



## SEED GERMINATION TEST TECHNOLOGY PRACTICUM (STANDARD DEVELOPMENT TEST)

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### Abstract :

The aim of this practicum is to determine the percentage of seed germination, and to determine the germination capacity of the seed. The tools used in this practicum were a germonator, tweezers, clear plastic, and writing tools and the materials used in this practicum were substrate paper, 25 soybean seeds and 25 corn seeds. The results obtained were: On observations on the first day, it was seen that the germination value of both soybean seeds (*Glycine max L*) and corn seeds (*Zea mays*) had not changed because the time needed for the seeds to germinate had not been sufficient. In the 2nd observation, there were changes in soybean seeds (*Glycine max L*) and in the 3rd observation, there were changes in soybeans (*Glycine max L*).

Keywords: Corn Seeds, Practicum, Standard Development Test

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## INTRODUCTION

Plant seeds are used for agricultural purposes and development and have an agronomic function (Kartasapoetra, 2003). The main factor that determines the success of production in agriculture is the use of quality seeds. Quality seeds are seeds that germinate under favorable environmental conditions. Apart from that, he must also be able to produce quality seeds that he can plant well in non-optimal environmental conditions. The Quality Seed Index is that it has good viability and vigor. According to KEPMENTAN number 620 (2020), seed quality is an overall description of the characteristics of good seeds indicating conformity with certain requirements.

Seeds are the largest part of the seed, so knowledge about seeds must be studied. With these seeds, the independence of the next generation of plants begins. Seeds contain miniature plants, structurally and physiologically suited to their role as dispersal or propagation units. Moreover, it is fully endowed with food reserves to sustain the young plant until it can maintain itself as an autotrophic organism. In the context of agronomy, seeds must be able to produce plants with maximum yields through advanced technology, therefore seeds must be of good quality (good quality, nutritious). The meaning of quality or good seed quality is the ability of seeds to show: high germination rate, low percentage of grass seeds, high vigor, free from pests and other contaminants (Panggabean, 2012).

Seed viability is the vitality of seeds which can be demonstrated through metabolic symptoms and growth symptoms, apart from that, germination is also a benchmark for potential seed viability parameters. In general, seed viability is defined as the ability of the seed to grow into normal sprouts. Seed germination has a close relationship with seed viability and the number of seeds that germinate from a set of seeds is an index of seed viability (Ridha et al., 2017).

Seed viability testing can be done directly, including assessing important seed structures, and indirectly, examining symptoms of seed metabolism. In direct testing, several test substrates can be used

such as paper, cotton, sand, soil and others. However, paper substrates are more widely used because they are more convenient and meet the requirements of modern seed quality control procedures (Leisolo et al., 2013).

Seed testing is carried out in the laboratory to determine the physical and physiological qualities of a variety or group of seeds. One of these tests is for germination parameters which are used as a percentage of normal sprouts based on an assessment of the structure of embryo development that is directly observed. Testing under field conditions often does not provide satisfactory results because accurate results cannot be repeated Nuno, L et al. (2017).

In this practicum, the researcher used abstract paper with the UKDp test method in his testing. Paper Substrate is a practical material that does not require much space, is easy to assess the important structures of sprouts and is easy to standardize. Types of paper substrates that can be used are straw paper, filter paper, opaque paper, and so on (Leisolo et al., 2013).

## RESEARCH METHOD




The Seed Technology Practicum was held at the Seed Technology Laboratory in March 2023. The tools used in this practicum were germonators, tweezers, clear plastic, and stationery and the materials used in this practicum were substrate paper, 25 soybean seeds and 25 corn seeds. The practical procedures carried out are as follows: 1) Prepare the tools and materials to be used; 2) Place 3 sheets of substrate paper in the bottom layer of the seedling tub then wet it slowly with a sprayer; 3. Take 3 sheets of paper substrate and place them on top of plastic that has been cut to the size of the paper substrate then plant 25 soybean seeds and 25 peanut seeds on top of them at a distance that is not close to each other; 4). Cover the planted substrate with the remaining 3 sheets of substrate paper then roll it using the UKDp test method, making 3 repetitions; 5). Insert them into the germinator alternately per group; 6). Make observations 1 x 24 hours for 3 days; 7). After the observations have been made, the SGT = Standard Germination Test calculation is carried out using the formula:

$$\frac{\text{Normal number of germinated seeds}}{\text{Number of seeds planted}} \times 100\%$$

## RESULTS AND DISCUSSION

Based on the results of the practicum that was carried out, it was found that the results of observing soybean seeds can be explained in table 1. 1st observation.

Table 1. Observation of 1st soybean seeds

Test	Germination Power %	Normal Sprouts	Abnormal Sprouts	Dead Seed	Documentation
1	0%	0	0	0	
2	0%	0	0	0	
3	0%	0	0	0	

Based on table 1. The results obtained have been calculated using the calculation formula SGT = Standard Germination Test with the following explanation:

$$\text{SGT} = (\text{number of germinated seeds}) / (\text{number of germinated seeds}) \times 100\%$$




$$\text{Repeat 1} = 0/25 \times 100\% = 0\%$$

$$\text{Repeat 2} = 0/25 \times 100\% = 0\%$$

$$\text{Test 3} = 0/25 \times 100\% = 0\%$$

After getting the results of the 1st observation table, continue with the 2nd observation with a time span of one day after the 1st observation table. To make it clearer, see table 2.

Table 2. 2nd observation of soybean seeds

Test	Germination Power %	Normal Sprouts	Abnormal Sprouts	Dead Seed	Documentation
1	52%	13	0	0	
2	0%	0	0	0	
3	60%	15	0	0	

Based on table 2. Then you get the results that have been calculated using the calculation formula SGT = Standard Germination Test with the explanation:




$$\text{Test 1} = 13/25 \times 100\% = 52\%$$

$$\text{Repeat 2} = 0/25 \times 100\% = 0\%$$

$$\text{Test 3} = 15/25 \times 100\% = 60\%$$

After getting the results of the 2nd observation table, continue with the 3rd observation with a time span of one day after the 2nd observation table. To make it clearer, see the table 3.

Table 3. Observation of soybean seeds 3rd

Test	Germination Power %	Normal Sprouts	Abnormal Sprouts	Dead Seed	Documentation
1	40%	10	0	0	
2	20%	5	2	2	
3	0%	0	0	0	

Based on table 3, we get the results that have been calculated using the calculation formula SGT = Standard Germination Test with the following explanation:

$$\text{Test 1} = 10/25 \times 100\% = 40 \%$$

$$\text{Test 2} = 5/25 \times 100\% = 20 \%$$

$$\text{Test 3} = 0/25 \times 100\% = 0 \%$$

This practicum discusses the germination test or Standard Germination Test (SGT). According to Nurhafidah et al., (2021) seed germination is the process of the initial stages of plant growth in the nursery or nursery, in this stage the embryo in the seed undergoes a number of physiological changes. In this practicum, the materials used were 25 soybean seeds and 25 corn seeds arranged on substrate paper at a predetermined distance.

On observation on the first day, it was seen that there had been no change in the germination value of both Soybean seeds (*Glycine max L*) and Corn seeds (*Zea mays*) because the time required for the seeds to germinate had not yet been met. In the second observation there was a change in the Soybean seeds (*Glycine max L*) in U1 which had a germination capacity of 0%, U2 had a germination capacity of 0%, U3 had a germination capacity of 12% and then in the Corn seeds (*Zea mays*), there was a change in U1 it has a germination capacity of 52%, U3 has a germination capacity of 60% and. Only U2 did not experience changes in germination power. This means that the corn seeds in U2 have a hard texture so they have not germinated. In the 3rd observation, there was a change in soybeans (*Glycine max L*) where U1 had a germination rate of 0%, U2 had a germination rate of 8%, U3 had a germination rate of 8%. Meanwhile, for corn seeds (*zea mayas*), U1 has a germination capacity of 40%, U2 has a germination capacity of 20%, U3 has a germination capacity of 0%. In the third observation for soybeans and corn there was an increase in the germination rate. Therefore, this increase in germination rate is very significant. This may be influenced by temperature conditions in the germination device. Temperature also plays an important role in germination testing. The recommended temperature in the germination test is a constant temperature between 20 and 30°C.

The germination test is a direct test of seed viability with direct indication. A pathogen is said to be normal if all its parts (root, hypocotyl or scutellum, plumule, cotyledons) are intact and not damaged at all. A sprout is considered abnormal if one of its parts is absent, or present but damaged or imperfect. Seeds are considered dead if at the end of the testing period they show no signs of germination and are not hard seeds. Hard seeds are seeds that are still hard even though they have been moistened during growth. In the germination test, a seed is said to germinate if it can produce sprouts with normal or close



to normal parts. Some seeds that produce hard seeds are considered viable even if they do not germinate when tested according to officially accepted procedures. Sometimes dormant seeds require special germination testing. There is a viability test which aims to quickly find all viable seeds, both dormant and not dormant.

## CONCLUSION

From the discussion above we can see that this practicum regarding the Germination Test (SGT) uses the UKDP method of rolled substrate paper. Therefore, it can be concluded that to determine the percentage of soybean and corn sprouts, the following formula is used: Germination (SGT) = number of germinated seeds/germinated seeds multiplied by 100%. The percentage of soybeans and corn in the 1st and 5th observations did not increase significantly. Because there are several factors that influence it such as light, humidity, temperature and time. At the germination test stage, a seed is said to germinate if it can produce sprouts with normal or close to normal parts. Some seeds that produce hard seeds are considered viable even if they do not germinate when tested according to officially accepted procedures. Sometimes dormant seeds require special germination testing. When there are live seeds, it is easy to be negatively controlled. Indication that the seeds are dead. Even though the seed shows signs of life, such as its respiratory rate, even the embryo cells do not die. Seeds can be classified as capable of surviving even if they do not grow.

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