



Quality Seed Production of Brinjal (*Solanum melongena* L.): A Way to Ensure Maximum Income in Farmer's Field

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The demand for food has undoubtedly increased due to the world's expanding population. As a result, the agricultural scientists and researcher have come up with new and better ideas of seed manufacturing and production. Seed production is not only a conventional tactic for the production of seeds but it's consisting of numerous standards as prescribed by the central seed committee of India. For a successful agriculture production, seed is a fundamental and essential component. Therefore, maintaining its purity and quality throughout the many stages of seed production is absolutely crucial.

Lack of seeds at the right time of sowing can cause yield to fall. It's important that farmers receive sufficient supplies of high-quality seeds at the appropriate times. This aids in achieving the goal of global food security. Seed production has gained importance in the recent years due to several reasons such as huge demand of good quality seed, for production of seeds of new varieties, for hybrid seeds that retain the best qualities, for better availability of seed to non-conventional areas.

Brinjal commonly known as baigan in hindi, is one of the most common, popular and principal vegetable crop grown in India. Eggplant is the important vegetables of solanaceae family. It can be cultivated all year long throughout India except higher altitudes. India is the world's second-largest producer of brinjal after China. Today, the nation offers its farmers high-quality seeds for a wide variety of vegetables. Apart from satisfying domestic demands India export high-quality seeds to other countries of the globe. India, which is the second-largest exporter of brinjal seed worldwide, sends the majority of its exports to Bangladesh, the United Arab Emirates, and Oman.

Flower Biology

Brinjal's flower are either solitary or in cluster of 2-5 flowers. Flowers are generally purple to white in colour. Heterostyly is a typical trait. In accordance with the length of the styles, eggplant has four different flower types: (i) long-styled with large ovary with fruit setting % (70 to 85%); (ii) medium-sized styled has a medium-sized ovary fruit setting % (12.5–55%). (iii) True short-styled with an extremely primitive ovary and (iv) pseudo short-styled with a rudimentary ovary. True and pseudo-short styled flowers typically do not set fruit. Although eggplant is mostly self-pollinated, up to 29% of cross-pollination has studied, hence it is considered to be often cross-pollinated. Fruits type is berry with many numbers of seeds.

Procedure of Quality Seed Production

Seed Production Stages: Breeder seed - Foundation seed I – foundation seed II - Certified Seed

Field Selection and Preparation: Produce quality and quantity depends greatly on the fields selected for the cultivation of brinjal seeds.

- Upland field should be recommended for brinjal to minimize water logging during the rainy season.
- The soil of the selected field should vary from loam to clay loam with pH value ranges from 6.0 to 6.8.
- Selected field has not continuously grown solanaceous crops for the previous three to four years.



Sowing Time: Brinjal seed production can be done throughout the year but the maturity of the fruits should not coincide with rains. For seed production in northern plains, only rainy season crop is advised. In the months of June - July, seeds are sown in a well-prepared nursery.

Seed Selection and Treatment: The concept of producing quality seed begins with seed selection. The only authorised source for certified seeds should be used. Healthy seeds should be free from disease and pest infestation. To protect the crop from seed-borne diseases seed treatment is essential. Apply 4g of *Trichoderma viride* kg⁻¹ of seeds prior to sowing, seeds need to soak in the biogas slurry for 12 hours. This will eradicate all disease-causing microbes and boost seed vigour.

Seed Rate: Varieties: 160 g acre⁻¹ (400 g ha⁻¹)

Hybrids: 200 g ha⁻¹ (female) and 50 g ha⁻¹ (male)

Nursery Preparation and Sowing

The Seedling Raising Techniques in Portrays : Growing media must be placed inside the portrays or seedlings tray (cocopeat, vermiculite and perlite in the ratio of 3:1:1). One seed should be planted per cell, followed by covering the seed with medium. Coco peat having 300–400% moisture to minimize irrigation immediately after seeding and to maximize germination and plant stand.

Transplanting: Seedlings become ready for transplanting after 4 to 5 weeks of sowing. Seedling should be 12 and 15 cm tall at the time of transplanting. Seedlings should be treated with biofertilizers like PSB, *Azotobacter*, and *Azospirillum* by root dipping technique @2 lit acre⁻¹ for 15 to 30 minutes before transplanting.

Planting Distances

- Spreading varieties: 75 x 60 cm
- Non Spreading varieties: 60 x 60 cm
- Small varieties: 60 x 45 cm



Nutrient Management: The amount of fertilizers application depends on the soil's fertility and the amount of organic manure used on the crop. For a good yield, 15-20 tonnes of well-decomposed FYM are incorporated into the soil. Generally, application of 150 kg N, 100 kg P₂O₅ and 50 kg K₂O is recommended for optimum yield. Integrated plant nutrient management is the intelligent use of optimum combination of organic, inorganic and biological nutrient sources such as NPK fertilizers, organic manure, biofertilizers, foliar nutrition, biostimulants. INM is a vital component against adverse climatic situation so as to achieve and to sustain the optimum yield and to improve or to maintain the soil's physical, biological and chemical properties (Thingujam *et al.*, 2016).

Weed management

- **Soil Solarization:** Polyethylene film with a thickness of 50 to 100 microns is used to solarize the soil in brinjal crops, and it is quite effective for limiting weed growth (Yaduraju, 1997).
- **Mulching:** Black silver LDPE of 25-30 micron is most frequently used for weed control.

Irrigation: The most efficient method for meeting the crop's moisture needs is drip irrigation. It is extremely important to irrigate plants during the flowering and fruit-setting phases. Depending on the soil's moisture level, subsequent irrigation should be done once every week or every 10 days.

Plant Protection

Brinjal	Botanical Names	Symptoms	Remarks
Fruit and Shoot borer	<i>Leucinodes orbonalis</i>	Infestation starts at the early vegetative stage and lasts up to fruiting stage	Use pheromone traps @ 3 – 4/acre (8/ha), collect and destroy the infected shoots, whole plants, fruits etc., use <i>Trichoderma chilonis</i> @ 20,000/acre (50,000/ha).
Damping off	<i>Pythium sp. and Phytophthora sp.</i>	Common in nursery seedlings	Use disease free good quality seeds, treat seeds in hot water (30 minutes @ 52°C)

Field Inspection: A minimum of three field inspections should be done from vegetative to fruiting stage by the Seed Certification Officer.

Stage of Field Inspection	Characteristics to be Identified
Vegetative Stage	Isolation distance, presence of volunteer plants and diseased plants based on the physical appearance
Flowering Stage	The off-types are identified based on the flower colour and shape.
Fruiting Stage	The off-types are identified based on the fruit colour and shape. Third inspection at maturity stage performed to estimate yield.

Specific Requirement (Field standards)

Factors	Maximum permitted %	
	Foundation seed	Certified seed
Off type	0.10	0.20
Seed born diseases	0.10	0.50
Not seed born disease (little leaf)	0.50	2.0
Isolation Distance	300m	150m

Seed Standards

Factors	Class of Seed (%)	
	Foundation seed	Certified seed
Pure seed (minimum)	98.00	97.00
Inert matter(maximum)	2.00	2.00
Other crop seed (Maximum)	None	None
Weed seeds	None	None
Germination % (Minimum)	70.00	70.00
Moisture content % (Maximum)	8.0	8.0
For VP container	6%	6%
Moisture previous container (maximum)	8%	8%
Genetic purity	90%	90%

Harvesting: For seed production fruits usually harvested when they turned brown in colour. Fruits are permitted to reach a level of maturity beyond the edible stage. A change in colour indicates that fruit is physiologically mature. The initial and last one or two harvests may be utilised for vegetable purposes, while the fruits from the remaining pickings may be used to extract seeds. Usually, the seeds from intermediate pickings have good vigour and germination rates.

Seed extraction and processing: Wet extraction and dry extraction are the two main approaches used to extract brinjal seeds. While dry extraction is used for small-scale seed production, wet extraction is used for large scale seed production. In wet extraction, the picked fruits are kept at room temperature for 5-7 days until they soften. This permits the seeds to develop completely. These are soaked until the seeds are separated from the pulp, at which point they are softened. Since the pulp of the brinjal fruit is relatively dry, more water must be added both during and after crushing, and it should be left to stand overnight to help the seeds separate from the flesh. While using a dry extraction method, the ripe fruits are

collected and exposed to sunlight until they shrivel. The skin colour of purple and purple-black fruits turns to a coppery brown after drying.

Drying and storage: After seed extraction the seeds are cleaned, and dried properly. Drying is done by spreading the seeds in partial sunlight for a few hours every one to two days, up to a moisture content of 8% or less. The seeds should be dried to 6% moisture content for longer storage periods. Seeds can be kept for a very long period if they are sealed in moisture-proof polythene bags (700 gauge polythene bags) and kept in a cold, dry environment or CA storage.

Conclusion

Quality seed production is one of the most important pillars of agriculture industry in all over the world. A production programme cannot be successful unless the requirements for seed purity and seed quality, are maintained. Legislation is crucial for ensuring these quality standards. In India, the production of vegetable seeds is a significant economic activity. For growing crops, farmers use a variety of seed, including farm-saved seed. Quality seed is becoming more important in the farmer field since old methods are now more susceptible to biotic and abiotic stress. To fulfil the demand of Indian farmers, adequate supply of seed will be possible only when seed production will enhance via using the general and specific standard under the supervision of seed certification agency along with advance technology of seed storage and packaging.

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