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Effect of treatment, packing material and storage on viability in paddy (*Oryza sativa L.*)

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Abstract
This study was for evaluate the effect of packaging materials and different treatment on viability during storage. This evaluation was started in two different rice varieties was studied during October 2014 to March 2015. Two variety *viz.* Pusa basmati-1 (V_1), and Jaya (V_2) were equally divide into 4 lots of 2000 gm each and treated with castor oil @ 5ml/kg seed (T_1), neem cake @ 10 gm/ kg seed (T_2), Thiram @ 2gm/kg (T_3) seed alone with control (untreated T_0) and packed in vacuum polythene bags (P_1), non vacuum polythene bags (P_2), and jute bags (P_3) and maintained for 24 weeks with 12% seed moisture content under ambient conditions. The results clearly revealed that seed stored in vacuum polythene bags and treated with castor oil, variety Jaya was proved to be superior of viability (mean P_1 83.38, T_1 83.33 and V_2 83.17). According to this research castor oil protective agent against seed deterioration due to fungal invasion and physiological ageing as result of which the seed viability was maintained for a comparatively longer period of time.

Keyword: Packaging materials, seed viability, storage and seed treatments

Introduction
Rice grain is hygroscopic and in open storage systems the grain moisture content will eventually equilibrate with the surrounding air. High relative humidity and high temperatures contribute to high equilibrium or final moisture content. In many tropical countries, the equilibrium moisture content is above safe storage moisture levels. Ten to fifteen percent production was found reduced due to use of poor quality seed (Huda, 2001) [3]. The purpose of paddy storage facility is to prevent grain loss from weather, moisture, temperature and microorganisms. Rice storage facilities take many forms depending on the quantity of grain to be stored, the purpose of storage, and the condition of the store. Seeds should be stored at proper moisture, temperature, packing material, treatments, to maintain their viability. Normally seeds stored in dry air at room temperature remain viable till the next growing season. For prolonged storage low humidity and low temperatures (15^0C) are required. If germination is low plant stand in the field will be less and seed vigor also will be less it will affect the ultimate output of the crop, which will result in low yields and losses. It is important to know that the seeds that are stored in a gene bank will grow to produce plants. Therefore they must have a high viability at the start and during storage. The viability of seeds at the start of storage will also determine, within the environmental conditions, the storage life of the accession. Major part of seed quality deteriorates at the time of storage in our country. Most of the farmers do not know how to preserve seed. They store their seeds as they store their food grain. Although seed quality is governed by genetic make-up, but commonly the quality of seeds is deteriorated during storage period. Seed storage and retention of seed viability always an important Consideration in agricultural practice. Poor storage conditions greatly affect seed vigor.

Methodology
The experiment was conducted at the Department of Genetics and Plant Breeding, Sam Higginbottom University of Agriculture, Technology and Science, Allahabad, Uttar Pradesh, India during October 2014 to March 2015. Experiment was laid down in a Factorial Complete Randomized Design (FCRD), with four replications. The seed of V_1 (Pusa basmati-1), V_2 (Jaya) were sun dried to a uniform moisture content of 15% before proceeding for storage. Seed to each variety were castor oil (T_1) 5 gm/kg, neem cake (T_2) 10 gm/kg and Thiram (T_3) 3gm/kg and the last portion was kept as untreated control (T_0) and stored in three different types of packaging materials *viz*. vacuum polythene bags (P_1), non-vacuum polythene bags (P_2) and Jute bags (P_3) and at room temperature in seed store house for different period of time and recorded the seed viability with TZ test.

Procedure

In this test, seed is incubated in a dilute (0.1%) solution of 2,3,5-triphenyltetrazolium chloride. Initially the tetrazolium solution is colorless but changes to red when it comes into contact with hydrogen (reduction) derived from enzymes in the respiration process. Embryos showing active respiration are considered "viable" and turn red. The darker the color greater the respiratory activity in the seed. Light pink color indicates a seed with reduced viability when compared to a seed that stains dark red. There is some evidence that microwaving a seed will improve its ability to germinate. This effect may be the result of increased permeability due to the heating. In this experiment was use the tetrazolium test to monitor the effect of microwaves on paddy viability

Results and Discussion

The maximum seed viability percent was found in (Jaya, 87.14 %) followed by (Pusa basmati, 85.56 %) after storage of 24 weeks. The seed viability percent went on decreasing with increase in storage period in different variety of rice.The seed viability percentage after 24 weeks of storage as affected by the fungicidal seed treatment (castor oil, 86.99 %) scored significantly superior values than (neem cake, 85.72 %), (Thiram, 86.5 %) (control, 86.06 %) which revealed the least value.

With reference to the packaging materials, (non vacuum polythene, 86.71%) were found to be significantly superior followed by P_1 (vacuum polythene, 85.87%) and P_3 (Jute bags, 84.13 %) being least after 24 months of storage bin securing the seed viability percentage.

Table indicating the interaction effect of variety, fungicides and packaging material on seed viability at different period of storage showed significant different and the treatment combination ($V_1T_3P_2$) recorded superior values of seed viability after 24 weeks of storage.

The decline in viability percentage may be attributed to ageing effect leading to depletion of food reserves and decline in synthetic activity of embryo apart from death of seed because fungal invasion, insect damage, fluctuating temperature, relative humidity and storage container in which seeds are stored. This suggests that castor oil protective agent against seed deterioration due to fungal invasion and physiological ageing as result of which the seed viability was maintained for a comparatively longer period of time. Significant differences in seed viability percentage due to seed treatments were observed throughout storage period. The Bioagent and chemical treated rice seed significantly higher seed viability percentage compared to untreated seeds.

Table 1: Effects of different genotypes, seed treatments and packaging materials on seed viability of rice seed at different period of storage.

Treatments		4 week	12week	24week
Bioagent/Chemical				
T_0	Control	89.33	86.17	83.00
T_1	Castor oil	90.83	86.83	83.33
T_2	Neem cake	88.83	86.00	82.33
T_3	Thiram	89.83	86.67	83.00
	CD at 5%	0.242	0.170	0.208
Variety				
V_1	Pusa basmati	89.33	85.67	81.67
V_2	Jaya	90.08	87.17	84.17
	CD at 5%	0.209	0.148	0.180
Packaging Material (F)				
P_1	Polythene bag (vacuum)	89.88	86.88	83.38
P_2	polythene bag (non vacuum)	89.38	86.00	82.25
P_3	Jute bag	89.88	86.38	83.13
	CD at 5%	0.242	0.170	0.208

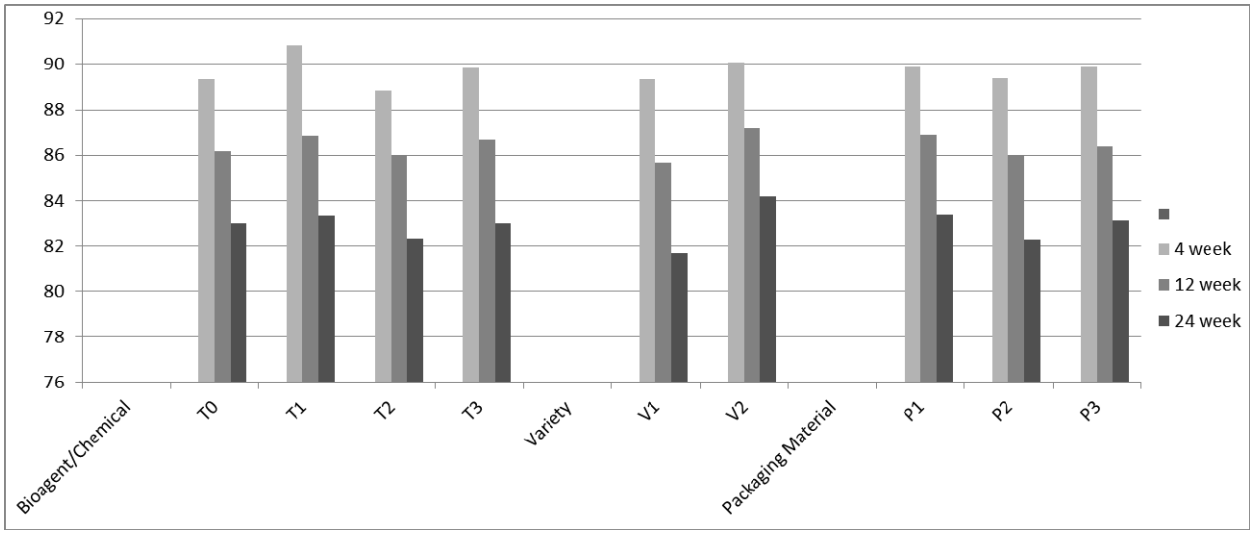

Fig 1: Effect of different treatment, packaging material on seed viability during storage.

Reference

1. Abram J. Bicksler Testing Seed Viability Using Simple Germination Tests; A Regional Supplement to ECHO Development Notes. Unpublished. 2011, 1-4
2. Duruigbo CI. Assessing the viability of maize and cowpea seeds stored using local plant biocides. New York Science Journal. 2012; 3:55-60
3. Huda MN. Why quality seed? Reality & vision, Bangladesh context. Bangladesh- German Seed Development Project, Dhaka, Bangladesh. 2001, 90.
4. International Seed Testing Association (ISTA). ISTA Working Sheets on Tetrazolium Testing. Vols. I and II. ISTA, Bassersdorf, Switzerland, 2003.
5. Porter R, Durrell M, Romm H. The use of 2, 3, 5-triphenyl-tetrazoliumchloride as a measure of seed germinability. Plant Physiol. 1947; 22(2):149.
6. Paul SR, Sharma NN, Sarma D, Borah RK, Nath PD. Maintenance of viability and vigour of stored mungbean

seeds under the ambient conditions in the hills zone of Assam. Annals of Agricultural Research. 1996; 17(2):196 -198.
7. Singh SN, Srivastava SK, Agrawal SC. Viability and germination of soybean seeds in relation to pre-treatment with fungicides, period of storage and type of storage conditions. Tropical Agriculture, United Kingdom. 2007; 65(2):106-108.
8. Terry J, Probert RJ, Linington SH. Processing and maintenance of the Millennium Seed Bank collections. In:Seed Conservation. Turning Science into Practice. RD Smith, JB Dickie, SH Linington, HW Pritchard and RJ Probert, eds. Royal Botanic Gardens Kew. 2003, 307-325
9. Verma P, Kaur H, Petla BP, Rao V, Saxena SC, Majee M. PROTEIN L-ISOASPARTYL METHYLTRANSFERASE2 is differentially expressed in chickpea and enhances seed vigor and longevity by reducing abnormal isoaspartyl accumulation predominantly in seed nuclear proteins. Plant Physiol. 2013; 161(3):1141-1157.
10. Wharton MJ. The use of tetrazolium test for determining the viability of seeds of the genus Brassica. Proc Int Seed Test Assoc. 1955; 20:81-88.