Dharmawangsa: International Journals of The Social Science, Education and Humanities
P - ISSN : 2716-5132, E - ISSN : 2723-0783 Vol. 6 Number 2 July 2025 Page: 333-337

Viability And Vigor Test Of Rice Seeds (Oryza Sativa, L.) Farmer's Harvest Results

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ABSTRACT

The study aimed to determine the viability and vigor of rice seeds harvested by farmers. The study was conducted in April 2025 in Pare Kranggan Village, Temanggung, by taking several samples of dry rice harvested by farmers. The samples were dried and then tested for viability and vigor. Each seed was placed in a petri dish containing 100 seeds and replicated three times. This study was designed using a Completely Randomized Design. Observations were made for 14 days, observing seed germination (viability) and seed vigor.

The results showed that seeds with a germination rate (viability) above 85% were only obtained from two sample farmers. Seed viability significantly influences the seed vigor index, with seeds with high viability also having a high vigor index. High vigor seeds are indicated by seeds with a high germination rate, namely with a vigor index above 20. One factor influencing low seed viability and vigor is that at harvest, the rice is not yet fully physiologically ripe.

Keywords: viability, vigor

INTRODUCTION

The demand for rice is increasing with population growth and shifts in consumption patterns from non-rice to rice-based foods. This situation becomes unstable if the balance between demand and supply is imbalanced. This situation forces Indonesia to import large quantities of rice. If left unchecked, this situation will lead to an increased dependence on rice imports, which will continue to grow in the future.

One way to meet these needs is through proper plant cultivation, for example, by using superior seeds. Good seeds are those with high viability and vigor. Maximum seed viability is achieved when the seeds reach physiological maturity. To ensure high or good storability, seeds must have the highest possible vigor and germination potential (Sutopo, 2002).

Seeds will deteriorate during storage, reducing the supply of high-quality seeds. Seed quality is related to germination indicators, particularly in tropical regions, which often experience problems due to environmental factors not only during planting but also during storage. Seed deterioration is a gradual and irreversible process of quality decline due to physiological changes caused by internal factors. The process of seed deterioration cannot be prevented or avoided; however, it can be reduced through several efforts and treatments during storage, namely through proper storage methods. Seed deterioration increases in line with increasing seed moisture content. Seed viability during storage is determined by internal and external factors. Internal factors include seed genetic traits, initial viability, seed coat condition, and moisture content, while external factors include

seed packaging, gas composition, temperature, and humidity of the storage room (Kartasapoetra, 2003).

According to Sutopo (2002), seed vigor is the ability of seeds to grow normally in suboptimal environmental conditions. Seed vigor is reflected by two pieces of information about viability: germination strength and seed storage capacity. Vigor is separated into genetic vigor and physiological vigor. Genetic vigor is the vigor of seeds from different genetic lines, while physiological vigor is vigor that can be distinguished within the same genetic line. Physiological vigor can be seen from indications of root growth, plumule or coleoptile, resistance to disease attacks, and cotyledon color, among others. Initial seed vigor also greatly determines seed quality, because during processing the seeds have undergone storage. Seeds with high initial vigor will experience a slower deterioration process during processing than seeds with low initial vigor. Characteristics of seeds with high vigor are long-term storage resistance, resistance to pests and diseases, rapid and even growth, and the ability to produce normal, productive mature plants in suboptimal growing environments. Meanwhile, the definition of seed germination capacity according to Kartasapoetra (2003) is the ability of seeds to grow normally in a suitable environment.

Efforts to increase rice yields and maintain high quality require proper cultivation practices to ensure high productivity. One such effort is testing the viability of rice seeds for subsequent planting.

RESEARCH METHOD

Place and Time of Research

The research was conducted in Pare Village, Kranggan District, Temanggung Regency in April 2025.

Research Materials

The materials used were dry harvested grain samples taken from alcohol farmers and distilled water.

Experimental Tools

The tools used in this research were stationery, computers, documentation tools, petri dishes, tweezers, paper towels, and beakers.

Method

This descriptive study used several rice harvest samples. The samples were dried and then tested for viability and vigor. Each seed was placed in a medium containing 100 seeds, and the experiment was replicated three times. A completely randomized design was used. Observations were conducted until 14 days old.

Observed Variables

Germination power

Observations were made by counting the number of normally growing seed sprouts each day. The percentage of germination, a parameter of seed viability, was calculated using the formula:

$$Dk = \frac{\sum \text{benih yang berkecambah normal}}{\sum \text{benih yang dikecambahkan}} \times 100\ \%$$

Vigor, calculated using the vigor index formula as follows:

IV = G1/D1+G2/D2+ ….Gn/Dn

G = Number of seeds that germinate on day n

D = Time corresponding to the number G of days n

Data analysis

Data analysis was carried out after completing the observations by calculating the germination power and seed vigor index.

RESULTS AND DISCUSSION

This research was conducted to determine the viability and vigor of seeds.Rice harvested by farmers. Table 1 shows that the viability of rice seeds from 10 samples taken shows that seeds with viability / germination above 85% were only obtained from two sample farmers. Good rice seeds are indicated by germination / seed growth power above 85%, meaning the seeds are suitable for use as further planting material, while seeds with a germination power of less than 85% are no longer suitable for use. Seeds with a germination power of less than 85% have a higher mortality rate.

Table 1. Seed Viability

Sample No.	Test			
	1 (%)	**2 (%)**	**3 (%)**	**Average (%)**
1	72	75	82	**76.33**
2	96	93	96	**95.0**
3	93	96	97	**95.33**
4	27	34	39	**33.3**
5	78	69	72	**73.00**
6	96	93	95	**94.7**
7	96	92	91	**93.00**
8	67	75	71	**71.00**
9	82	70	68	**73.3**
10	34	34	32	**33.33**

The results of the study show that seeds with high vigor are indicated by seeds that have high germination power, namely seeds harvested from two sample farmers, with a vigor index above 20, as shown in table 2. Seeds with a high vigor index value mean that the seeds have better seed vigor compared to seeds that have a lower vigor index value, after germinating and becoming seedlings that are more resistant to pest and disease attacks in the field, their growth is fast and even and they are able to produce normal and high-yielding adult plants.

Table 2. Seed Vigor Index

Sample No.	Test			
	1	**2**	**3**	**Average**
1	14.50	16.54	16.89	15.98
2	24.07	21.07	23.17	22.8
3	22.90	21.95	22.02	22.29
4	4.63	5.50	6.86	5.7
5	15.98	14.81	14.81	15.20
6	22.44	21.60	20.28	21.4
7	21.18	20.95	20.57	20.90
8	11.31	13.42	11.82	12.18
9	18.23	15.92	15.37	16.5
10	11.32	10.53	10.80	10.89

Observations indicate that the embryos of the seeds are still incomplete (not yet physiologically mature), resulting in suboptimal seed viability and vigor. This significantly impacts seed quality. The seed vigor index declines more rapidly than the seed viability index. To ensure the harvest can be used as seed or for subsequent planting, harvesting should be done when the rice is physiologically ripe. The farmers in the sample generally harvest rice before physiological maturity, resulting in low seed viability and vigor index.

CONCLUSION

The research results concluded that the rice seeds harvested by the sample farmers were unsuitable for use as planting material for the next season due to their poor vigor, meaning they had low germination and viability. Of the 10 samples taken, only seeds from two sample farmers had a viability above 85% (seeds suitable for use as planting material for the next season). Seed viability significantly influences the seed vigor index, with seeds with high viability also having a high vigor index.

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