009 | 0.08 | 0.06 | 0.06 |
| CD at 5% | 1.73 | 3.61 | 1.73 | 3.63 | NS | 0.02 | NS | NS | 2.25 | 2.05 | 2.93 | 2.32 | 0.02 | NS | 0.19 | NS |

**Table 2:** Effect of seed coating treatments on electrical conductivity (mmhos/cm/g) and seed infection (%)

| | Electrical conductivity (mmhos/cm/g) | | | | Seed infection (%) | | | |
|---|---|---|---|---|---|---|---|---|
| | 2 | 4 | 6 | 8 | 2 | 4 | 6 | 8 |
| P1T0 | 1.27 | 1.35 | 1.80 | 2.1 | 2.4(8.93) | 3.1(10.14) | 5.3(13.68) | 9.3(17.74) |
| P1T1 | 1.18 | 1.23 | 1.72 | 2.24 | 1.0(5.76) | 1.3(6.53) | 3.3(10.46) | 6.3(14.57) |
| P1T2 | 1.34 | 1.13 | 1.49 | 1.63 | 0 | 1.1(4.62) | 1.2(6.54) | 6.0(14.14) |
| P1T3 | 1.05 | 1.09 | 1.29 | 1.55 | 0 | 0.8(3.82) | 1.3(6.54) | 5.0(12.99) |
| P1T4 | 0.90 | 1.12 | 1.31 | 1.53 | 0 | 0.8(3.82) | 1.6(7.26) | 6.0(14.15) |
| P1T5 | 0.87 | 1.02 | 1.23 | 1.37 | 0 | 0.1(1.91) | 1.1(3.10) | 5.1(13.01) |
| P2T0 | 1.13 | 1.26 | 1.56 | 2.03 | 1.8(5.74) | 1.1(6.03) | 5.6(13.68) | 8.2(16.62) |
| P2T1 | 1.06 | 1.18 | 1.30 | 1.52 | 0.8(3.83) | 1.3(6.54) | 3.2(10.14) | 5.2(13.25) |
| P2T2 | 0.95 | 1.03 | 1.27 | 1.47 | 0 | 1.8(5.73) | 1.6(7.26) | 4.4(12.18) |
| P2T3 | 0.93 | 0.97 | 1.12 | 1.36 | 0 | 0.4(2.71) | 1.6(7.26) | 3.3(10.54) |
| P2T4 | 0.89 | 1.00 | 1.14 | 1.34 | 0 | 0.4(2.71) | 1.3(7.26) | 3.9(11.38) |
| P2T5 | 0.84 | 0.95 | 1.08 | 1.20 | 0 | 0.1(1.91) | 0.1(1.81) | 2.7(9.45) |
| SE(m)± | 0.07 | 0.009 | 0.58 | 0.09 | 1.20 | 2.05 | 0.15 | 0.49 |
| CD at 5% | 0.23 | 0.02 | 1.73 | 0.28 | NS | NS | 0.44 | 1.44 |

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