

Soyabean Seed Quality Evaluation

Sunil Chandra Joshi*, N. Indrakumar Singh** and J.S. Chauhan***

*M. Phil. Student, Global Open University, Nagaland (India). E-mail: cool.suniljoshi@rediffmail.com

**Research Scholar, Department of Seed Science & Technology, H.N.B. Garhwal University, Srinagar Garhwal, (Uk)-246 174 (India). E. mail: indrasst08@gmail.com

***Assoc. Prof. & Head, Department of Seed Science & Technology, H.N.B. Garhwal University, Srinagar Garhwal, (Uk)-246 174 (India). E. mail: jai002004@yahoo.com

Abstract: Seed quality is very essential for optimum stand establishment and maximum yield potential in soyabean. As a result, it is necessary to have different seed testing parameters that permit rapid, objective and accurate evaluation of seed quality. This investigation evaluated physical and physiological seed quality components of four seed lots of one soyabean (*Glycine max* L. Merr.) cultivar PS-1092 collected from different seed farms of Almora district of Uttarakhand (India). Each sample was divided into four replicates. Seed quality was evaluated by physical purity, standard germination, imbibition rate, seed vigour test and pure live seed. Experimental results has shown that, sample S₂ recorded the maximum pure live seed (95.06 %) with high vigour and sample S₃ showed the minimum pure live seed with 79.54%. So, as per observation recorded, sample S₂ and S₄ meets the minimum standard of purity and germination percent. In another case purity percent of sample S₁ and S₃ was below the minimum standard but the germination percent was very high from the recommended standard. So from the discussion it may be concluded that as seed lot 2 (Sample S₂) possessed the highest quality than any other seed lots but all the remaining three seed lots were found good enough to use as a planting material in the next season as the quality value was within the standard value. [Nature and Science. 2009;7(5):82-85]. (ISSN: 1545-0740).

Key Words: Quality, germination, purity, vigour, planting value

Introduction

Soyabean seed evaluation of vigour and its relation with field seedling emergence can provide secure indicatives of seed physiological potential. The production of high quality seed results in many direct benefits to the seed consumer and seed producer. Use of high quality seed affords the seed consumer many production options; because high quality seeds better tolerate stressful planting conditions. Planting a superior seed lot usually results in a more uniform stand that allows better secondary tillage and weed/pest control. All of these factors promote earlier and more uniform emergences, which can lead to increase yield and more economic return to seed consumer.

Different seed testing parameter's results will provide the basic seed quality information and aid in planting decisions. Growers should conduct germination test immediately after harvest to determine if the seed is worth saving and again before planting to see if they are worth planting. Seed quality can change dramatically during storage, so testing twice is always good. The quality of the seed lot is judged by the relative percentage of various components. The quality is considered superior, if pure seed percentage is above 98, and other seeds and inert matter percentage as low as possible. The purity test is done with the object of determining the composition by weight of the sample being tested, and by inference the composition of the seed weight. Since germination test are based on pure seed components, it can readily be seen that purity analysis and germination tests compliment each other. Thus the actual planting value of seed can be determined only when the purity analysis and germination tests are considered together. One of the primary factors is access to moisture for the seed

([McDonald & Copeland, 2004](#); [Hartmann and Kester, 1999](#)). High physiological potential (germination and vigour) of a given seed lot credentialed it for a superior performance in a broad range of field environmental conditions ([Egli & TeKrony, 1996](#); [Marcos Filho, 1999](#)).

The investigation was conducted to characterize the quality of soyabean seeds by comparing the different testing parameters with respect to the Indian Minimum Seed Standard in order to maintain the quality of the seed for further generation.

Materials and Methods

The investigation was conducted at the Seed Testing Laboratory of Dept. of Seed Science and Technology, H.N.B. Garhwal University. According to the Indian Minimum Seed Standard the germination percent of soyabean is 70 % and purity percent is 98 %.

Four samples of soyabean (*Glycine max* L. Merr.) cultivar PS-1092 seeds were collected from different seeds lots of different villages of Almora district of Uttarakhand (India). Each sample was assigned as S1, S2, S3 and S4 and divided into four replicates for each sample. The work consists of purity test, standard germination test, imbibition rate, seed vigour test and pre live seed.

Purity analysis sorted out three components; inert matter, other seed and pure seed. The three components were weighed by using the Electronic Balance having the accuracy of $\pm 0.001\text{g}$ and expressed in percentage. Standard germination test was conducted on a 100 seeds per replicate at 25°C for six days in germinator by using filter paper and, for seedling emergence test sand was taken as substratum and kept at the same temperature. Pure live seed (PLS) percentage represents the amount of pure seeds in a seed lot that are capable of producing seedlings. It is calculated by using the formula:

$$\text{PLS} = \text{Germination\%} \times \text{Purity \%} / 100.$$

For imbibition, four replicates of 40 seeds to each were weight before and after imbibition. Seeds were imbibed in 100 ml of water for 72 hours and measurement were taken 3 times i.e., after every 24 hrs. Seedling length was taken after the completion of germination period (7 days) in randomly selected five seedlings from each replication. The dry weight of the 5 randomly selected seedlings (without cotyledons) for each replicate was measured after it was dried on oven at 103°C for 24 hrs.

Results and Discussion

As quality is considered superior, if pure seed percentage is above 98, and other seeds and inert matter percentage as low as possible. Germination test are based on pure seed components, this has been shown by the observations recorded and that purity analysis and germination tests compliment each other. Thus the actual planting value of seed can be determined only when the purity analysis and germination tests are considered together. Vigour test have been used as complementary information to the germination test. They are considered efficient to classification of seed lots according to physiological potential, but it is also desirable that they provide coherent results with field seedling emergence.

Recorded experimental findings ([Table 1](#)) showed that sample S2 exhibited maximum germination, PLS and seedling length values. Maximum purity percent, highest imbibition and seedling emergence in minimum days was observed in Sample S4 and S1 obtained maximum (0.97 gm) dry weight of seedling. Seeds of sample S4 showed high emergence percent at the first reading with high rate of imbibition due to

the characteristic of high accessibility moisture seed coat. Similar responses have been described by [McDonald & Copeland \(2004\)](#). For early seedling emergence all samples were started taking observation from the 3rd day of sowing, on the 1st day of counting sample S4 and S3 recorded the maximum and minimum seedlings respectively. But there was no significant difference on the final counting date of seed germination except S3, having low vigour seed, which support the report of [O'DELL *et al.* \(1998\)](#). Sample S2 exhibited maximum germination, PLS and seedling length values with high seedling dry weight indicated more vigour than any other samples which was in accordance of the reports of [Egli *et al.* \(1990\)](#), [Egli & TeKrony, \(1996\)](#) and [Marcos Filho \(1999\)](#). The result of low emergence percentage contradicts the observation of [Green *et al.* \(1965\)](#), who reported that low emergence percentages in the laboratory and field were associated with high occurrence of green cotyledons in soyabean.

Table 1. Mean values of analysis by different tests methods of soyabean seed quality. In the table, seed lot 2 (S2) and lot 4 (S4) recorded maximum mean values in varied tests.

SS	P %	I (after 72 hrs)	G (%)	PLS %	E %	P. ht. (cm)	SDW (gm)
S1	94.52	6.83	95	89.79	99	16.60	0.97
S2	98.15	6.28	97	95.21	96	17.18	0.94
S3	97.63	6.80	82	80.06	95	10.43	0.57
S4	98.43	7.29	96	94.49	99	16.45	0.93

Acronym used: SS=Seed Sample, P=Purity, I=Imbibition, G=Germination, PLS=Pure live seed, E=Emergence, P. ht.=Plant height, SDW=Seedling dry weight

Thus, from the discussion it may be concluded that seed lot 2 (Sample S2) possessed the highest quality than any other seed lots but all the remaining three seed lots were found good enough to use as a planting material in the next season as the quality value was within the standard value of Indian Minimum Seed Standard.

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