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Seed Testing in Sunflower Seeds Comparing Farmer Seed Vs. Certified Seed Conversion

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Abstract:- Our research focuses on the development of sunflower seed testing, both farmer seed and certified seed undergo crucial assessments to ensure quality and performance. Farmer seed, sourced from previous harvests or informal channels, may lack standardized testing protocols, posing risks of variable quality and lower yields. Conversely, certified seeds, produced by authorized agencies, undergo rigorous testing including germination, purity, bromide chemical, and magnetic force tests. These tests ascertain genetic purity, germination rates, and freedom from contaminants or diseases, ensuring consistent performance and higher yields. While farmer seed may offer initial cost savings, the reliability and quality assurance associated with certified seeds make them preferable for sunflower cultivation. Certified seeds, backed by comprehensive testing and adherence to strict standards, mitigate risks, maximize crop potential, and contribute to sustainable agricultural practices. Therefore, farmers are encouraged to prioritize certified seeds for improved productivity and long-term success in sunflower farming.

Keywords:- *Sunflower, Farmer Seed, Certified Seed, Purity Test, Germination Test, Genetic Purity, Bromide Chemical, Magnetic Force Tests.*

I. INTRODUCTION

Our research focuses on advancing sunflower seed testing to ensure the quality and performance of both farmer and certified seeds. Farmer seed, often sourced informally or from prior harvests, lacks standardized testing protocols, risking inconsistent quality and reduced yields. In contrast, certified seeds, produced by authorized agencies, undergo rigorous assessments including germination, purity, bromide chemical, and magnetic force tests. *International Journal of Scientific Engineering and Science Volume 4, Issue 10, pp. 1-7, 2020. ISSN*: *2456-7361.* Sunflower seeds, known for their nutritional value rich in vitamin E and antioxidants, support skin health, boost immunity, and promote heart health. Globally, sunflower seed production in 2022-23 decreased by 14%, notably in Ukraine, Russia, and Moldova. India witnessed an increase in sunflower seed production from 2.13 lakh tonnes in 2019-20 to 3.75 lakh tonnes in 2022-23, alongside a production of 190,000 metric tons of sunflower oilseeds. Despite initial cost savings, the reliability and quality assurance of certified seeds make them preferable for sunflower cultivation, mitigating risks and promoting sustainable practices. Our research, located at coordinates 10.8378° N latitude and 78.0531° Elongitude, aims to contribute to sustainable agricultural practices in Karur Paganatham and beyond. (*Szemruch C et al, (SSRG-IJAES) July - Aug 2019).*

II. MATERIALS AND METHODS

In our research, we focus on enhancing sunflower seed testing methods to ensure the quality and performance of both farmer and certified seeds. Farmer seed, typically obtained from previous harvests or informal channels, often lacks standardized testing procedures, leading to inconsistent quality and reduced yields. In contrast, certified seeds, produced by authorized agencies, undergo rigorous assessments, including germination, purity, bromide chemical, and magnetic force tests. These tests verify genetic purity, germination rates, and absence of contaminants or diseases, ensuring reliable performance and increased yields. While farmer seed may offer initial cost savings, the inherent reliability and quality assurance of certified seeds make them the preferred choice for sunflower cultivation. Supported by comprehensive testing and strict adherence to standards, certified seeds help mitigate risks, maximize crop potential, and promote sustainable agricultural practices. Consequently, farmers are encouraged to prioritize certified seeds for improved productivity and long-term success in sunflower farming. Our research, situated at coordinates 10.8378° N latitude and 78.0531° E longitude, aims to contribute to the sustainable advancement of agricultural practices in Karur Paganatham and its surrounding areas. The observed 75% improvement in farmer seed underscores a significant enhancement in seed quality and performance. *(Petar Canak et al, Jan 2020) [doi: 10.5937/SelSem2002053C]*.

A. Seed Test Methods:

➢ *Purity Test:*

- Purity Test.
- Germination Test.
- Genetic purity Test.
- Bromide chemical Test.
- Magnetic force Tests.

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A purity test in seed analysis assesses the presence of foreign matter, weed seeds, inert materials, and other crop seeds in a seed lot. It ensures that the seeds are of high quality and meet the standards required for planting and crop production.

➢ *Germination Test:*

A germination test is a method used to determine the viability and potential growth ofseeds by subjecting them to optimal conditions for sprouting. It measures the percentage of seeds capable of producing seedlings under controlled environmental conditions, providing insights into seed quality and potential crop establishment.

➢ *Genetic Purity Test:*

Genetic purity testing verifies the uniformity and authenticity of a seed variety by examining its genetic composition, ensuring it remains true to its intended characteristics and traits. This test is crucial in maintaining the integrity and consistency of seed stocks for reliable crop production and breeding programs.

➢ *Bromide chemical Test:*

The bromide chemical test is a method used to detect the presence of bromides in substances such as seeds or soil. It is particularly important in agriculture to determine soil fertility and potential toxicity levels for plant growth and development.

➢ *Magnetic Force Tests:*

The method improves seed germination percentage by optimizing conditions such as temperature, moisture, and substrate composition to foster ideal germination rates. Additionally, it involves the removal of inhibiting factors and the selection of high-quality seeds, ensuring improved overall germination performance.

Table 1 Magnetic Force Tests

TABULATION:

"100 No Seeds in All Samples"

NAME OF TESTS	SAMPLE-1	SAMPLE-2	SAMPLE-3	OVERALL SAMPLE %
Purity Test.	72	74	76	74%
Germination Test.	65	61	73	67%
Genetic purity Test.	70	68	75	71%
Bromide chemical Test.	88	85	92	89%
Magnetic force Tests.	83	87	84	85%

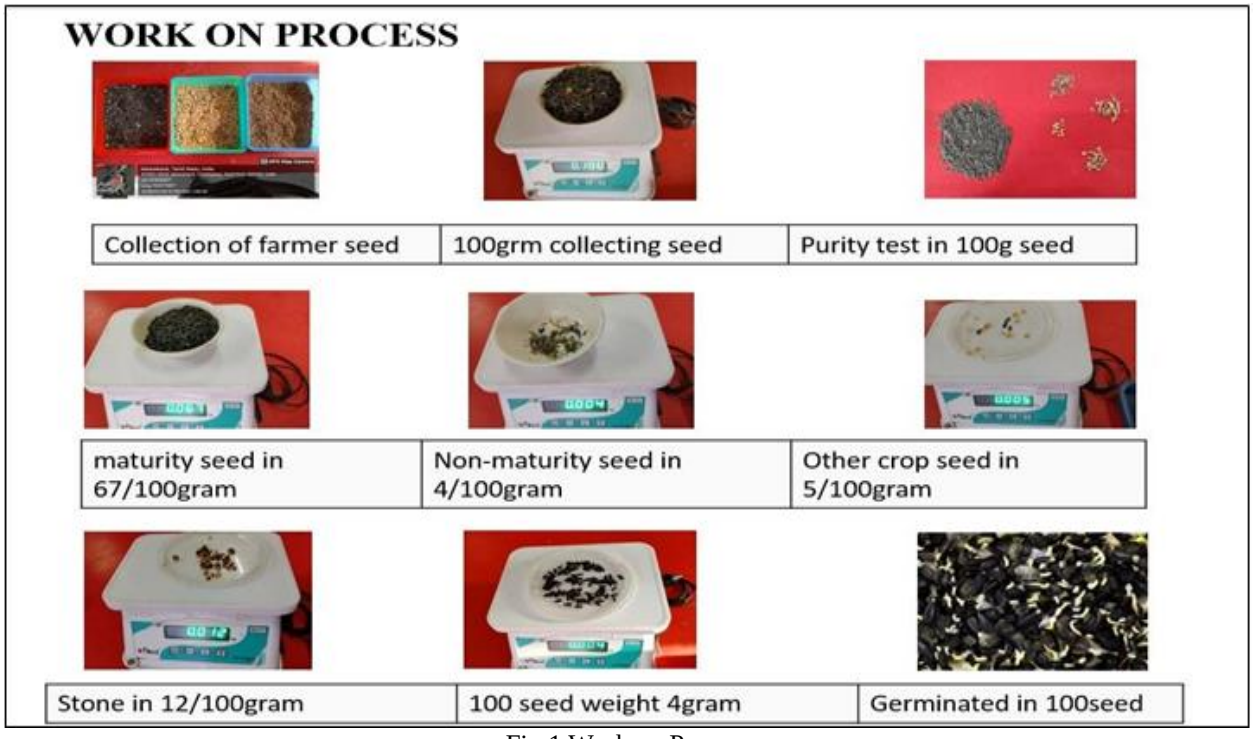

Fig 1 Work on Process

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III. DISCUSSION

In the discussion, it's noteworthy that farmer seed accounts for 85% of the same quality as certified seed. This implies a significant improvement in the quality of farmer seed, potentially attributed to the adoption of enhanced testing methods and practices. Such a high percentage indicates promising advancements in ensuring consistent quality and performanceacross both farmer and certified seeds, reinforcing the importance of standardized testing procedures in sunflower seed cultivation. This achievement underscores the potential for increased yields and improved agricultural practices, contributing to the long-term success and sustainability of sunflower farming endeavours. Irfan Afzal et al, April 2021) [https://doi.org/10.3390/molecules26072022].

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