Guidelines for Release and Notification of Spice Crops in India

ICAR - All India Coordinated Research Project on Spices,
ICAR - Indian Institute of Spices Research, Kozhikode

2026

Guidelines for Release and Notification of Spice Crops in India

Technical Bulletin –2026/04

Citation: Vinu V, Mukesh Sankar S, Aarthi S, Lijo Thomas and D. Prasath (2026). Guidelines for Release and Notification of Spice Crops in India. ICAR–All India Coordinated Research Project on Spices, and ICAR–Indian Institute of Spices Research, Kozhikode, Keralam India **115 p**.

Published by

Project Coordinator,
ICAR-All India Coordinated Research Project on Spices (ICAR-AICRPS)
ICAR–Indian Institute of Spices Research (IISR)
Kozhikode – 673012, Kerala, India

© ICAR–AICRPS, 2026
All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form without prior permission of the publisher, except for educational and non-commercial purposes with due acknowledgement.

Foreword

India is globally renowned for its rich diversity of spice crops and its significant contribution to the production, processing, and export of spices. The sustained growth and competitiveness of the Indian spice sector depend largely on the development of high-yielding, quality-oriented, climate-resilient, and disease-resistant varieties, supported by an efficient system for varietal evaluation, release, notification, seed quality assurance, and conservation of genetic resources. In this context, a clear understanding of the relevant regulatory frameworks and institutional procedures is essential for ensuring the effective transfer of improved technologies from research laboratories to farmers' fields.

The development and dissemination of improved varieties of spice crops involve several important processes, including varietal release and notification, adherence to prescribed seed standards, protection of plant varieties and breeders' rights under the Protection of Plant Varieties and Farmers' Rights (PPV&FR) framework, and the documentation, registration, and conservation of plant genetic resources through the National Bureau of Plant Genetic Resources (NBPGR), as applicable. These processes play complementary roles in ensuring varietal identity, genetic purity, seed quality, recognition of improved varieties, protection of intellectual property, and sustainable utilization of valuable genetic resources.

The present Technical Bulletin is a timely and useful initiative aimed at consolidating the relevant guidelines, procedures, and regulatory requirements pertaining to these aspects of spice crop improvement in India. By compiling and presenting the information in a systematic and accessible manner, the bulletin is expected to assist plant breeders, agricultural scientists, research institutions, seed production agencies, policymakers, and other stakeholders in understanding the procedures to be followed at different stages of varietal development, release, registration, and dissemination. I hope that the publication will promote greater awareness of the applicable regulatory frameworks, encourage their appropriate implementation, and contribute to the sustainable development of the spice sector in India.

D Prasath
Project Coordinator
All India coordinated Research project on Spices
ICAR-IISR, Kozhikode, Kerala-673 012

Preface

Spice crops occupy a significant place in Indian agriculture, contributing substantially to agricultural diversification, farmers' livelihoods, domestic consumption, export earnings, and the country's position in the global spice trade. The development and release of improved spice varieties, supported by appropriate regulatory mechanisms and quality assurance systems, are essential for enhancing productivity, improving quality, strengthening resistance to biotic and abiotic stresses, and ensuring the availability of quality planting and seed material to farmers.

The development, release, notification, registration, and commercial distribution of new spice varieties in India involve a series of scientific, technical, and regulatory procedures. These include the evaluation and release of varieties through AICRP (Spices), notification under the applicable seed legislation, compliance with seed quality standards, registration of eligible plant varieties under the Protection of Plant Varieties and Farmers' Rights Authority (PPV&FRA), and registration of plant genetic resources with the National Bureau of Plant Genetic Resources (NBPGR), wherever applicable. Each of these processes serves a distinct purpose and contributes to varietal identification, quality assurance, intellectual property protection, conservation of genetic resources, and the sustainable use of plant biodiversity.

The present Technical Bulletin has been prepared to provide comprehensive and practical guidance on the procedures and requirements associated with the release and notification of spice crop varieties, applicable seed standards, registration under the PPV&FRA framework, and registration and documentation of plant genetic resources through NBPGR. It aims to bring together the relevant guidelines, procedural steps, documentation requirements, and institutional responsibilities in a systematic and accessible manner. By promoting a clear understanding of the applicable procedures and institutional frameworks, this publication seeks to facilitate the efficient translation of research outcomes into farmer-accessible technologies and contribute to the sustainable growth and competitiveness of the Indian spice sector.

The guidelines and procedures presented in this bulletin should be read in conjunction with the latest applicable Acts, Rules, notifications, official guidelines, and instructions issued by the competent authorities, as regulatory requirements may vary according to the crop, category of variety, intended use, and nature of the material being registered or notified.

Authors

Table of Contents

Foreword 02

Preface 04

Table of Contents 06

Introduction 08

1. Variety Identification, Release, and Notification 10

2. Seed Production & Certification 15

3. Indian Minimum Seed Certification Standards for Spice Crops 25

4. Protection of Plant Varieties and Farmers' Rights Act, 2001 77

5. Registration of Plant Germplasm 80

Reference 85

Annexure I. Proforma for Submission of Proposal for Identification of Crop Varieties/ Hybrids by Workshops 86

Annexure II. Proforma for Submission of Proposal for Release of Crop Varieties/ Hybrids 89

Annexure III. Specification for Certifiaction Tag 92

Annexure IV. Procedure For Construction of Lot Numbers 93

Annexure V. Grow-Out Test for Cultivar Purity 96

Annexure VI. Specification for Certification Tag 99

Annexure VII. Extension of the Validity Period 100

Annexure VIII. Released/ Notified Spice Varieties 101

Annexure IX. Spice Varieties/ Genotypes Registered under PPVFRA 107

Annexure X. Unique Spice Germplasm Registered under ICAR-NBPGR 111

Introduction

Identification or development of an improved variety is the most important step for improving the crop productivity in any agriculture crops. The plant genetic resources in any crop plays an important role in these crop development programs. The next crucial step is the quality seed production of the identified improved variety since seeds are the basic and most critical input in agriculture, directly determining crop productivity. Assurance of quality seed production in any improved variety will lead to utilization of its full genetic potential and complete manifestation of its yield potential. As per botany a plant/crop variety is defined as a taxonomic subdivision of a species consisting of naturally occurring or selectively bred populations or individuals that differ from the remainder of the species in certain minor characteristics. According to Seed Act (1966, sub section 16 of section 2) a variety is defined as a sub division of a kind identified by its growth, yield, plant, fruit, seed or other characters.

The regulatory framework for plant varieties and seed production in India is a robust, multi-layered system designed to balance the commercial interests of plant breeders with the socio-economic safeguards of farmers and this system works through four progressive phases:

1. Variety Identification, Release, and Notification
2. Seed Production & Certification
3. Protection of Plant Varieties and Farmers' Rights Act (PPV&FRA) 2001
4. Plant Germplasm Registration

The Indian Council of Agricultural Research (ICAR) operates the mechanism for evaluation, identification and recommendation for release of crop varieties. The Ministry of Agriculture under the Seed Act, 1966, Section 5 provides procedure for notification of released varieties through Central Sub-Committees on Crop Standards, Notification and Release of Varieties of Agricultural Crops (CVRC) and ensures production and sale of seeds meeting the Minimum Seed Certification Standards. Government of India enacted Seed Act (1966) to regulate the production and quality of seeds of Agriculture and Horticulture crops in the country. This Indian legislation enacted to regulate the quality of certain notified kinds and varieties of seeds for sale, ensuring that farmers receive high-quality planting material.

According to Seed Act (1966) seed certification is generally voluntary, but labeling with details like germination percentage, purity, and date of test is mandatory for notified varieties. Further, the enactment of Protection of Plant Varieties and Farmers' Rights Act (PPV&FRA) 2001 provides for protection of the intellectual property rights of plants breeders and farmers involved in development of plant varieties. Plant Genetic Resources for Food and Agriculture (PGRFA) form the basis for genetic improvement of crop species in development of new varieties. Hence, it was realized that due recognition should be accorded to the persons/institutions who are associated with the development and identification of improved or unique potentially valuable germplasm and genetic stocks. It is also desirable from the point of changed world scenario of Intellectual Property Rights (IPR) regimes to inventorize, document and bring all the important genetic resources into public domain, facilitating their safe and accelerated use in research and crop improvement. Recognizing the importance of the issue, a mechanism for "Registration of Plant Germplasm" was instituted at the ICAR-National Bureau of Plant Genetic Resources (ICAR-NBPGR), New Delhi by the ICAR to serve as a recognized tool for registration of PGRFA at national level.

India is the world's largest producer, consumer, and exporter of spices. India produces about 75 of the 109 spice varieties listed by the International Organization for Standardization (ISO). A robust mechanism for

quality control across the seed chain is important to ensure that the primary producers have access to quality assured planting material through out the country. Since spice crops have a significant export orientation, the quality of the starting seed material can play a vital role in determining the economic success of the entire value chain.

Spice crops are versatile in view of the propagation and seed production, keeps high diversity in propagating material (propagule) even though many of them follows asexual / vegetative propagation. Seed spices like Coriander, Cumin, Fenugreek etc. propagates via true seed. In asexually propagated spices we have rhizomatous spices (Ginger, Turmeric, Mango Ginger, Black Turmeric etc.), Pepper being a woody perennial climber with runner shoots as propagating material, Cardamom with suckers (clumps) and for tree spices even though seeds can be used, the preferred propagation methods are through epicotyl grafting/ approach grafting/ air-layering/ softwood cuttings/ semi-hardwood cuttings etc. This manual describes the procedure of release and notification of a variety and the system of quality seed production in spice crops along with other regulatory systems, PPV&FRA, 2001 and germplasm registration.

1. Variety Identification, Release, and Notification

1.1. Variety Identification

1.1.1 Evaluation of Test Entries In public/ private sector the improved genotypes developed by plant breeders are released after a thorough assessment under multi-disciplinary approach and comparison with other developed genotypes along with at least three checks (national/zonal/local) under All India Coordinated Research Project (AICRP) of respective crop at national level in three tier system (two under special consideration) at multi-location. Test entries shall be included in the coordinated trials on the basis of the data generated in precoordinated testing (station and other trials). The entries to be nominated must have undergone critical evaluation/screening in the station/regional trials, which are conducted by the sponsoring breeder/institution/organization/company at least for three years. All the data generated in the precoordinated tests on yield and other important agronomic attributes, reaction to insect-pests and diseases and relevant quality parameters are to be made available to the coordinator in support of inclusion of the test entries in the coordinated trials. The proposed entries will be evaluated for three years *viz.*, CVT 1, CVT II & CVT III under AICRP at different centres. In case of perennial spice crops like black pepper, cardamom, the evaluation period is 6-8 years whereas for tree spices it may take 10-12 years. The developer of the variety supplies the pure quality seed. The seed from same lot is distributed to all the testing centres after coding. In each center, plot size and number of replications are kept uniform and the performance is tested under best agronomic management with recommended package of practice. The required data on yield, different agronomic traits like plant height, no. of shoots etc. and quality traits should be recorded by the test centres. The Project Director/Coordinator will supply each test centre a set of proforma/data-books with details for recording various observations and also the standard scale for measurement of each character along with the list of standard descriptors. All cooperators need to record observations strictly according to the guidelines provided, and should ensure the supply of one set of data-books to the coordinator by the specified date.

1.1.2. Monitoring of the trials: All the trials shall be monitored by a team of scientists to be deputed by the Project Director/ Coordinator. The monitoring team shall have the following minimum composition.

Sl n.	Description	Designation/role
(i)	PD/PC/ZC/PI/Senior most member of the team	Team Leader
(ii)	Plant Breeder	Member
(iii)	Agronomist	Member
(iv)	Pathologist /Entomologist	Member
(v)	Scientist of any other specified discipline	Member

The team shall visit the trial sites near the maturity/ fruiting time of the crop and record observations on the quality of the trials conducted and, on the management, as per the specified norms, and comment on the reliability of data likely to be generated. The monitoring team shall record observations on plot uniformity within replications and test plots, crop stand, disease and insect-pest incidence, bird damage etc., and any other feature having a bearing on quality of the data generated and is attributable to crop management aspects. The monitoring team shall also indicate an overall estimate of the yield of the trial on the basis of its observations, and give a clear-cut recommendation whether the trial data should be accepted or rejected. Recommendations of the monitoring team shall be the major deciding factor in acceptance or rejection of the trials.

1.1.3. Data processing:

i. All the data received at the coordination cell shall be critically examined to decide suitability for inclusion for statistical processing. The trial data may be considered for discarding or acceptance for further processing on the basis of the following.
   - Recommendations of the monitoring team
   - Suggestions by the Zonal Coordinator/concerned breeder
   - Deviation from the specified range of sowing date, specified crop management practices for the trial such as fertilizer doses, irrigation levels etc.
   - Any other serious flaw in conducting of trial/data recording/reporting
   - Damage by animals/birds/natural calamity

ii. All the trials considered acceptable on the basis of the above may be statistically analyzed and examined for general yield levels, C V levels and Overall performance of checks before pooling of the results. In the case of irrigated conditions, trials with extremely low yields (less than state/region/district average as per norms fixed by the workshop), normally attributable to poor crop management, or exceptionally high yields, which can be considered unrealistic and presumably arising out of various types of errors, are to be discarded. Trials, where performance of the checks is low and unrepresentative of the general trial performance, may be considered cautiously.

iii. Data from all the trials qualifying on the above criterion may be pooled, analyzed for stability etc. and included in the result books.

iv. The data on ancillary characters may be compiled/ summarized appropriately and presented in the result books. Means and ranges may be given.

v. Data generated in additional trials/nurseries by other disciplines may be appropriately analyzed and presented in the result books.

vi. Data once included in the data-books after scrutiny on the above basis would not be changed unilaterally by the PD/PC without discussion in workshop/group meeting.

1.1.4. Variety Identification Procedure: Superior eligible test entries shall be identified based on the performance for specific crop zone(s) in the workshop/group meeting for presentation to the Central Sub-Committee on Crop Standards, Notification and Release of Crop Varieties. This shall be done by a committee called "Variety Identification Committee", constituted in advance of annual workshop/group meeting with the approval of the Deputy Director General (Horticulture).

Eligibility for identification

i. The candidate variety will be eligible for identification on fulfilling the following minimum requirements.

- Three years yield data from coordinated trials under given ecology (rainfed/irrigated etc.) are required.
- At least two years data are a must on disease and pest reaction at the hot spot/artificial epiphytotic conditions under the coordinated project.
- At least one year data on the agronomic performance with special reference to response to dates of sowing/planting/population density/fertilizer/irrigation levels are a must. These data will be only for the purpose of determining adaptive features of the variety.

ii. Availability of enough pure seed is required for sowing a minimum of five hectares. In case of non-availability of specified quantity, the identification process may be postponed to the later stage, at the most by one year.

iii. Availability of pure/nucleus seed of high quality is desired with the breeder for producing quality seed in at least 0.5 hectare. The nucleus seed should have been produced as has been prescribed for each crop.

Data compilation

- The PD/PC Unit will provide to the breeder duly processed data of the third year of the test entries at least 20 days prior to workshop to enable the breeder for preparation of identification proposal and formal approval from the competent authority of the involved institution(s).
- The data from three years of coordinated testing of the candidate variety shall be compiled by the concerned breeder/institution/organization/company in the prescribed proforma (Annexure-I), and should be submitted to PD/PC seven days prior to workshop.

Presentation of the proposal

- Concerned breeder of the variety shall present the identification proposal to the Committee, highlighting characteristics of the candidate variety and other related issues.
- The PIs may be asked to clarify specific points by the Committee.
- In cases where PD/PC is also a contributing breeder of the proposed variety, PD/PC will not be associated in discussion and in decision-making concerning the specific variety.

Norms for Variety Identification

The identification shall be on the basis of the following norms.

1. Significant superiority in yield/ in produce of economic importance over the best performing check (including qualifying checks) along with the acceptable levels of other features.

   OR

   Yield/ produce of economic importance comparable to the best performing check and combining specific favourable attributes such as tolerance to biotic and abiotic stresses relevant to the region/ agro-ecology along with other acceptable features — quality characters, suitability for specific cropping system of the region, etc.

   OR

   Yield marginally lower to the best performing check but is outstanding in one or more crucial traits such as specific product quality—nutritional superiority, industrial processing property, export quality etc.—which will result in higher cash returns per unit area to cultivator/country.
2. The candidate entry should be uniform for important characters, like plant height and maturity, and particularly in respect with the distinguishing morphological characters in the region recommended for.
3. In case, the candidate variety qualified on the above characteristics is not distinct enough from the already released varieties on the basis of any of the morphological, or other diagnostic characteristics for which data are available, it should be made identifiable on the basis of the biochemical/molecular markers before the final release.
4. The candidate variety must be stable for key trait(s) (such as resistance to a specific disease/insect pest), for which it has been identified for the particular region.

5. The Committee may identify/reject/postpone decision/recommend retesting for one more year to generate additional information/reconfirmation of the results based on the data presented.
6. The Committee shall state in brief the specific reasons for identification/retesting/rejection of the proposed candidate variety.

Availability of Test Stock and Nucleus Seed

Test stock seed (pure high-quality seed produced by the concerned breeder/institute) for sowing in five hectares for seed production/demonstrations/adaptive trials and nucleus seed for 0.50 hectare must be available at the time of making of proposal for identification (for hilly regions and restrictive environments, above requirements can be suitably reduced).

Molecular Fingerprinting of Identified Variety

DNA profile or DNA fingerprinting of the variety, parental lines and the hybrid along with the details of the molecular markers (where markers data-base is available in public domain) used may be generated after the identification of a particular variety before submission of release and notification proposal.

1.2. Variety Release and Notification

1.2.1. Central release: Once the variety/hybrid has been identified, seeds of variety/hybrid/parental lines are to be deposited with the NBPGR/ respective NAG centres for conservation in the gene bank. After obtaining the acknowledgment with IC No. from the NBPGR, the release and notification proposal of the variety/ hybrid needs to be submitted to the Central Sub-Committee on Crop Standards, Notification and Release of Varieties along with DNA fingerprinting data (wherever available) and good photographs of seed, single plant and of field view (Annexure-II).

1.2.2. State release: Genotypes tested in the AICCIP trials for at least one year or those which could not be identified on the zonal basis in the workshop but adequate information on disease and insect pests reactions of them are available from the coordinated testing, can be proposed for identification for the concerned state after further yield evaluation trials with a greater number of sites within the state and with the on-farm demonstrations. The variety has to be first cleared by the Institutional Variety Identification Committee of the concerned organization and then proposed to the State Seed Sub-Committee for release. Once the variety is released by the State Seed Sub-Committee, proposal is required to be submitted to the Central Sub-Committee on Crop Standards, Notification and Release of Varieties for its notification (Annexure-II).

1.2.3. Notification: After official release (at State / Central level), the cultivars are notified under the Seed Act, so that the quality of seed can be regulated. The main purpose of notification is to bring the seed of a particular crop/variety under the purview of Seed Law Enforcement, mainly to empower the Seed Inspectors to verify the quality by sampling and analysis. After release, the proposal of the variety is submitted to Central Sub Committee on Crop standards, Notification and Release of Varieties, Division of Seed, Ministry of Agriculture, Government of India for notification (Annexure II). In the event, the variety is notified under section 5 by the Central Government in consultation with the Central Seed Committee for 10-15 years under the chairmanship of Deputy Director General (Crops) ICAR. The seed of the notified variety is multiplied following seed multiplication chain. Availability of Breeder seed of the notified variety is the responsibility of the Ministry of Agriculture and Farmers' Welfare, Government of India. It is fulfilled by National Seed Project (Crops) of ICAR under the supervision of Directorate of Seed Research Maunath Bhanjan UP. The Notification is a statutory function performed under the Seed Act so that the provisions of the Seed Act could be applied to regulate the quality of seed during sale. Under the Seed Act, Certified seed can be produced only of notified

varieties and thus, notification precedes the certification. Therefore, notification is compulsory for production of Certified category seed. Unless the variety is notified, the seed cannot be certified.

1.2.4. De-notification: Instructions for de-notification are issued by Ministry of Agriculture and Farmers' Welfare, GOI upon completion of the validity period of a variety and/or when, the variety is not under cultivation.

1.2.5. Re-notification: Instructions for re-notification may be issued by GOI for the variety that remains in demand for cultivation even after completion of the validity period.

1.2.6. Identified variety: The strain that has been identified by the AICRP workshop as better performer than the existing varieties over the location and year for particular zone or state that can be released for cultivation is termed as identified variety.

1.2.7.Pre-released variety: The identified variety whose proposal has been submitted for release to the State Seed Sub-Committee or Central Sub Committee on Crop standards, Notification and Release of Varieties.

1.2.8. Released variety: Based on better performance of the newly developed strain in comparison to existing varieties, the state/ central government can release it for cultivation.

1.2.9. Notified variety: A variety notified under section 5 of the Seeds Act, 1966 (54 of 1966) by Government of India is considered as notified variety.

2. Seed Production & Certification

Quality seed is the basic input of agriculture and all other inputs are contingent upon it for being optimally effective. Availability of quality planting material is the fundamental right of the farmers.

2.1. The seed use for sowing purpose is considered fit in the event it fulfils following criteria:

Genetic purity: The seed is the vehicle of genes of a variety and produces a plant of required characters. Therefore, all the seeds used for sowing purpose must have similar genetic constitution for uniform performance and quality of produce. If all the seeds are of similar genetic constitution of the required variety, then it is considered as pure at genetic level. Therefore, to exploit genetic ability of variety for high quality and quantity of the produce, the quality seed should be purchased from a reliable source and seed of self- and cross-pollinated crops should be changed after every third year and hybrid every year.

Physical purity: Usually, the seed should be 98% pure at physical level. The margin of two percent may be anything other than seed of the crop selected for sowing purpose. Therefore, while selected for sowing purpose seed should be free from inert matter and seeds of other species to maintain optimum plant population and storage of seed safely.

Germination: Plant population is an important key factor to determine seed yield from a unit area. With the use of recommended seed rate, one should get optimum plant population. Both low and high plant population affects per unit produce. The seed that has no germinability becomes source for growth of pathogen and insect that may also affect seed with germinability or establishment of seedlings. Seed with slightly low or high germinability (±10%) may be used for sowing purpose by correction in the seed rate. Seed lot with very low germinability should not be used for sowing purpose. Therefore, high germinability is essential to maintain optimum plant population with recommended seed rate.

Seed vigour: High vigour of seed offers the establishment of vigorous seedling. Seed vigour helps in establishment of seedling even under abiotic stress. Therefore, use of vigorous seed is a prerequisite to establish optimum plant population even under poor management conditions.

Seed health: Seeds free from seed borne pathogens and insects is essential to maintain optimum plant population, yield/plant, quality and to check further transmission of disease with the use of recommended seed rate. Presence of insect in seed deteriorates longevity, shelf life, germinability and vigour of seed.

Weed: Seed lot should not be contaminated with weed seeds, as it is difficult and costly to remove them from the field. Identification of objectionable weed for removal and use of herbicide to control them in associated crop is a challenge. Weeding enhances the cost of cultivation. Therefore, seed used for sowing purpose should be free from weeds with special reference to objectionable category.

2. 2. Isolation Distance

The minimum physical distance required between a seed production plot and any neighbouring crop of the same or closely related species. It is required to maintain the genetic and physical purity of the seed and to prevent the quality deterioration during the multiplication. For each crop minimum isolation distance is standardized for the production of different classes of seeds.

2.3. Seed production and certification system in India

Objective: Multiplication of quality seed under vigilant supervision of plant breeder or seed certification agency to distribute seed of notified varieties for sowing purpose. The Certified seed of improved varieties are made available to the farmers year after year as per demand. The seed of the variety in demand is

multiplied with the aim to maintain its genetic constitution as such. For multiplication of seed without altering genetic constitution of the variety, Government of India adopted a three-tier model i.e., Breeder, Foundation and Certified seed. It involves State Agricultural Universities/ ICAR Institutes, State/National Seed Corporation and Seed Certification Agencies. Production of Foundation and Certified seed class is the responsibility of National or State Seed Corporation. Whereas, maintenance breeding and Breeder seed production are of Agricultural Universities or ICAR institutes under the supervision of plant breeder.

2.3.1. Hierarchy of Seed Classes

Nucleus seed:

(a) Basic Nucleus seed: This is the cent percent pure seed at genetic and physical levels produced by the plant breeder who evolved the variety. This seed is maintained by the institute that developed the variety. The seed is made available to different agencies on demand to start seed multiplication chain.

(b) Nucleus seed for seed multiplication chain: This is the cent percent pure seed at genetic and physical levels produced by a plant breeder from basic nucleus seed stock or produce of the progenies of the plants selected from Breeder seed production plot to start the seed multiplication chain. This seed is not certified by any agency.

Breeder seed: This is the progeny of the Nucleus seed multiplied in large area under the supervision of plant breeder and monitored by a committee. It provides cent percent physical and genetic pure seed for production of Foundation class. Golden yellow coloured tag is issued for this category by the producing agency.

Foundation seed: The progeny of breeder seed with 99.5% genetic purity. Produced by authorized state or national seed corporations under strict supervision. Seed Certification Agency issues a white colour tag for Foundation seed. Foundation seed can again be multiplied in the event of its shortage with similar seed certification standard.

(i) Foundation seed stage I: Foundation seed produced from Breeder seed.

(ii) Foundation seed stage II: Foundation seed produced from Foundation seed stage I.

Certified seed: Progeny of Foundation seed produced by registered seed growers under the supervision of Seed Certification Agency by maintaining the seed quality as per Indian Seed Certification Standards. Seed Certification Agency issues a blue colour (Shade ISI No. 104, azure blue) tag for this category of seed. Seed Corporation can multiply the Certified seed as Certified seed stage - 2 with the similar seed certification standards as prescribed for Certified seed.

(i) Certified seed stage I: Produce of Foundation seed stage I or II.

(ii) Certified seed stage II: Produce of Certified seed stage I. It is permitted when the reproduction does not exceed 3 generations excluding Breeder seed.

Truthfully labelled seed (TL): When a seed is sold based on the result of the laboratory established by the producer then the seed is considered as TL seed e.g., seed produced and sold by many private agencies. In government sector, many times seed is not able to fulfil seed certification standard for any one parameter, marginally. This seed may be sold by making correction (increase the quantity/ bag if germination percentage is low) after getting certification by the authorized Seed Certification Agency. The price of TL seed is always lower than the Certified seed in government sector. Seed rejected due to genetic impurity or presence of objectionable disease, pest or weed is not labelled as truthful

2.3.2. Seed certification system

The seed of Foundation and Certified categories produced by respective agencies are tested and certified for sowing seed quality at field and seed levels. The producers are not recognized as quality control agency by the Government of India. The responsibility of quality control is with seed certification agency an autonomous body. In place of certification, Breeder seed production programme is monitored by a team constituted for the purpose whereas, seed is tested in the notified laboratory for sowing seed quality. No seed certification standard has been fixed at field and seed levels for Breeder seed category.

a) Breeder seed production

Fulfilment of the requirement of Breeder seed is one of the mandates of ICAR. The responsibility is shouldered by State Agricultural Universities and ICAR Research Institutes. Ministry of Agriculture and Farmers' Welfare, Government of India has introduced a centralized digital system, **SATHI Portal** (Seed Traceability, Authentication and Holistic Inventory) for receiving the breeder seed indents and supply of breeder seed. The theme of this system is *Utam Beej Samrit Kisan* (Quality Seeds, Prosperous Farmers) and the purpose is to ensure seed quality, improve transparency, and track seeds throughout the entire supply chain from breeder to certified seed and farmer. Sathi portal can be assessed through https://seedtrace.gov.in.

b) Maintenance breeding

Maintenance breeding refers to the process to maintain uniform expression of all the distinguishable traits of a variety year after year without any genetic drift. It requires negative selection i.e., the plant progeny which deviates in expression has to be rejected but there is no positive selection for performance. Maintenance breeding is adopted to maintain genetic purity, quality and health of the variety. It produces true to the type, healthy and quality seed sowing material to produce Breeder seed for exploitation of the variety to enhance production and extend the life of the variety. Maintenance breeding has to be under the control of experienced plant breeder and technical staff who know the genetic basis of phenotypic variation. Different methods are followed for maintenance breeding in cross and self-pollinated crops and vegetatively propagated crops based on the nature of variety.

c) Production of Foundation and Certified seed

Foundation and Certified category of seeds are produced under the supervision of Seed Certification Agency by National Seeds Corporation and State Farms Corporation of India. Seed certification is a legally sanctioned system for quality control of seed for sale. The Seed Certification Agency (SCA) is authorized to certify Foundation and Certified category of seed. Seeds of only those varieties notified under section 5 of the Seed Act 1966 are eligible for certification. In charge of government farm applies for Foundation and/or Certified whereas, registered farmers for Certified seed production programme. Any farmer desires to produce Certified seed has to register himself with the Seed Corporation/ Seed Certification Agency.

The Central Seed Certification Board, Department of Agriculture and Farmers' Welfare, Ministry of Agriculture and Farmers' Welfare, Government of India has issued Indian minimum seed certification standards for Agricultural and Horticultural crops.

d) General seed certification standards

The General Seed Certification Standards are applicable to all crops which are eligible for certification, and with field and seed standards for the individual crops, shall constitute the Minimum Seed Certification Standards. The word 'Seed' or 'seeds' as used in these standards shall include all propagating materials.

I. Purpose of Seed Certification

The purpose of seed certification is to maintain and make available to the public, through certification, high-quality seeds and propagating materials of notified kind and varieties so grown and distributed as to ensure genetic identity and genetic purity. Seed certification is also designed to achieve prescribed standards.

II. Certification Agency

Certification shall be conducted by the Certification Agency notified under Section 8 of the Seeds Act, 1966.

III. Certified Seed Producer

Certified seed producer means a person/organization who grows or distributes certified seed in accordance with the procedures and standards of the certification.

IV. Eligibility Requirements for Certification of Crop Varieties

Seed of only those varieties which are notified under Section 5 of the Seeds Act, 1966 shall be eligible for certification.

V. Classes and Sources of Seed

A. *Breeder Seed*

Breeder seed is seed or vegetative propagating material directly controlled by the originating or sponsoring plant breeder of the breeding programme or institution and/or seed whose production is personally supervised by a qualified plant breeder and which provides the source for the initial and recurring increase of Foundation seed. Breeder seed shall be genetically so pure as to guarantee that in the subsequent generation i.e. certified Foundation seed class shall conform to the prescribed standards of genetic purity. The other quality factors of Breeder seed such as physical purity, inert matter, germination etc. shall be indicated on the label on actual basis. The Breeder seed shall be packed and supplied by the breeders in the form and manner indicated in Annexure III.

B. *Certified Seed*

Certified seed shall be the seed certified by Certification Agency notified under Section 8 of the Seeds Act, 1966 or seed certified by any Certification Agency established in any foreign country provided the Certification Agency has been reorganized by the Central Government through notification in the Official Gazette. Certified seed shall consist of two classes, namely, Foundation and Certified seed and each class shall conform to the following description:

1. Certified Foundation seed shall be the progeny of Breeder seed, or be produced from Foundation seed which can be clearly traced to Breeder seed. Thus, Foundation seed can even be produced from Foundation seed. During the production of certified Foundation seed, the following guidelines shall be observed:

(a) Certified Foundation seed produced directly from Breeder seed shall be designated as Foundation seed stage-I;

(b) Certified Foundation seed produced from Foundation seed stage-I shall be designated as Foundation seed stage-II;

(c) Certified Foundation seed stage-II will not be used for further increase of Foundation seed and shall be used only for production of Certified seed class;

(d) Minimum Seed Certification Standards shall be the same for both Foundation seed stage-I and II unless otherwise prescribed;

(e) Certification tag shall be of white colour for both Foundation seed stage-I and II and shall contain the information as to its stage;

(f) Production of Foundation seed stage-II shall ordinarily be adopted in respect of such crop varieties provided, when it is expressly felt by the Certification Agency that Breeder seed is in short supply;

(g) Production of Foundation seed stage-II may be adopted for the following group of crops:

- vegetatively propagated crops;
- apomictically reproduced crops;
- self-pollinated crops;
- often cross-pollinated and cross-pollinated crops, these being gene – pools should not lose their genetic identity and purity if measures to safeguard the same are adequately taken;
- composite and synthetics;
- parental line increase of hybrids.

2. Production of Foundation seed stage-I and II shall be supervised and approved by the Certification Agency and be so handled as to maintain specific genetic identity and genetic purity and shall be required to conform to certification standards specified for the crop/variety being certified.

3. (a) Certified seed shall be the progeny of Foundation seed and its production shall be so handled as to maintain specific genetic identity and purity according to standards prescribed for the crop being certified;

(b) Certified seed may be the progeny of Certified seed provided this reproduction does not exceed three generations beyond Foundation seed stage-I and

- it is determined by the Certification Agency that genetic identity and genetic purity will not be significantly altered;
- and when the Certification Agency is satisfied that there is genuine shortage of Foundation seed despite all the reasonable efforts made by the seed producer.

(c) Certification tag shall be of blue colour (shade ISI No. 104 AZURE BLUE) for Certified seed class

(d) Certified seed produced from Certified seed shall not be eligible for further seed increase under certification. Certification tags for such production which is not eligible for further seed increase under certification shall be super scribed with, “not eligible for further seed increase under certification”.

VI. Phases of Seed Certification

Certification shall be completed in six broad phases listed as under:

(a) receipt and scrutiny of application

(b) verification of seed source, class and other requirements of the seed used for raising the seed crop;

(c) field inspections to verify conformity to the prescribed field standards;

(d) supervision at post-harvest stages including processing and packing;

(e) seed sampling and analysis, including genetic purity test and/or seed health test, if any, in order to verify conformity to the prescribed standards; and

(f) grant of certificate and certification tags, tagging and sealing.

VII. Establishing Source of Seed

The individual intending to produce seed under certification shall submit to the Certification Agency, one or more relevant evidence such as certification tags, seals, labels, seed containers, purchase records, sale records etc., as may be demanded by the Certification Agency during submission of the application, its scrutiny and/or during first inspection of the seed crop, in order to confirm if the seed used for raising the crop has been obtained from the source approved by it and conforms to the provisions contained in para V. This requirement also applies to both parents in seed production involving two parental lines.

Field Area for Certification: There is no minimum or maximum limit for the area offered by a person for certification, provided the certified seed production meets all the prescribed requirements.

VIII. Unit of Certification

For the purpose of field inspection, the entire area planted under seed production by an individual shall constitute one unit provided:

(a) it is all under one variety;

(b) it does not exceed ten hectares;

(c) it is not divided into fields separated by more than fifty meters between them;

(d) it is planted with or is meant to produce seed belonging to the same class and stage in the generation chain;

(e) the crop over the entire area is more or less of the same stage of growth so that observations made are representative of the entire crop;

(f) the total area planted, by and large, corresponds to the quantity of seed reported to have been used; and the Certification Agency's permission had been obtained to sow a larger area by economizing on seed rate; if that the case;

(g) raised strictly as a single crop and never as mixed;

(h) not so heavily and uniformly lodged that more than one third of the plant population is trailing on the ground leaving no scope for it to stand up again thus making it impossible for the Certification Agency to inspect the seed crop at the appropriate growth stage in the prescribed manner;

(i) as far as possible, so maintained as to show adequate evidence of good crop husbandry thereby improving the reputation for certified seeds; and

(j) not grown as inter, companion or ratoon crop.

IX. Use of Chemical Hybridizing Agents ('CHAs')

(a) In case of hybrid seed production, the seed producer can use proper Chemical Hybridising Agents ('CHAs') on seed parent (female line) in order to induce male sterility. Consequently the Minimum Seed Certification Standards specified for production of 'A' and 'B' lines shall not be applicable for the relevant hybrid.

(b) The hybrid seed produced through the application of 'CHAs' shall be compulsorily subjected to grow-out test as a pre-requisite for grant of certificate.

X. Field inspection

a) The field inspection work which requires technically-trained personnel, shall be performed by the persons who have been so authorized by the Certification Agency;

b) Field inspection meant to verify those factors which can cause irreversible damage to the genetic purity or seed health shall be conducted without prior notice to the seed producer;

c) Soon after the completion of the field inspection, a copy of the report shall be handed over to the seed producer or his representative.

XI. Re-inspection

Seed fields not conforming to prescribed standards for certification at any inspection, the Certification Agency shall, upon the request of seed producer and after he removes the sources of contamination in the seed field and within the prescribed isolation distances and/or the contaminated plants in the seed field (if so directed by the Certification Agency perform one or more re-inspections provided such removal can ensure conformity of the seed crop to the prescribed standards and provided further that no irreversible damage has been caused to the quality of seed by the contaminant(s). The Certification Agency may at its discretion, also perform one or more re-inspections over and above the minimum number of inspections prescribed, if considered necessary.

XII. Harvesting, Threshing and Transportation

Seed crop meeting field standards for certification shall be harvested, threshed and transported to the seed processing plant in accordance with the guidelines issued by the Certification Agency. During these operations, seed producer will take all precautions to safeguard the seed from admixture and other causes of seed deterioration.

XIII. Bulking

Bulking of unprocessed seed stocks to obtain larger homogeneous seed stocks may be permitted by the Certification Agency provided the stocks to be bulked meet the following requirements.

- belong to the same certified seed producer;
- belong to the same crop, variety, class of seed and stage in the generation chain;
- were produced in the same season and under similar agro-climatic conditions;
- were subjected to certification by the same Certification Agency;
- have more or less similar physical appearance and levels of moisture;
- are adequately homogenous in composition.

XIV. Seed Processing and Packing Schedule

The Certification Agency shall prepare and communicate seed processing and packing schedule to all certified seed producers soon after the certification of seed crops at field stage. The seed producers shall

adhere to the schedule specified by the Certification Agency. However, re-scheduling may be accepted by the Certification Agency on the request of seed producer on genuine grounds.

XV. Seed Lot

A seed lot is a physically identifiable quantity of seed which is homogeneous.

XVI. Lot Size

A seed lot would represent any quantity of agricultural seeds up to a maximum of 20,000 kilograms for seeds of the size of rice or larger (except maize seed, seed potato, sweet potato, yams, taro and chow-chow for which the maximum size of the lot may be 40,000 kilograms) and 10,000 kilograms for seeds smaller than rice subject to a tolerance limit of 5.0%. The quantities in excess of the above maximum limits shall be sub-divided and separate lot identification shall be given.

XVII. Construction of Seed Lot Number

Each seed lot shall be assigned a specific number in order to facilitate maintaining its identity, tracing back to its origin, handling in stores, transit etc., accounting and inventory maintenance and referring/communicating about a certain quantity of seed. The procedure for assigning lots numbers is given in Annexure-IV.

XVIII. Seed Processing

Seed processing means cleaning, drying, treating, grading and other operations which will improve the quality of seeds. Seed from fields which conformed to the standards of certification at field stage shall, as soon as possible after the harvest will be brought at processing plant for processing. The screen aperture size specified for many crops and that shall be used for cleaning and grading of seeds so that typical contaminants such as weed seeds, small seeds, damaged seeds, broken and shriveled seeds, straw, chaff, leaves, twigs, stones, soil particles etc. are removed. However, the Certification Agency is authorized to deviate under exigencies to use the screen of small aperture size than specified. In such cases, the Certification Agency shall record the reasons for reduction in the aperture of the screen. Processed seed shall not have seed of the size lower than the bottom screen used beyond 5.0% (by weight).

XIX. Seed Treatment

When a variety, seed of which is under certification is susceptible to a seed borne disease organism or when seed under certification is carrying a seed borne pathogen and a seed treatment is available which may control the disease or pathogen when properly applied, the Certification Agency may require such seed to undergo such treatment before Certification. In case seed is required to be treated before sowing by the user, the chemical calculated at the recommended dose shall be kept in a plastic packet and placed inside the seed container with complete direction and precautions required for treating of the seed. The information about the treatment shall also be displayed on seed containers. If the seeds have been treated, the following instructions shall also be complied with:

a) a statement indicating that the seed has been treated;

b) the commonly accepted chemical or abbreviated chemical name of the applied substance; and

c) if the substance of the chemical used for treatment and present with the seed is harmful to human beings or other vertebrate animals, a caution statement such as “Do not Use for Food; Feed or Oil purposes”. The caution for mercurials and similarly toxic substances shall be word “POISON” which shall be in type size, prominently displayed on the label in red.

XX. Samples and Sampling of Seeds

Soon after completion of the seed processing or after seed treatment as the case may be, the Certification Agency shall draw a representative composite sample as per procedure specified in Seed Testing Manual. The quantity of seed samples so drawn shall be sufficient to provide three samples of the size of submitted sample. The composite sample will be divided into three equal parts, and one shall be sent for analysis to a notified Seed Testing Laboratory, the second part to the seed producer and retain the third part as a guard sample.

XXI. Seed Analysis Report

The Seed Testing Laboratory shall analysis the seed samples in accordance with the prescribed procedure and deliver the Seed Analysis Report to the Certification Agency as soon as may be, but not later than 30 days from the date of receipt of the samples unless the seed is subjected to such tests which require more than 30 days for completion of the test.

XXII. Seed Standards of Genetic Purity

a) All certified seed lots shall conform to the following Minimum Standards for genetic purity unless otherwise prescribed:

Class	Standards for Minimum Genetic Purity (%)
Foundation	99.00
Certified:	
i. Varieties, composites, synthetics & multi lines	98.00
ii. Hybrids	95.00
iii. Hybrids of cotton, TPS, muskmelon, brinjal &tomato	90.00
iv. Hybrid castor	85.00

b) Grow-out Test

The Certification Agency shall conduct grow-out test to determine genetic purity of a seed lot whenever it is a pre-requisite for grant of the certificate and also on the seed lots where a doubt has arisen about the genetic purity. The grow-out test can be complemented by certain related laboratory tests. The grow-out test shall be conducted as per the procedure specified in Annexure V.

XXIII. Recleaning, Resampling and Retesting

When a seed lot does not meet the prescribed seed standards, the Certification Agency on the request of seed producer may permit recleaning, resampling and retesting. The recleaning, resampling and retesting shall be permitted only once.

XXIV. Seed Standards for Insect Damage

A seed lot under certification shall not have apparent or visible evidence of damage by insects for both Foundation and Certified seed classes in excess of 1.0% for the seeds of maize and legumes and 0.50% for the seeds other than maize and legumes unless otherwise prescribed.

XXV. Seed Moisture Content

Seed standards in respect of seed moisture shall be met at the time of packing of seed.

XXVI. Downgrading of Seed Class

If a seed field or a seed lot is not found meeting prescribed standards for the class for which it has been registered but conforms to the prescribed standards to the immediate lower class, the Certification

Agency may accept such seed fields/seed lots for certification to the immediate lower class provided request has been made to this effect by seed producer. However, downgrading of the seed class shall not be applicable in case of hybrids and their parents.

XXVII. Specification of the Certification Tag

Size, quality, colour, lay out and contents of the certification tag shall be as specified in Annexure VI.

XXVIII. Packing, Tagging, Sealing and Issuance of the Certificate

On receipt of Seed Analysis Report and the results of the grow-out test wherever prescribed, and if seed lot has met prescribed standards, the Certification Agency shall ensure packing, tagging and sealing and issuance of certificate expeditiously. An authorized official of the Certification Agency shall endorse the signature on the reverse of each certification tag and shall affix rubber stamp indicating the official's name and designation. Containers to be used for packing of the certified seeds shall be durable and free from defects. Advance tagging may be permitted at the discretion of the Certification Agency with proper safeguards.

XXIX. Refusal for Certification

The Certification Agency shall have the authority to refuse certification of any seed production field or any seed lot that does not conform to the Minimum Standards prescribed for that particular crop, either for field or for seed or for both. Such refusal will be subject to any appeal made to the Appellate Authority constituted under Section 11(1) of the Seeds Act, 1966.

XXX. Validity Period of the Certificate

The validity period shall be nine months from the date of test at the time of initial certification. The validity period could be further extended for six months provided on retesting seed conforms to the prescribed standards in respect of physical purity, germination and insect damage for all seeds except vegetatively propagating material for which lot shall be re-examined for seed standards specified for respective crop. A seed lot will be eligible for extension of the validity period as long as it conforms to the prescribed standards. The procedure for extension of the validity period is given in Annexure VII.

XXXI. Revocation of Certificate

If the Certification Agency is satisfied, either on reference made to it in this behalf or otherwise that:

(a) the certificate granted by it under Section 9(3) of the Act has been obtained by misrepresentation as to an essential fact; or

(b) the holder of the certificate has, without reasonable cause, failed to comply with the conditions subject to which the certificate has been granted or has contravened any of the provisions of the Act or the Rules made thereunder, then, without prejudice to any other penalty to which the holder of the certificate may be liable under the Act, the Certification Agency may, after giving the holder of the certificate an opportunity of showing cause revoke the certificate, under the provisions of Section 10 of the Act.

XXXII. Retention of Certification Records

The Certification Agency shall preserve in order all the documents including the guard samples pertaining to certification of each seed lot for two years from the date of grant/ extension of the certificate and four years in respect of rejected seed crops or lots from the date of communication of rejection unless and otherwise required for longer period.

3. Indian Minimum Seed Certification Standards for Spice Crops

3.1. BLACK PEPPER (*Piper nigrum* L.)

In black pepper, the rooted cuttings constitute the planting material. Hence, the standards are for the production of quality rooted cuttings.

Phase of certificate

1. Field inspection for selection of the field (for single Season certified nursery- conventional method-three nodded cuttings).

1.1 Selection of mother vines:

The material meant for multiplication should be selected only from a uniformly established gardens free from diseases/inoculants of diseases such as Phytophthora foot rot, Stunt and Phyllody diseases. Elite mother vines are to be identified in such garden with the following characteristics.

a) Age of the mother vines should be at least of 7 years.
b) The vine should have given stable yield of at least 2 kg dry pepper/vine/year for 4 consecutive years.
c) Management practices followed for those vines during the last five years should be noted.
d) These selected vines should be monitored at least once in year for a possible infection of the disease and continuously monitored for future use.

Vines with above characters are identified, labeled and runner shoots from such lines only should be used for large scale multiplication. In any such selection, varietal purity should be maintained. Close examination is essential to avoid physical mixing of varieties. To avoid such mixing, support trees and vines should be examined carefully so that if more than one variety of pepper vines are growing on the same tree support, such vines should be rejected.

1.2. Field inspection team

The fields from planting material are to be collected, should be inspected by a team consisting of a breeder, pathologist, entomologist and nematologist besides an agronomist/horticulturist.

1.2.1. Minimum specific number of field inspection

Two inspections are to be carried out; one during October-November for identifying mother vines with the specification of the crop field as mentioned in para 1.1 and the other during January-February to inspect field for the incidence of pests and diseases if any particularly to locate Phytophthora foot rot and stunt/phyllody diseases. A certificate to this effect shall be given to the selected vines which meet the standards para 1.1. It is mandatory for any commercial nursery to obtain this certificate annually.

2. Standards for planting material production methods.

2.1 Nursery inspection-standards

The nursery is to be established in a well-drained preferably in a slightly elevated place. The surface soil (0-15 cm depth) in this area should be tested for the presence/absence of disease-causing fungi/ bacteria/ nematodes particularly for the fungus *Phytophthora capsici*, nematodes *viz., Radopholus similis* and *Melodogyne incognita*. These tests should be carried out by the qualified personnel.

3. Black Pepper Tissue Culture (BPTC) Standards

3.1. Applications and Amplification of General Seed Standards for BPTC

i. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for approval of BPTC. As the name implies, these standards are applicable to tissue culture multiplied under laboratory and greenhouse conditions as laid here.

ii. The General standards are amplified as follows to apply specifically to the BPTC.

3.2. Eligibility requirements for BPTC production:

i. All micro-propagation and greenhouse facilities must be approved as per standards/ guidelines set by the Competent Authority.

ii. Laboratory and greenhouse facilities used for production of plantlets shall be maintained free of insects or vectors of Black Pepper pathogens. Failure to keep such insects under control may cause rejection of all lots maintained in the facility. All potting or growth media shall be sterile. Water sources used in the laboratory or greenhouse operation shall be treated or otherwise rendered free of all possible pathogens by the applicant.

iii. Hygienic conditions should be maintained strictly during micro-propagation, potting, planting, irrigating, movement and use of equipment and other laboratory and greenhouse practices to guard against the spread of diseases or insects in the facilities used for Black Pepper plant multiplication.

iv. The greenhouse (protected environment) must be insect proof and be equipped with a double-door entrance, provision for footwear disinfection prior to entering the protected environment and insect proof ventilation screening on intakes and exhaust openings. The persons entering he protected environment should use wellington boots (plastic boots) and change lab-coat in the changing area to reduce the changing area to reduce the chances of inadvertent introduction of vector or insects clinging to clothes

v. The material being initiated must be of a notified variety and confirmed identity. It must be duly documented with respect to origin.

vi. All samples of black pepper varieties being initiated should be tested in an accredited laboratory and should be free of viruses (CMV, Badna virus, Phytoplasma) and other endophytic or epiphytic bacteria and fungi.

vii. The basic material for sub-multiplication needs to be obtained afresh from the nodal organization as soon as the maximum permitted number of passages (as confirmed by DNA fingerprinting) of shoot multiplication with old cultures has been completed.

On application for inspection, the mother cultures as developed above are eligible for certification, the micro-propagation facility to be inspected must have been approved by the Competent Authority. All stocks must have a valid variety identification and disease testing report at any time during multiplication process.

In vitro multiplication of an imported variety or a non-notified variety can be taken up by the industry exclusively for export purposes. Such varieties, however, should be introduced following the approved guidelines of Government of India.

3.3. Source of seed:

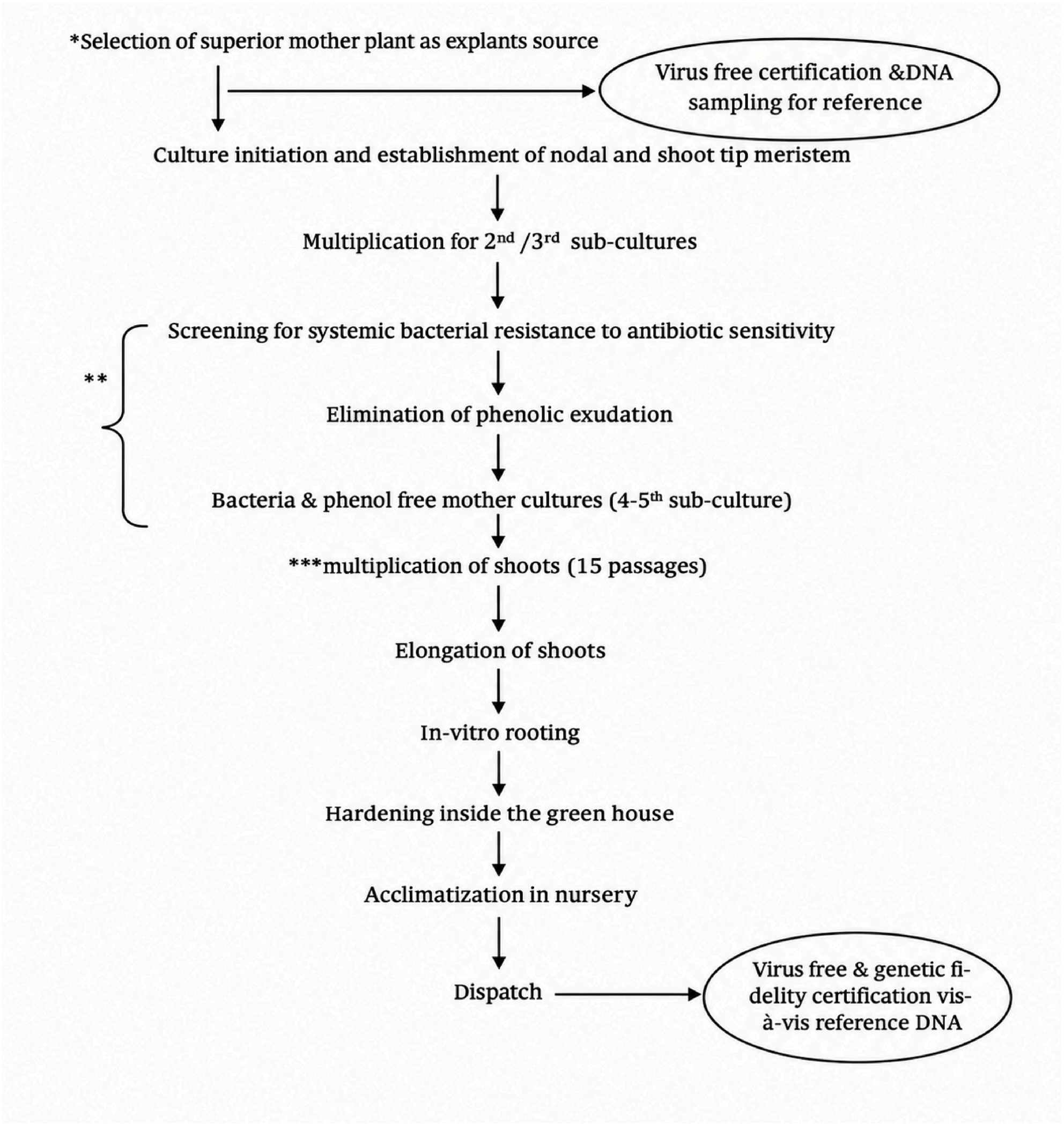
i. The facility should use recognized aseptic initiation and propagation procedures (i.e. follow procedures and use equipment, which will maintain sterile conditions as per standard tissue culture norms).

ii. The initiation facility must maintain following information on each variety for review and audit by the Competent Authority at least once in a year, variety identification, date of initiation, origin and testing results from accredited laboratory.

iii. Tests must be carried out on a minimum of 0.1% (minimum ten) plantlets for each variety by an accredited laboratory. Such tests will be valid as long as cultures of that particular batch are under production. No plant should contain (CMV and Badna virus) and other endophytic or epiphytic bacteria and fungi.

iv. Valid pathogen testing results are required at the $2^{nd}/3^{rd}$sub-culture stage prior to the bulking up of the cultures.

3.4. Procedures and standard parameters for production of black pepper by tissue culture



**Plants should be of superior quality in terms of growth, disease / insect resistance, drought tolerance, constant bearing (confirmed for at least three consecutive years), high yield (fresh and dry weight), oil and oleoresin content etc. The explants should be healthy and free from microbial infections. One set of mother plants must be maintained in the glass house as reference sample.*

***Since black pepper tissue culture is frequently confronted with endogenous bacterial contamination and phenolic exudation, these should be eliminated using appropriate method.*

***In black pepper the number of passages can be up to 15 for sub-culture of shoots.*

3.5. Minimum Quality Standards for growing of plants inside greenhouses/polyhouses

The following requirements must be met for production of plantlets:

i. Effective sanitation practices including insect and disease monitoring and prevention must be adhered to.

ii. No field-produced Black Pepper plants can be grown in the protected environment (greenhouse/polyhouse) along with tissue cultured plants.

iii. Varieties must be separated by physical barriers and proper tagging, which will prevent varietal mixture.

iv. Before dispatch to the farmers, the tissue-cultured plants growing in the nursery should be tested for the absence of the viruses such as CMV, Badna virus and clonal uniformity. For establishing clonal fidelity, the sample size should be 0.1 % of the batch size with a minimum of 10 plants.

v. If testing performed by an accredited laboratory reveals the presence of banned viruses, fungus or bacteria the tissue-cultured plants should not be dispatched from the premises of the production lab and the entire material should be destroyed.

vi. The concerned laboratory/agency producing the tissue culture raised material should issue a certificate to the effect that BPTC have been produced as per guidelines

vii. The agency producing BPTC will follow the labelling procedures.

3.2. CARDAMOM (*Elettaria cardamomum* Maton)

I. Application and Amplification of General Clone/suckers Certification Standards

1. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of cardamom clones.

2. The General Standards are amplified as follows to apply specifically to cardamom.

3. All certified clones shall be produced by asexual means *viz.*, suckers.

II. Land Requirements

Land to be used for clonal propagation of cardamom shall be free from volunteer plants.

III. Field Inspection

a) Mother Plant(s)

Mother Plant (s) should be healthy, true to type, and free from diseases and pests. The plants should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of capsule maturity for health and quality of mother plant (s).

b) Clones (Suckers)

A minimum of one inspection shall be made before the sale of the clones/ suckers after attaining the specified size to verify relevant factors.

IV. Field Standards

A. General Requirements

1. **Isolation:** The clone propagation plots of cardamom shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** The spacing between in clone propagation plots should be 2 m and between row 2m for Malabar type and 3 m x 3m for Mysore and Vazuka types.

3. **Rotation:** Nursery bed should be rotated to other plots after raising cardamom three times in the same plot

B. Specific Requirements

1. Clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded.
2. Off-types should not be more than 1% (maximum)

V. Clone specifications

The specification concerning the size of clones shall be as follows:

1. The diameter of the sucker should range from 5.0-10.0 cm.
2. Each sucker should have an emerging sucker attached to it.
3. In the clone lot, clones not conforming to the specified size shall not exceed 10% (by number).

3.3 LARGE CARDAMOM (*Amomum subulatum- Roxburgh.*)

1. Application and Amplification of General Seed Certification Standards

A. The common seed certification standards are basic and together with the following specific standards indicate the standards for certification of large cardamom.

B. The general standards are amplified as follows to apply specifically to large cardamom in North Eastern states.

All certified classes shall be produced by seedling from field collected open pollinated seeds, seedlings, from hybrid seeds produced in clonal seed production garden and vegetative, through suckers.

II. Nursery requirement/land requirement

- The nursery should be maintained only in rich organic soils or in soil where large cardamom/other related zingiberaceous crops were not planted earlier. Shades are immediately erected by using bamboo mats/reed mats or agro-shade nets.
- Avoid soil infected with Colletotrichum and soil borne insect pests.
- The land after preparation can be subjected to soil solarisation and enriched with organic inputs like FYM and vermicompost.

III. Field Inspection/Nursery inspection

For selection of mother plants for collection of open pollinated seeds minimum two visits are needed. The first inspection should be at time of the full bearing stage in the previous season (August-September for lower altitude <975 m MSL), (September-October for middle altitude 975-1515 m MSL) and (October-November for higher altitude>1515 m MSL) for marking the plants having high yield parameters. The second inspection shall be made just before the harvesting season of the current year for assessing the performance of the selected plants and also for pest and disease incidence.

For hybrid seeds from clonal crossing blocks minimum three inspection may be followed i.e., before flowering during flowering to rogue off unsuitable plants if any, and also confirm the plants are free pest and diseases, third inspection shall be at harvest to assess the quality of capsules and seed.

In case of nursery, minimum here inspection shall be made first at 3 months after sowing and second at 6 months to check off-types, pest and disease and seedling shall be transferred to poly bags final inspection made before at the time of distribution (10-12 months) to assess the quality of seedlings and pest and disease incidence.

IV. Field Standards

A. General Requirements

1. Isolation:

The clone crossing blocks of large cardamom shall be free from the contaminants.

Contaminants	Foundation	Certified
Fields of Blocks of general	200 m	100 m

B. Spacing requirements:

Standards	Foundation	Certified
1. Presence of diseases		
a. Chirke	0	0

b. Foorkey	0	0
c. Colletotrichum blight	0	1.5%
d. Leaf streak	0	0
e. Leaf rust		
2. Presence of pests		
a. Leaf eating caterpillars	0	0
b. Stem borer	0	0
c. Shoot fly	0	1.5%
d. White grub (root)	3%	5%
e. Aphids	0	0

V. Capsule/seedling standards

A. Capsule standards

Standards	Foundation	Certified
1. Appearance	Bold and healthy	Bold and healthy
2. Uniformity	95%	85%
3. Borer affected capsules	2%	5%
4. Deformed capsules	1%	5%
5. Contamination with others	Brownish black	Brownish black
6. Colour of the seed	75%	70%
7. Germination	70%	75%

B. Seedling standards

Standards	Foundation	Certified
1. Height	30-35cm	30-35cm
2. No. of leaves	4-5	4-5
3. 3. No. of diseases	-	-
Presence of disease		
4. Chirke	0	0
5. Foorkey	0	0
6. Colletotrichum blight	1.5%	2.0%
7. Insect pest	1%	5%
8. Undesirable seedlings	5%	10%

Note: The seedlings are sown in raised beds of convenient size at 5-6 months seedlings are transferred to secondary nursery i.e., in poly bags of 25 X 10 cm size filled with organic nursery mixture.

3.4 GINGER (*Zingiber officinale* Rose)

I. Application and Amplification of General Seed Certification Standards

A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of seed ginger.

B. The general standards are amplified as follows to apply specifically to ginger

C. All certified classes shall be produced by vegetative propagation of underground rhizome, whose source and identity may be assured and approved by the certification agency.

II. Land Requirements

- Partial shade with gentle sloppy landscape
- Soil should be loose, friable and offer minimum resistance to rhizome development. Soil depth 30 cm or more, high organic matter and pH of 6-6.5 are favorable. Virgin forest soil particularly after deforestation is ideal.
- Planting should be avoided if soil is infested with *Pythium* sp., *Pseudomonas solanacearum*, and *Meloidogyne incognita*.
- Land to be used for seed/planting material production of ginger shall be free from volunteer plants.

III. Field Inspection

A minimum of four inspections shall be made as follows:

A. The first inspection shall be made at the time of planting variety isolation, rhizome rot, seed piece weight and spacing.

B. The second inspection shall be made about 45-125 days after planting to check germination, sprouting, rhizome rot and shoot borer incidence.

C. The third inspection shall be made about 180-190 days after planting to check off types, rhizome rot and Phyllosticta leaf spot.

D. The fourth inspection shall be made before harvest of or between 240-250 days after planting to verify rhizome rot, scale insect and meal bug infestation.

IV. Field Standards

A. General requirements

1. Isolation

The fields/blocks of seed ginger shall be isolated from the contaminants shown in the column 1 of the table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

B. Specific requirements

Factor	Inspection stage	Foundation	Certified (Maximum)
1.Spacing	I	45 x30 cm	45x30cm
2.Seed piece weight	I	20-25 g	20-25 g
3.Rhizome rot	I	0	0
4. Shoot borer	II to IV II to III	0 1.0%	0 5.0%
5.Off-types	III	0.5%	1.0%
6.Phyllosticta Leaf spot: Bacterial wilt (*Rhizoctonia solanacearum)*	III	1.0% 1.0%	5.0% 1.0%
7.Scale insect	IV	1.0%	5.0%
8.Mealy bugs	IV	1.0%	5.0%

Note:

1. *All Off-types and diseased plants should be rogued out along with rhizomes and destroyed.*
2. *Gaps in the seed plot should not be more than 10.0%*

V. Seed Standards

Factor	Foundation	Certified
1. Appearance	Healthy & Plumpy	Healthy & Plumpy
2.Uniformity (Minimum)	95.0%	85.0-95.0%
3. Dry rot (Maximum)	1.0%	5.0%
4. Phyllosticta (Maximum)	5.0%	10.0%
5. Scales (Maximum)	1.0%	5.0%
6. Mealy bugs (Maximum)	1.0%	5.0%

Note:

1. *In a seed lot, rhizomes not conforming to specific characteristics of a variety shall not exceed 0.5% and 1.0% (by number – max) for foundation and certified seed classes, respectively.*
2. *The seed material shall be reasonably clean healthy and firm.*
3. *Cut, bruised, or those damaged by insects shall not exceed more than 1.0% (by weight)*

3.5 TURMERIC (*Curcuma longa* L.)

I. Application and Amplification of General Seed Certification Standards

A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of seed turmeric.

B. The general standards are amplified as follows to apply specifically to turmeric.

C. All certified classes shall be produced by vegetative propagation of underground rhizome, whose source and identity may be assured and approved by the Certification Agency.

II. Land Requirements

- Soil should be loose, arable and offer minimum resistance to rhizome development.
- Soil depth 30 cm or more, high organic matter of acidic soil.
- The crop of seed turmeric shall not be eligible for certification if grown on the land infested with Pythium sp., Pseudomonas solanacearum, and Meloidogyne incognita.

III. Field Inspection

A minimum of four inspections shall be made as follows:

A. The first inspection shall be made at the time of planting to verify isolation, rhizome rot, seed piece weight and spacing.

B. The second inspection shall be made about 45-50 days after planting to check germination, sprouting, rhizome rot and shoot borer incidence.

C. The third inspection shall be made about 120-180 days after planting in order to verify off types, shoot borer and rhizome rot.

D. The fourth inspection shall be made before harvest or between 240-250 days after planting to verify rhizome rot, scale insect and meal bug infestation.

IV. Field Standards

A. General requirements

1. Isolation

The fields/blocks of seed turmeric shall be isolated from the contaminants shown in column 1 of the table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	*Minimum distance (meters)*	
	Foundation	*Certified*
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

B. Specific requirements

Factor	Inspection stage	Foundation	Certified (Maximum)
1.Spacing	I	45 x30 cm	45x30cm
2.Seed piece weight	I	20-25g	20-25 g
3.Rhizome rot	I	0	0
4. Shoot borer	II to III	1.0%	5.0%
5.Off-types	III	0.5%	1.0%
6. Scale-insect	IV	1.0%	5.0%
7.Mealy bugs	IV	1.0%	5.0%

Note:

1. *All Off-types and diseased plants should be rogued out along with rhizomes and destroyed.*
2. *Gaps in the seed plot should not be more than 10.0%*
3. *Land should be free from volunteers*

V. Seed Standards

Factor	Foundation	Certified
1. Appearance	Healthy & Plumpy	Healthy & Plumpy
2. Uniformity (Minimum)	95.0-100.0%	85.0%
3. Dry rot (Maximum)	1.0%	5.0%
4. Scales (Maximum)	1.0%	5.0%
5. Mealy bugs (Maximum)	1.0%	5.0%

Note:

1. *In a seed lot, rhizomes not conforming to specific characteristics of a variety shall not exceed 0.5% and 1.0% (by number – maximum) for foundation and certified seed classes, respectively.*
2. *The seed material shall be reasonably clean healthy and firm.*
3. *Cut, bruised, or those damaged by insects shall not exceed more than 1.0% (by weight)*

3.6 VANILLA (*Vanilla planifolia* Andr.)

Information regarding parent material

Method of propagation-Vegetative (Cutting)

Standards of planting material

Height of cuttings- 60-120 cm in length,

Number of internodes- 15-20

Diameter- 0.8 cm.

Number of leaves- 13-15 nos.

Disease incidence

i. Name of disease- Stem rot

Causal organism- *Fusarium oxysporum* fsp.vanilla and *Phytophthora meadii*

Detection and diagnosis- Visual

ii. Name of disease- Yip rot and die back

Causal organism- Cucumber mosaic virus, Cymbidium mosaic virus, Vanilla mosaic virus.

Detection and diagnosis- Visual, ELISA, Polymerase chain reaction (PCR) tests.

1. Maximum permitted % of off type plant affected by seed born disease
2. Weed seed 0.00%

Seed Standards

Seed standard of each class:

Factor	Foundation seed	Certified seed
Purity %	99	99
Inert matter %	1	1
Other crop seed %	None	None
Other distinguish variety %	05/kg	10/kg
Weed seed %	None	None
Moisture %	10%	10%
Germination %	65%	60%
Vapour contain moisture %	6%	6%

VANILLA- TISSUE CULTURE (VTC)- STANDARDS

I. Applications and Amplification of General Seed Standards for VTC

a. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for approval of VTC. As the name implies. These standards are applicable to tissue culture multiplied under laboratory and greenhouse conditions as laid here.

b. The General Standards are amplified as follows to apply specifically to the VTC.

1. Eligibility requirements for VTC production:

i. All micro-propagation and greenhouse facilities must be approved as per standards/ guidelines set by the Competent Authority.

ii. Laboratory and greenhouse facilities used for production of plantlets shall be maintained free of insects or vectors of Vanilla pathogens. Failure to keep such insects under control may cause rejection of all lots maintained in the facility. All potting or growth media shall be sterile. Water sources used in the laboratory or greenhouse operation shall be treated or otherwise rendered free of all possible pathogens by the applicant.

iii. Hygienic conditions should be maintained strictly during micro-propagation, potting, planting, irrigating, movement and use of equipment and other laboratory and greenhouse practices to guard against the spread of diseases or insects in the facilities used for Vanilla plant multiplication.

iv. The greenhouse (protected environment) must be "insect proof' and be equipped with a double-door entrance, provision for footwear disinfection prior to entering the protected environment 'and insect proof ventilation screening on intakes and exhaust openings. The persons entering the protected environment should use Wellington boots (plastic boots) and change lab-coat in the changing area to reduce the chances of inadvertent introduction of vector or insects clinging to clothes

v. The material being initiated must be of a notified variety and confirmed identity. It must be duly documented with respect to origin.

vi. All cultures of vanilla varieties being initiated should be tested in an accredited laboratory and be free of viruses such as Vanilla Mosaic Potyvirus, Vanilla Necrosis Potyvirus, Cymbidium Mosaic Potex virus, Odontoglossum Ring Spot Tobamo virus, Uncharacterized Potyvirus/ Rhabdovirus and other endophytic or epiphytic bacteria and fungi.

vii. The basic material for sub-multiplication needs to be obtained afresh from the nodal organization as soon as the maximum permitted number of passages (as confirmed by DNA fingerprinting) of shoot multiplication with old cultures has been completed.

viii. On application for inspection, the mother cultures as developed above are eligible for certification. The micro-propagation facility to be inspected must have been approved by the Competent Authority. All stocks must have a valid variety identification and disease testing report at any time during multiplication process.

In vitro multiplication of an imported variety or a non-notified variety can be taken up by the industry exclusively for export purposes. Such varieties, however, should be introduced following the approved guidelines of government of India.

2. Source of Seed:

i. The facility should use recognized aseptic initiation and propagation procedures (i.e. follow procedures and use equipment, which will maintain sterile conditions as per standard tissue culture norms.)

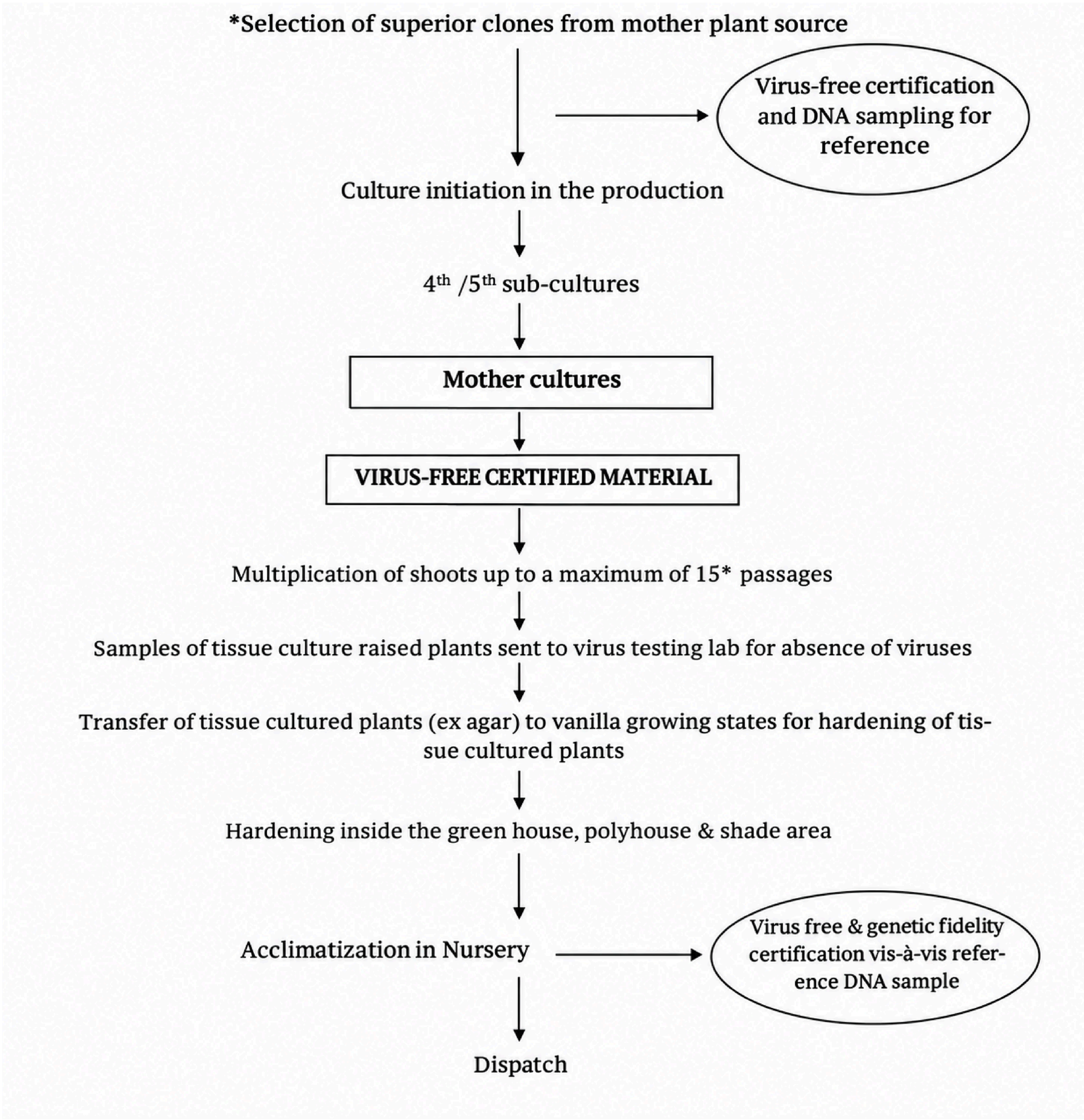
ii. The initiating facility must maintain following information on each variety for review and audit by the Competent Authority at least once in a year: variety identification, date of initiation, origin and testing results from accredited laboratory.

iii. Tests must be carried out on a minimum of 0.1% (at least ten) plantlets for each variety by an accredited laboratory. Such tests will be valid so long as cultures of that particular batch are under production (subject to a maximum of 15 passages). No plant should contain pathogens such as Vanilla Mosaic Potyvirus, Vanilla Necrosis Potyvirus, Cymbidium Mosaic Potex virus, Odontoglossum Ring Spot Tobamo virus, Uncharacterized Potyvirus/Rhabdovirus and other endophytic or epiphytic bacteria and fungi.

iv. Valid pathogen testing results are required at the 2nd /3rd sub-culture stage prior to the bulking up of the cultures

In tissue culture, it is well known that lesser the number of sub-cultures, lower will be the chances of somaclonal variation. However, it must also be realized that if the number of passages are far too small then the entire production process becomes economically unviable. Therefore, efforts should be made to optimize the shoot multiplication process and extend the number of passages only till the clonal uniformity of the progenies is maintained. This could be achieved through a) strict monitoring of shoot multiplication process ensuring that adventitious shoots are not multiplied and b) confirming the clonal fidelity of tissue cultured plants using molecular markers in different passages. It has been seen in vanilla using molecular markers that clonal fidelity is maintained even up to 24th passage. However, to be on the safer side, the shoot multiplication process should not be carried out beyond 15 passages.

3. Procedures and standard parameters for production of Vanilla by tissue culture



4. Minimum Quality Standards for growing of plants inside greenhouses/polyhouses

The following requirements must be met for production of plantlets:

a. Effective sanitation practices including insect and disease monitoring and prevention must be adhered to.

b. No field-produced Vanilla plants can be grown in the protected environment (greenhouse/polyhouse) along with tissue cultured plants.

c. Varieties must be separated by physical barriers and proper tagging, which will prevent varietal mixture.

d. Before dispatch to the farmers, the tissue-cultured plants growing in the nursery should be tested for the absence of the viruses such as Vanilla Mosaic Potyvirus, Vanilla Necrosis Potyvirus, Cymbidium Mosaic Potexvirus, Odontoglossum Ring Spot Tobamovirus and Uncharacterized Potyvirus/ Rhabdovirus) and clonal uniformity. For establishing clonal fidelity, the sample size should be 0.1 % of the batch size with a minimum of 10 plants.

e. If testing performed by an accredited laboratory reveals the presence of banned viruses, fungus or bacteria the tissue-cultured plants should not be dispatched from the premises of the production lab and the entire material should be destroyed.

f. The concerned laboratory/agency producing the tissue culture raised material should issue a certificate to the effect that VTC have been produced as per guidelines.

g. The agency producing VTC will follow the labelling procedures.

3.7 BLACK TURMERIC (*Curcuma caesia Roxb.*)

I. Application and Amplification of General Seed Certification Standards

A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of Black Turmeric planting material.

B. The General Standards are amplified as follows to apply specifically to Black Turmeric.

C. All certified classes shall be produced from planting stakes by asexual methods like rhizomes.

II. Land Requirements

a. Land to be used for clonal propagation of Black Turmeric shall be free from volunteer plants.

b. Swampy conditions must be avoided. Requires about 30 percent shade. Avoid fully open fields and polluted with hazardous chemicals.

III. Field Inspection

Mother Plant

Mother Plant should be healthy, true to type and free from diseases and pests. The plants should be certified for the specified varietal characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries.

A minimum of four inspections shall be made, the first about 60 days, the second about 120 days and the third about 180 days after planting or at appropriate growth stage depending on the crop duration of the variety concerned and the fourth prior to harvesting for collection of rhizomes for planting to ensure genetic purity with respect to plant characteristics, rouging of off types, transmittable pests and diseases infection etc.

IV. Field Standards

A. General Requirements

Isolation

Seed fields (mother plant plots) shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table.

Contaminants	Minimum Distance (meters)	
	Foundation	Certified
1	2	3
Fields of the varieties	5	5
Fields of the same variety not conforming to varietal purity requirement for certification	5	5

B. Specific Requirements

Isolation

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off types	0.10	0.20
Plants showing symptoms of leaf spot and leaf blight	0.10	0.50

Plants infested with nematodes	None	None
Plants infested with mealy bug	None	None
Plants infested with virus	None	None

**Standards for off-types shall be met at final inspection and for leaf spot and plants infested with nematodes, mealy bug and virus at each inspection.*

Note: All off-types and plants infested with pests and diseases should be rouged out.

V. Seed Standards

A. Specifications in respect of size and age of the planting stakes (Rhizomes for raising nursery) for foundation and certified classes shall be as follows:

1	Age of the crop	8 to 10 months
2	Approximate Length of the rhizome	3.0 cm to 4.0 cm (planting stake)
3	Approximate breadth of the rhizome	6.0 cm -10.0 cm (planting stake)
4	Approximate number of nodes	2-3 nodes in the planting stake

B. Maximum tolerance limit of planting stakes showing visible symptoms of infestation caused by nematodes, mealy bugs and viruses will be as follows:

Contaminants	**Minimum Distance (meters)**	
	Foundation	**Certified**
Planting stakes infested with nematodes, mealy bug and viruses	None	None

3.8 THIPPALI (LONG PEPPER) (*Piper longum* L.)

1. Application and Amplification of General Seed Certification Standards

A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of Thippali planting material.

B. The General Standards are amplified as follows to apply specifically to Thippali.

C. All certified classes shall be produced from planting stakes by asexual methods like cuttings.

II. Land Requirements

A. Land to be used for clonal propagation of Thippali shall be free from volunteer plants.

B. Swampy conditions must be avoided. Requires about 30 percent shade.

C. Avoid fully open fields and polluted with hazardous chemicals

III. Field Inspection

Mother Plant

Mother Plant should be healthy, true to type and free from diseases and pests. The plants should be certified for the specified varietal characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries.

A minimum of four inspections shall be made, the first about 60 days, the second about 120 days and the third about 180 days after planting or at appropriate growth stage depending on the crop duration of the variety concerned and the fourth prior to taking cuttings for planting to ensure genetic purity with respect to plant characteristics, rouging of off types, transmittable pests and diseases infection etc.

IV. Field Standards

A. General Requirements

Isolation

Seed fields (mother plant plots) shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	5	5
Fields of the same variety not conforming to varietal purity requirement for certification	5	5

B. Specific requirements

Factor	Maximum permitted (%)	
	Foundation	Certified
1	2	3
Off types	0.10	0.20
Plants showing symptoms of leaf spot and leaf blight	0.10	0.50
Plants infested with nematodes	None	None
Plants infested with mealy bug	None	None
Plants infested with virus	None	None

Standards for Off-types shall be met at final inspection and for leaf spot and plants infested with nematodes, mealy bug and virus at each inspection.
Note: All off-types and plants infested with pests and diseases should be roughed out.

V. Seed Standards

A. Specifications in respect of size and age of the planting stakes (cuttings for raising nursery) for foundation and certified classes shall be as follows:

1	Age of the crop	7 to 12 months
2	Diameter of the stem	0.3 cm to 0.5 cm (planting stake)
3	Approximate length of the stem	6.0 cm -10.0 cm (planting stake)
4	Approximate number of nodes	2-3 nodes in the planting stake

- Plant standards for sale: The rooted plants of minimum of 3 months age, well hardened plants with good root system and shoot growth of about 15 cm-20 cm, free from pests, diseases and nematodes.

B. Maximum tolerance limit of planting stakes showing visible symptoms of infestation caused by nematodes, mealy bugs and viruses will be as follows:

Factor	**Maximum tolerance limit (%)**	
	Foundation	**Certified**
Planting stakes infested with nematodes, mealy bug and viruses.	None	None

3.9 BLACK GINGER *(Kaempheria parviflora Wall. ex Baker)*

I. Application and Amplification of General Seed Certification Standards

A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of Black Ginger planting material.

B. The General Standards are amplified as follows to apply specifically to Black Ginger.

C. All certified classes shall be produced from planting stakes by asexual methods like rhizomes.

II. Land Requirements

A. Partial shade with gentle sloppy landscape.

B. Soil should be loose, friable and offer minimum resistance to rhizome development. Soil depth 30 cm or more, high organic matter and pH of 6-6.5 are favourable. Virgin forest soil particularly after deforestation is ideal.

C. Planting should be avoided if soil is infested with Pythium sp., Pseudomonas solanacearum, and Meloidogyne incognita.

D. Land to be used for seed/ planting material production of Black ginger shall be free from volunteer plants and stones.

III. Field Inspection

Mother Plant should be healthy, true to type and free from diseases and pests. The plants should be certified for the specified varietal characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of four inspections shall be made as follows:

a. The first inspection shall be made at the time of planting variety isolation, rhizome rot, seed piece weight and spacing.

b. The second inspection shall be made about 45-125 days after planting to check germination, sprouting, rhizome rot and shoot borer incidence.

c. The third inspection shall be made about 180-190 days after planting to check off types, rhizome rot and Phyllosticta leaf spot.

d. The fourth inspection shall be made before harvest of or between 240-250 days after planting to verify rhizome rot, scale insect and mealy bug infestation.

IV. Field Standards

A. General Requirements

Isolation

The fields/blocks of seed Black Ginger shall be isolated from the contaminants shown in column 1 of the table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum Distance (meters)	
	Foundation	Certified
1	2	3
Fields of the varieties	3	3
Fields of the same variety not conforming to varietal purity requirement for certification	3	3

3.10 THYME (*Thymus vulgaris* L.)

1. Application and Amplification of general Clone Certificate Standards

1. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of thyme clones.
2. The General Standards are amplified as follows to apply specifically to thyme.
3. All certified clones shall be produced by shoot cuttings, whose source and identify may be assured and approved by the certification agency.

II. Land Requirements

Land to be used for clonal propagation of thyme shall be from volunteer plants.

III. Field Inspection

A. Mother Plant

Mother Plant should be healthy, true to type and free from diseases and pests. The herbs should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of the inspection shall be made at the time of active growth for ascertaining the growth of the mother plant.

B. Clones (Shoot cuttings)

A minimum of one inspection shall be made after establishment of the clones and attaining the specified size to verify relevant factors.

IV. Field Standards

A. General Requirements

1. Isolation: The clonal propagation plots of thyme shall be isolated from the fields of other varieties and field of the same variety not conforming to varietal purity requirements for certification by 3 m.

2. Spacing: The spacing between rows and plants either way is 30 cm for the clonal mother block.

B. Specific Requirements

1. Clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded
2. Off-types should not be more than 0.10% (maximum).

V. Clone specifications

1. The girth of the clone should range from 0.50-0.75 cm above ground level and length of the clone 10-12 cm with 3-4 nodes.
2. In the clone lot, not confirming to specified size shall not exceed 5.0% (by number).
3. Pure living clones should be 98.0% by number
4. The clone should be totally free from nematode infection.
5. Pure living clones should be 98.0% by number.

3.11 TIKHUR (*Curcuma angustifolia* Roxb.)

1. Application and Amplification of General Seed Certification Standards

A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for cert5ification of seed Tikhur.

B. The general standards are amplified as follows to apply specifically to Tikhur.

C. All certified classes shall be produced by vegetative propagation of underground rhizome, whose source and identity may be assured and approved by the Certification Agency.

II. Land Requirements

A. Soil should be loose, arable and offer minimum resistance to rhizome development.

B. Soil depth 30cm or more, high organic matter of acidic soil.

C. The crop of seed Tikhur shall not be eligible for certification if grown on the land infested with *Pythium* sp. Pseudomonas solanacearum and Meloidogyne incognita.

III. Field Inspection

A minimum of four inspections shall be made as follows:

A. The first inspection shall be made at the time of planting of verify isolation, rhizome rot, seed piece weight and spacing.

B. The second inspection shall be made about 45-50 days after planting to check germination, sprouting, rhizome rot and shoot borer incidence.

C. The third inspection shall be made about 100-120 days after planting in order to verify off types, shoot borer and rhizome rot.

D. The fourth inspection shall be made before harvest or between 170-180 days after planting to verify rhizome rot, scale insect and meal bug infestation.

IV. Field Standards

A. General requirements

1. Isolation

The fields/blocks of seed Tikhur shall be isolated from the contaminants show in column 1 of the table below by the distances specified in columns 2 and 3 of the said:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

B. Specific requirements

Factor	Inspection stage	Foundation	Certified
Spacing	I	60*20 cm	60*20 cm
Seed piece weight	I	20-30 g	20-30 g

Rhizome rot	I	0	0
Shoot borer	II to III	1.0%	5.0%
Off types	III	0.5%	1.0%
Scale insects	IV	1.0%	5.0%
Mealy bugs	IV	1.0%	5.0%

Note:

1. *All off-types and diseased plants should be rouged out along with rhizomes and destroyed.*
2. *Gaps in the seed plot should not be more than 10.0%*
3. *Land should be free from volunteers.*

V. Seed Standards

Factor	**Foundation**	**Certified**
1.Appearance	Healthy and plumpy	Healthy and plumpy
2. Uniformity (Minimum)	95.0-100%	85.0%
3. Dry rot (Maximum)	1.0%	5.0%
4. Scales (Maximum)	1.0%	5.0%
5. mealy bugs (Maximum)	1.0%	5.0%

Note:

1. *In a seed lot, rhizomes not conforming to specific characteristics of a variety shall not exceed 0.5% and 1.0% (by number - maximum) for foundation and certified seed classes, respectively.*
2. *The seed material shall be reasonably clean healthy and firm.*
3. *Cut, bruised, or those damaged by insects shall not exceed more than 1.0% (by weight).*

3.12 NUTMEG (*Myristica fragrans* Houtt.)

I. Application and Amplification of General Clone Certification Standards

A. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of nutmeg clones.

B. The General Standards are amplified as follows to apply specifically to nutmeg.

C. All certified clones shall be produced by asexual methods like softwood grafting, epicotyl grafting, approach grafting, and patch budding.

II. Land Requirements

The land to be used for clonal propagation of nutmeg should be free from volunteer plants

III. Field Inspection

A. Rootstock

A minimum of one inspection shall be made before grafting/budding when the rootstock has attained a suitable stage for grafting/budding

B. Mother Plant/Scion

Mother Plants should be healthy, true to type, and free from diseases and pests. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and quality of the mother tree.

C. Grafted /Budded/Air layered Clones

A minimum of two inspections shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

IV. Field Standards

A. General Requirements

1. Isolation:

The clone propagation plots of nutmeg shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

2. Spacing:

The spacing between plants in clone propagation plots should be 30 cm and between rows 50 cm.

3. Rotation:

Nursery should be rotated to other plots after raising Nutmeg three times in the same plot.

B. Specific Requirements

(a) Foundation Clones

Foundation Clones being a group of common ancestry shall be genetically pure in absolute terms. Off – types should be discarded under the supervision of Certification Agency. The plants should be free from scales, shot holes, thread blight, and horse hair blight

(b) Certified Class

Factor	Maximum permitted (%)
Off- type	0.10
Plants infected with Scales	0.10

The specification with respect of the size of clones for foundation and certified classes shall be as follows:

a) The diameter of the stock should range from 1.0 to 1.25 cm.
b) The height of the grafting should range from 10 to 25 cm.
c) The diameter of grafts at 10 cm above the graft union should range from 1.25- 1.50 cm and the height of the grafts 60-100 cm.
d) The height of the plant should be 25-40 cm in case of budding.
e) The grafted clone should be free from rootstock shoots.
f) In the clone lot, clones not conforming to the specified size shall not exceed 5.0% (by number).

V. Clone Standards

Factor	Standards for each class	
	Foundation	Certified
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Root-stocks (maximum)	0.5% (by number)	2.0% (by number)

3.13 CINNAMON (*Cinnamomum zeylanicum* Blume.)

1. Application and Amplification of General Seed Certification Standards

A. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of cinnamon planting material (semi hard wood cutting).

B. The General Standards are amplified as follows to apply specifically to cinnamon.

C. All certified classes shall be produced from stem cutting the mother block whose source and identify may be assured and approved by the Certification Agency.

II. Land Requirements

A. Land to be used for cinnamon planting of cinnamon planting material shall be free from volunteer plants.

B. Swampy and shaded conditions might be avoided.

C. Avoid residue and drainage from other cinnamon fields.

III. Field Inspection

A minimum of three inspections shall be made, the first about 60 days, the second about 90 days and the third 120 days after planting and before to procuring of stem cuttings to verify isolation, off-types and other relevant factors.

IV. Field Standards

A. General Requirements

1. Isolation: Mother block shall be isolated from the fields of varieties and fields of the same variety not conforming to varietal purity requirement by 5 m.

2. Spacing requirements:

1. Cones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded.

2. Off-types should not be more than 0.10% (maximum).

V. Clone Standards

Specification in respect of size and age of the semi hard wood stem cutting for shall be as follows:

1	Age of the semi cutting	5-9 months of rejuvenation growth.
2	Girth of the stem cutting	1.0 to 1.5 cm
3	Approximate length of the stem cutting	25 cm
4	Approximate number of nodes in the stem cutting	4
5	The minimum limit of survival percentage must be 90% and the minimum limit of pure living clones	

3.14 CASSIA (*Cinnamomum aromaticum* Nees)

I. Application and Amplification of General Clone Certification Standards

A. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of Cassia clones.

B. All certified clones shall be produced by vegetative methods like cuttings or air layering

II. Land Requirements

The land to be used for clonal propagation of cinnamon shall be free from volunteer plants.

III. Field Inspection

a) Mother Plant

Mother Plants should be healthy and free from diseases and insect pests. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made to ascertain health and varietal purity.

b) Clones (Rooted Cuttings/Air layers)

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

IV. Field Standards

A. General Requirements

1. Isolation:

The clonal propagation plots of cinnamon shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

2. Spacing:

The spacing between plants in clone propagation plots should be 20 cm and between rows 30 cm

B. Specific Requirements

(a) Foundation Clones

Foundation Clones being a group of common ancestry shall be genetically pure in absolute terms. Off – types should be discarded under the supervision of Certification Agency. The plants should be free from scales, shot holes, thread blight, and horse hair blight

(b) Certified Class

Factor	Maximum permitted (%)
Off- type	0.10
Plants infected with Scales	None

V. Clone specifications

The specification concerning the size of clones for foundation and certified classes shall be as follows:

1. The diameter of the clone should range from 0.50-1.00 cm above ground level and the height of the clone 25-40 cm
2. In the clone lot, clones not conforming to the specified size shall not exceed 5.0% (by number).

VI. Clone Standards

Factor	Standards for each class	
	Foundation	Certified
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)

3.15 CLOVE (*Syzigium aromaticum* Merrilet Perry)

1. Application and Amplification of General Clone Certification Standards

1. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of clove seedlings

II. Land Requirements

Land to be used for propagation of clove shall be free from volunteer plants.

III. Field Inspection

A minimum of two inspections should be made, the first during flower maturity, and the second at mature fruit stage to harvest for seed extraction.

IV. Field Standards

A. General Requirements

1. Isolation:

The clone propagation plots of clove shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum Distance (meters)	
	Foundation	Certified
Fields of other varieties	20	20
Fields of the same variety not conforming to varietal purity requirements for certification.	10	10

2. Spacing:

The spacing between plants in clone propagation plots should be 30 cm and between rows 50 cm.

3. Rotation:

Nursery should be rotated to other plots after raising clove three times in the same plot.

B. specific Requirements

1. Certified class

Factor	Maximum permitted(%)	
	Foundation	Certified
Off- type	0.10	0.20

* At seedling stage

V. Seedling specifications

Seeds are recalcitrant and hence seedling has to be raised immediately after harvest. The specification in respect of size of clones for foundation and certified classes shall be as follows:

a) The height of the plant should be 25-40 cm and the diameter should be around 1.5 to 2.0 cm at the base.

b) The seedling should be free from pest and disease attack.

c) In the seedling lot, plants not conforming to specified size shall not exceed 5.0% (by number).

VI. Seedling Standards

Factor	Standards for each class	
	Foundation	Certified
Pure living seedlings (minimum)	9	98.0% (by number)

3.16 Garcinia (*Garcinia* gummi-gutta (L.) N.Robson.)

I. Application and Amplification of General Clone Certification Standards

1. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of Camboge clones.
2. The General Standards are amplified as follows to apply specifically to Camboge.
3. All certified clones shall be produced by asexual methods like soft wood grafting, or approach grafting or patch budding.

II. Land Requirements

Land to be used for clonal propagation of Camboge shall be free from volunteer plants.

III. Field Inspection

A minimum of one inspection shall be made before grafting when the rootstock has attained a suitable stage for grafting.

a) Mother Plant/Scion:

Mother Plants should be healthy, true to type, and free from diseases and pests. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for the health and fruit quality of the mother tree.

b) Grafted Clones:

A minimum of two inspections shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

IV. Field Standards

A. General Requirements

1. Isolation:

The clone propagation plots of Camboge shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

2. Spacing:

The spacing between plants in clone propagation plots should be 20-30 cm and between rows 30-40 cm.

3. Rotation:

Nursery should be rotated to other plots after raising Camboge three times in the same plot.

B. Specific Requirements

(a) Foundation Clones

Foundation Clones being a group of common ancestry shall be genetically pure in absolute terms. Off – types should be discarded under the supervision of Certification Agency.

Certified Class

Factor	Maximum permitted (%) * Certified
Off- type	0.10
Plants with malformation	0.20
Plants with physiological disorders	

V. Clone specifications

The specification with respect of the size of clones for foundation and certified classes shall be as follows:

a) The diameter of the stock should range from 3.0-4.0 mm

b) The height of the grafting should range from 15-20 cm.

c) The diameter of grafts at 10 cm above the graft union should range from 3.0-5.0 mm and the height of the grafts 20-30 cm.

d) The diameter of the inarched grafts at 10 cm above the ground level should range from 5.0-8.0 mm and the height of the grafts 30-50 cm.

e) The grafted clone should be free from sprouts from rootstock.

f) In the clone lot, clones not conforming to the specified size shall not exceed 5.0% (by number).

VI. Clone Standards

Factor	Standards for each class	
	Foundation	Certified
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)

3.17 KOKUM Seed Standard (*Garcinia indica* Choisy)

Land requirements:

- Soil should be well drained, loose, friable, lateritic; and alluvial soil having depth about 2 m. and pH 6 to 7.
- Land should be free from volunteer plant and other species.
- Land should not be infested by any soil borne organisms.

Field Inspection:

- At least minimum three inspection shall made as follows:

a. First inspection shall be made at the time of planting for inspection of variety, isolation, pest and disease infestation, spacing & quality planting material.

b. The second inspection shall be made at the time flowering to check flowering behaviour fruit set & other characters of variety as well as to check incidence of leaf minor.

c. The third inspection shall made at fruit maturity to check for maturity and other characters specified for variety as well as to check incidence of fruit fly pink disease.

Field Standards:

A. General Requirements

Isolation

The field/block of kokum shall be isolated from the contaminants shown in column 1 of the table below by the distances specified in columns 2 and 3 of the said table.

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other variety	6m	6m
Fields of the same variety not conforming to variety purity requirements for certification.	6m	6m

B. Specific Requirements:

Factor	Inspection stage	Foundation	Certified(maximum)
1.Spacing	I	Minimum 6m×6m	Minimum 6m×6m
2.Off types	II	0%	0%
3.Seed germination	-	Kokum seeds are recalci-trant and sown within 15 days after harvesting by through washing to remove mucilage coating	Kokum seeds are re-calcitrant and sown within 15 days after harvesting by through washing to remove mucilage coating
4.Age of seedling for grafting or budding	III	6-9 months	6-9 months
5.Selection of scion material for grafting or budding.	III	Scion collected from fully grown mother tree free pest and disease	Scion collected from fully grown mother tree free pest and dis-ease

6.Age of grafts /budding for panting	III	9-12months	9-12 months
7.Root stock	III	*Gacinia indica* Choisy	*Gacinia indica* Choisy
8.Leaf minor	II	1%	5%
9.Fruit fly	III	5%	10%

Note: All plants of same species or other species should be rouged out as and when they appear.

Seed Standards

Factor	Foundation	Certified
1.Appearance of bud/grafts	Healthy 9 to 12 months ago with perfect grafts union	Healthy 9 to 12 months ago with perfect grafts union
2.Uniformity	99%	99%
3.Leaf minor	1%	1%
4.Fruit fly	5%	5%
5.Pink disease	1%	1%

3.18 KOKAM (Clone Standard) (*Garcinia indica* Choisy)

1. Application and Amplification of General Clone Certification Standards

A. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of Kokam clones.

B. The General Standards are amplified as follows to apply specifically to Kokam.

C. All certified clones shall be produced by asexual methods like wedge grafting, approach grafting.

II. Land Requirements

Land to be used for clonal propagation of Kokam shall be free from volunteer plants.

III. Field Inspection

A. Rootstock

A minimum of one inspection shall be made before grafting when the rootstock has attained graftable stage.

B. Mother Plant/Scion

Mother Plant should be healthy, true to type and free from diseases and pests. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree. The tree should be free from Phytoplasma infection.

C. Grafted Clones

A minimum of two inspections shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

IV. Field Standards

A. General Requirements

1. Isolation:

The clone propagation plots of Kokam shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

2. Spacing:

The spacing between plants in clone propagation plots should be 30 cm and between rows 50 cm.

3. Rotation:

Nursery should be rotated to other plots after raising Kokam three times in the same plot.

B. Specific Requirements

(a) Foundation clones

Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded under the supervision of Certification Agency. The plants should be free from scales and hoppers.

(b) Certified Class

Factor	Maximum permitted (%)* certified
Off type	0.10
Plants infected with scales	10.10

V. Clone specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

a. The diameter of the stock should range from 0.40-0.60 cm.
b. The height of the grafting should range from 15-30 cm.
c. The diameter of grafts at 10 cm above the graft union should range from 0.40-0.70 cmand height of the grafts 40-60 cm.
d. The grafted clone should be free from sprouts of rootstock.
e. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

VI. Clone Standards

Factor	Standards for each class	
	Foundation	Certified
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)

3.19 TAMARIND *(Tamarind indica* L.*)*

I. Application and Amplification of General Clone Certification Standards

A. The General Clone Certification Standards are basic and, together with the following specific standards constitute the standards for certification of Tamarind Clone.

B. The General Standards are amplified as follows to apply specifically to Tamarind. All certified clones shall be produced by asexual methods like air Layering or Batch budding or Ring budding.

II. Land Requirements

Land to be used for clone propagation of Tamarind shall be free from volunteer plants.

III. Field Inspection

A. Rootstock: A minimum of one inspection shall be made before budding when the rootstock has attained buddable stage.

B. Mother Plant/Scion

Mother plant should be healthy, true to type and free from pests and diseases. The trees should be certified for the desirable characters by the certifying agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

C. Clones (Budded/Air Layers)

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

IV. Field Standards

A. General requirements

1. Isolation

The clone propagation plots of Tamarind shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** the spacing between plants in clone propagation plots should be 25 cm and between row 40 cm.
3. **Rotation**: Nursery should be rotated to other plots after raising line Tamarind three times in the same plot.

B. Specific requirements

A. Foundation clones

Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off types should be discarded under the supervision of Certification Agency.

B. Certified Class

Factor	Maximum permitted (%)* Certified
Off-type	0.10

** Standards for off-types shall be met at final inspection.*

V. Clone Specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the stock should range from 0.75-1.0 cm
2. The height of the grafting should range from 15-20 cm.
3. The diameter of the grafts at 10 cm above the graft union should range from 1.0-1.25 cm and height of the graft 50 cm – 100 cm.
4. The diameter of the Air layer at 10 cm above the ground level should range from 1.0-1.25 cm and height of the Air layer 50-100 cm.
5. The grafted clone should be free from sprouts of rootstock.
6. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number)

VI. Clone Standards

Factor	Standards for each class	
	Foundation	Certified
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)

3.20 FENUGREEK (METHI) (*Trigonella foenumgracum* L.)

I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seeds of Kasuri methi and methi.

II. Land Requirements

Land to be used for seed production of Kasuri methi and methi shall be free from volunteer plants.

III. Field Inspection

A minimum of two inspections shall be made, the first before flowering, the second at the flowering and fruit stage.

IV. Field Standards

A. General requirements

1. Isolation

Seed fields offered for certification shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	50	25
Fields of the same variety not conforming to varietal purity requirements for certification	50	25

B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off-types	0.10	0.20
**Objectionable weed plants	0.010	0.020

**Maximum permitted at the final inspection.*

***Objectionable weed shall be: Senji (Melilotus spp.)*

V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	10/kg
Total weed seeds (maximum)	10/kg	10/kg
*Objectionable weed seeds (maximum)	2/kg	5/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination including hard seed (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	6.0%	6.0%

**Objectionable weed is the same as given at IV. B. above.*

3.21 CUMIN (*Cuminum syminum*)

Open pollinated varieties and Composites

I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seed of cumin open-pollinated varieties/composites.

II. Land Requirements

Land to be used for seed production of cumin should be free from volunteer plants and where cumin crop has not been taken over preceding two years.

III. Field Inspection

1. The first inspection shall be made before flowering preferably within 45 days of planting to determine isolation, volunteer plants Off-types and other relevant factors:
2. The second inspections shall be made during 50% flowering to check isolation, Off-types and other relevant factors.
3. The third inspection shall be made at maturity and prior to harvesting to verify the true nature of plant and other relevant factors.

IV. Field Standards

A. General requirements

1. Isolation

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	800	400
Fields of same variety not conforming to varietal purity	800	400

B. Specific requirements

Factor	Maximum permitted (%)	
	Foundation	Certified
1	2	3
Off-types plants	0.10	0.50
*Objectionable weed plants	0.050	0.10

* Objectionable weed shall be *Plantago pumila L.*

V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg

Objectionable weed seed (maximum)	5/kg	10/kg
Germination (minimum)	65%	65%
Moisture (maximum)	10%	10%
For vapour-proof containers (maximum)	8%	8%

3.22 CORIANDER (*Coriandrum sativum)*

Open pollinated varieties and composites

I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seed of coriander open-pollinated varieties, composites.

II. Land Requirements

Land to be used for seed production of coriander should be free from volunteer plants.

III. Field Inspection

A minimum of three inspections shall be made as follows:

1. The first inspection shall be made before flowering preferably within 45 days of planting to determine isolation, volunteer plants, Off-types and other relevant factors.
2. The second inspections shall be made during 50% flowering to check isolation, Off-types and other relevant factors.
3. The third inspection shall be made at maturity and prior to harvesting to verify the true nature of plant and other relevant factors,

IV. Field Standards

A. General requirements

1. Isolation

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	200	100
Fields of same variety not conforming to varietal purity	200	100

B. Specific requirements

Factor	Maximum permitted (%)	
	Foundation	Certified
1	2	3
Off-types plants	0.10	0.50
*Objectionable weed plants	None	None

**Objectionable weeds Lathyrus*

V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Objectionable weed seeds (maximum)	None	None
Germination (minimum)	65%	65%
Moisture (maximum)	10%	10%
For vapour-proof containers (maximum)	8%	8%

3.23 FENNEL (*Foaniculum vulgare)*

Open pollinated varieties and composites.

I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seed of fennel open-pollinated varieties, composites.

II. Land Requirements

Land to be used for seed production of fennel should be free from volunteer plants.

III. Field Inspection

A minimum of three inspections shall be made as follows:

1. The first inspection shall be made before flowering preferably within 45 days of planting to determine isolation, volunteer plants, Off-types and other relevant factors.
2. The second inspections shall be made during 50% flowering to check isolation, Off-types and other relevant factors.
3. The third inspection shall be made at maturity and prior to harvesting to verify the true nature of plant and other relevant factors,

IV. Field Standards

A. General requirements

1. Isolation

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	200	100
Fields of same variety not conforming to varietal purity	200	100

B. Specific requirements

Factor	Maximum permitted (%)	
	Foundation	Certified
1	2	3
Off-types plants	0.10	0.50
*Objectionable weed	None	0.05

V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
*Objectionable weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	65%	65%
Moisture (maximum)	10%	10%
For vapour-proof containers (maximum)	8%	8%

**Objectionable weed Dodder (Cuscuta spp.)*

3.24 AJAWAIN (*Trachyspermum ammi* L.)

I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seed of Ajawain (*Trachyspermum ammi* L.) open-pollinated varieties/composites.

II. Land Requirements

Land to be used for seed production of Ajawain should be free from volunteer plants.

III. Field Inspection

A minimum of three inspections shall be made as follows:

1. The first inspection shall be made before flowering preferably within 45 days of planting to determine isolation, volunteer plants, Off-types and other relevant factors.
2. The second inspections shall be made during 50% flowering to check isolation, Off-types and other relevant factors.
3. The third inspection shall be made at maturity and prior to harvesting to verify the true nature of plant and other relevant factors,

IV. Field Standards

A. General requirements

1. Isolation

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	200	100
Fields of same variety not conforming to varietal purity	200	100

B. Specific requirements

Factor	Maximum permitted (%)	
	Foundation	Certified
1	2	3
Off-types	0.10	0.50

V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Germination (minimum)	65%	65%
Moisture (maximum)	10%	10%
For vapour-proof containers (maximum)	8%	8%

3.25 NIGELLA (*Nigella sativa* L.)

No specific research work has been done in the country, but based on the public literature from India and abroad, seed production standards for Nigella are mentioned below for consideration. Advance research work may be taken up and if required necessary amendments can be made in future.

I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of celery seed.

II. Land Requirements

Land to be used for seed production of Nigella shall be free of volunteer plants.

III. Field Inspection

A minimum of three inspections shall be made, the first before flowering the second during flowering and fruiting stage and the third at maturity and prior to harvesting.

IV. Field Standards

A. General Requirements

Isolation: Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distance specified in columns 2 and 3 of the said Table:

Contaminants	Minimum Distance (meters)	
	Foundation	Certified
1	2	3
Fields of the varieties	200	100
Fields of the same variety not conforming to varietal purity	200	100

**In nigella flower is an open structure, but floral biology assures spontaneous self-pollination but honey bees are major pollinators; hence isolation distance is to ensure restriction over cross pollination by honey bee carrying pollen from other varieties/plants (Reference Munawar et al. 2009; Hannour, 2008)*

B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off types	0.10	0.20

*Maximum permitted at and after flowering in the case of Off-types

V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	95.0%	95.0%
Inert matter (maximum)	5.0%	5.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	65%	65%
Moisture (maximum)	8.0%	8.0%
Moisture in vapour proof containers (maximum)	7.0%	7.0%

3.26 ANISE (*Pimpinella anisum* L.)

Anise is a minor seed spice crop and no specific research work has been conducted to determine seed standards. Advance research work may be taken up and if required necessary amendments can be made in future.

I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of the seed of cross-pollinated Anise (*Pimpinella anisum*) crop.

II. Land Requirements

Land to be used for seed production of Anise should be free from volunteer plants.

III. Field Inspection

A minimum of three inspections shall be made; the first inspection shall be made before flowering to determine isolation distance, volunteer plants, off-types of plants, disease and relevant factor. The second inspection shall be made during flowering and seed setting to determine off-type plants, disease and relevant factors and the third shall be made at maturity and prior to harvesting to verify the designated disease, characteristics of seed, true nature of plant, confirmation of removal of off-types and other relevant factors.

IV. Field Standards

A. General requirements: Seed fields shall be isolated from the contaminants shown in the column 1 of the table by the distance specified in columns 2 and 3 of the said table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	800	400
Fields of the same variety not conforming to varietal purity requirements for certification	800	400

C. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off types	0.10	0.20
Common weed	0.01	0.02
Diseased plant*	0.10	0.50

**Diseases shall be: Alternaria blight and powdery mildew*

V. Seed Standards

Factor	Standard (%)	
	Foundation	Certified
Pure seed (minimum)	98	98
Insert matter (maximum)	2	2
Other crop seeds (maximum)	0.1	0.2
Weed seeds (maximum)	0.1	0.2
Germination (minimum)	65	65
Moisture (maximum)	10	10
Moisture in vapour proof containers (maximum)	8	8

Note: Insect damage seeds should not be more than 0.5%

3.27 CELERY (*Apium graveolens* (L.) var. *dulce* (Mill.) DC.)

I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of celery seed.

II. Land Requirements

Land to be used for seed production of celery shall be free from volunteer plants.

III. Field Inspection

A minimum of three inspections shall be made, the first before flowering the second during flowering and fruiting stage and the third at maturity and prior to harvesting.

IV. Field Standards

A. General requirements

1. Isolation

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	500	300
Fields of the same variety not conforming to varietal purity requirements for certification and from celeriac (turnip – rooted celery): *Apium graveolens* (L.) var. *rapaceum* DC.	500	300

B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off-types	0.10	0.20
**Plants affected by seed borne diseases	0.10	0.50

**Maximum permitted at and after flowering in the case of Off-types and at the final inspection in case of seed borne diseases.*

***Seed borne diseases shall be: Leaf blight (Septoria apiicola* Speg.*) Root rot (Phoma apiicola* Kleb.*)*

V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	7.0%	7.0%

3.28 SUWA (INDIAN DIL) *(Anethum suwa* L.*)*

Open pollinated varieties and composites.

I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seed of suwa (*Anethum suwa* L.) open-pollinated varieties, composites.

II. Land Requirements

Land to be used for seed production of Suwa should be free from volunteer plants.

III. Field Inspection

A minimum of three inspections shall be made as follows:

1. The first inspection shall be made before flowering preferably within 45 days of planting to determine isolation, volunteer plants, Off-types and other relevant factors.
2. The second inspections shall be made during 50% flowering to check isolation, Off-types and other relevant factors.
3. The third inspection shall be made at maturity and prior to harvesting to verify the true nature of plant and other relevant factors,

IV. Field Standards

A. **General requirements**

1. Isolation: Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	200	100
Fields of same variety not conforming to varietal purity	200	100

B. **Specific requirements**

Factor	Maximum permitted (%)	
	Foundation	Certified
1	2	3
Off-types	0.10	0.50

V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	97.00%	97.00%
Inert matter (maximum)	3.00%	3.00%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Germination (minimum)	65%	65%
Moisture (maximum)	10%	10%
For vapour-proof containers (maximum)		8%

4. Protection of Plant Varieties and Farmers' Rights Act, 2001

The PPVFR act was implemented to stimulate investments for research and development both in the public and the private sectors for the developments of new plant varieties by ensuring appropriate returns on such investments. It will also facilitate the growth of the seed industry, ensure the availability of high-quality seeds and planting material to Indian farmers, recognize the role of farmers as cultivators and conservers and the contribution of traditional, rural and tribal communities to the country's agro-biodiversity by rewarding them for their contribution through benefit sharing and protecting the traditional right of the farmers. The act is implemented by PPV&FR Authority for protection of new plant varieties (if required) and safeguard rights to breeder, farmer and researcher.

4.1. Protection of plant varieties: Protection means no body other than the concerned breeder or institute may commercialize the registered variety or produce, sell, market, distribute, import or export the seed for commerce of the registered variety without prior authorization form the breeder/institute developed the variety up to 15 years for crops and 18 years for tree and vines from the date of registration. On request of the breeder the act provides protection to new varieties that may be extant varieties, including Farmers' varieties, the varieties of common knowledge and essentially derived varieties.

New variety: A new variety is a plant variety that satisfies the requirements of novelty, distinctiveness, uniformity and stability (NDUS) under Section 15 of the Act.

Extant variety: a notified variety under section 5 of the Seeds Act, 1966 (54 of 1966); or a farmers' variety; or a variety about which there is common knowledge; or any other variety which is in the public domain is considered as Extant variety.

Essentially derived variety: a variety predominantly derived from any protected or non-protected variety that confirms to the initial variety in all aspects except for the differences which result from the act of derivation, and yet is clearly distinguishable from such initial variety.

Farmers' variety: a variety which- (i) has been traditionally cultivated and evolved by the farmers in their fields; or (ii) is a wild relative or land race of a variety about which the farmers possess the common knowledge or (iii) any wild species or traditional varieties or adds value to such wild species or traditional varieties through selection and identification of their useful properties.

Protected variety: A candidate variety passed DUS testing is considered as protected for 15 years after notification. Seed production by any other organization for commerce/business without prior permission is considered as offence.

Variety of common knowledge: A variety is considered as variety of common knowledge when

- The variety is entered in official list/ register of varieties in any country granting protection to plant variety.
- Inclusion of the variety in a recognized, publicly accessible collection, including a commercial or botanical reference collection or an accession in a National/International Gene Bank.

- Adequate description of the variety in a publication that may be considered a part of the public technical knowledge (including books, monographs, scientific/ popular journals, theses, technical bulletins and annual reports).
- Variety is freely cultivated by the farmers in a state/ region/ country.
- Propagating material or harvested material of the variety under authorized marketing or in circulation or trade.
- Shared traditional knowledge of relevant community about the variety (including a land-race or local variety or farmer's variety) that can be substantiated, if needed.

Variety in public domain: The knowledge of a variety that is freely available, commonly shared throughout the world without any access restrictions refers as variety in public domain. It is not restricted by geographical boundaries.

4.2. Procedure for registering a plant variety under The Protection of Plant Varieties and Farmers' Rights Authority (PPV&FRA):

a) Identify the appropriate category: Determine whether the variety is a new variety, an extant notified variety, a variety of common knowledge, a farmers' variety, or an EDV. A variety already in the public domain may qualify as an extant variety, depending on its status and evidence.

b) Prepare the application and supporting documents: Obtain the appropriate application form and prepare the variety's proposed denomination, botanical name, origin, breeding history (where applicable), distinguishing characteristics, applicant details and required declarations. Proof of the applicant's right to apply must also be provided where applicable. All the application forms and proforma for related documents are given in PPVFRA website.

c) Submit seed or planting material to the National Gene Bank: Supply the prescribed quantity of seed or planting material, along with the required forms and fees, according to the crop-specific requirements. Check whether registration is open for the particular species and category.

d) Examination and DUS testing: The Authority examines the application and, where required, arranges testing for Distinctiveness, Uniformity and Stability (DUS) under the relevant crop-specific guidelines. The variety must meet the applicable criteria.

e) Publication and invitation of objections: The variety's prescribed particulars are published in the Plant Variety Journal of India which will be treated equivalent to the Gazette of the Government of India. Interested persons may file objections within the prescribed period, and any objections are dealt with under the Act and Rules.

f) Registration certificate: If the application satisfies the statutory requirements and any objections are resolved, the Authority registers the variety and issues a certificate of registration.

The procedure to examine a variety for protection is based on *Novelty* present in the candidate variety in commercial sense and *Distinct nomenclature* based on expressions of the morphological characteristics listed in the National Test Guidelines of the crop, Uniformity in the expression over the population and Stability in the expressions of distinct traits over the year and locations. Novelty is not essential but distinct nomenclature is important.

4.3. NDUS Test:

Novelty: The variety's propagating or harvested material must not have been sold or otherwise disposed of by or with the breeder's consent for exploitation earlier than one year before filing in India, or earlier than four years outside India (six years for trees and vines).

Distinctiveness: The variety must be clearly distinguishable from any other publicly known variety.

Uniformity: New plant variety will pass uniformity test, if subject to the variation that may be expected from the particular features of its propagation, it is sufficiently uniform in its essential characteristics.

Stability: New plant variety will be considered stable if its essential characteristics remain unchanged after repeated propagation or, in the case of a particular cycle of propagation, at the end of each such cycle.

Compulsory Plant Variety denomination: After satisfying the above four essential criteria every applicant shall assign a single and distinct denomination to a variety with respect to which he is seeking registration.

PPVFR act permits a farmer to save, use, sow, resow, exchange, share or sell the produce as seed even of a protected variety (Farmers' Right). But the Act does not permit a farmer to use the protected brand name for sell of seed. The expected performance of the protected variety under given conditions has to be disclosed to the farmers. In the event of failure in the performance of the protected variety under given conditions, the farmer(s) may claim compensation as per the prescribed manner. Section 43 specifies that the farmer cannot be prosecuted for infringement of rights specified Rights in Protection of Plant Varieties and Farmers' Rights Act 815 in the Act if he can prove in court that he was unaware of the existence of such a right. Under section 30 of PPVFR act mention the Researchers' Right that is a researcher can freely use any registered varieties for research even to develop new varieties. Authorization from the original breeder of the protected variety is required for repeated use of the protected variety as parental line to develop new variety.

5. Registration of Plant Germplasm

5.1. Guidelines for Registration of Plant Germplasm:

ICAR-NBPGR, New Delhi, is the nodal agency for registration of germplasm. The application should be submitted online (http://www.nbpgr.ernet.in:8080/registration/) and one hard copy of the same addressed to the Director, ICAR-NBPGR, New Delhi-110 012, along with the seed sample or a certificate of submission and establishment of propagules with respective crop/plant-based National Active Germplasm Site (NAGS). NAGS for spices, seed spices and medicinal and aromatic plants are ICAR- Indian Institute of Spices Research, Kozhikode, Kerala, ICAR-National Research Centre on Seed Spices, Ajmer, Rajasthan and ICAR- Directorate of Medicinal and Aromatic Plants Research, Anand, Gujarat respectively. The Member Secretary, PGRC, will duly acknowledge with date, the receipt of the application and of the seed material. ICAR-NBPGR maintains a permanent record and database listing the germplasm materials approved by PGRC with details on unique trait(s) and other related information in soft and hard copy. The Plant Germplasm Registration Committee (PGRC) is constituted under the Chairmanship of Deputy Director General (Crop Science), Indian Council of Agricultural Research, New Delhi. The PGRC shall meet quarterly (preferably last month of the quarter) a year, with the concurrence of the Chairman, for consideration of applications and related matters.

a) Eligibility Criteria for Registration:

(i) Germplasm/genetic stock/elite material of field, horticultural and other economic crops, including agro-forestry species, spices, medicinal and aromatic plants, ornamental plants, which is unique, uniform, stable and has potential attributes of academic, scientific or commercial value shall be registered.

(ii) Exotic germplasm (imported) can be registered for a trait other than those published or registered. Similarly, selections made from exotic germplasm can also be registered.

(iii) Selection for unique traits from landraces (other than the landrace is known for) may be considered for registration.

All claims concerning the germplasm/genetic stocks/elite material/advanced material submitted for registration should accompany scientific evidence for uniqueness, reproducibility and value in the form of:

i. Performance (yield contributing traits, adaptation traits, quality traits) data fo r at least four environments (location and year combination) for annual crops and for at least two environments (location and year combination) for biennial and perennial crops under All India Co-Ordinated Research Project (AICRP) trial/nursery tests supported with relevant extracts of the documents (e.g. comparative data of all entries tested) or verification by concerned Project Director/Project Co-ordinator (PD/PC) or under any other relevant system verified by Competent Authority. For qualitative traits (e.g. flower colour, leaf venation, seed colour) data of two environments duly supported by documents. In case of biennial and perennial crops, for qualitative traits (e.g. flower colour, pulp colour, fruit/ pod colour and seed colour etc.) data of two environments/ seasons duly supported by documents.

ii. For resistance/tolerance to biotic and abiotic stresses, data should be obtained for at least four environments along with stress-specific resistant / susceptible checks under established hot spot locations and under artificial screening (epiphytotic) conditions. In case of biennial and perennial crops, data should be obtained at least two environments/seasons under established hot spot locations and under artificial screening (epiphytotic) conditions. For biotic stresses in annual/biennial crops inheritance of the trait should be worked out. All the proposers of the germplasm/genetic stock should sign declaration that standard procedures were followed for testing/screening.

iii. Supporting biochemical evaluation data should be obtained from at least four environments (seasons/year) and for biennial and perennial crops at least two environments/seasons.

iv. The proposed genetic stock/germplasm should also be evaluated along with already registered genetic stock(s)/germplasm(s), if available.

v. Supporting documentary evidence on (i), (ii) and (iii) either in AICRP Report or peer reviewed journals with NAAS rating.

vi. Recommendation of Institute Germplasm Identification Committee (IGIC) regarding the uniqueness of germplasm for trait (s) claimed is mandatory.

b) Germplasm Ineligible for Registration:

i. Germplasm or genetic stock without accompanying documentary evidence for the claim made in the application.

ii. Germplasm or genetic stock that does not contain complete passport data, including authenticated taxonomic identity, parentage, institutional or national identity, geographical location of origin and all such information relating to the development and contribution, if any, to the uniqueness of the germplasm.

iii. Exotic material per se, with no evidence of human intervention in its improvement.

iv. Released Varieties and their parents/hybrid/traditional or farmers' varieties of common knowledge.

v. Germplasm/GMO which involves any technology, which is injurious to the life or health of human being, animals or plants.

vi. Material for which any form of protection has been sought elsewhere (for eg. under PPVFRA).

5.2. Screening of Application(s) and their Consideration by the PGRC:

i. The Member Secretary, PGRC, will screen the proposal(s) submitted on prescribed Proforma, as per the guidelines of the checklist at ICAR-NBPGR. All the application forms and proforma for related documents are given in ICAR- NBPGR website.

ii. Each proposal will be reviewed by the relevant Director, PD/PC, expert or head of organization for validation of information, particularly for uniqueness of the proposed germplasm. In case the proposals received from PC/PDs or Directors of the crop-based institutes, the proposals will be sent to concerned experts in the area.

iii. After initial screening the incomplete applications would be advised for appropriate revision, if required.

iv. The application in which the validation of the data is considered necessary, the applicant would be required to produce a validation report from an appropriate institute, as advised by the Member Secretary. The revised application should accompany such report duly endorsed by the Competent Authority of the institute, as advised for the validation.

v. The proposals complete in all respects along with the comments of relevant Director, PD/PC or expert, will be put up to the PGRC for consideration.

vi. The decision of the PGRC will be final.

a) Validity of Registration: The period for validity of registration shall be 18 years for trees and vines and 15 years for other plant species, after which the registered germplasm would be national sovereign property.

b) Publication of Registered Germplasm: All Germplasm approved for registration would be officially communicated to the applicants along with Registration Number. A certificate to this effect will also be issued to the applicant. A brief description of not more than one page would be published in the ensuing issue of Indian Journal of Plant Genetic Resources - official publication of the Indian Society of Plant Genetic Resources, C/o ICAR-NBPGR, New Delhi-110012 and updated on ICAR-NBPGR Internet Website http://www.nbpgr.ernet.in

5.3. Conservation, Maintenance and Sustainable Utilization of Registered Germplasm:

(i) Registered germplasm will be conserved either in National Gene bank (http://www.nbpgr.ernet.in:8080/registration/InventoryofGermplasm.aspx) or at designated crop/plant-based NAGS.

(ii) All the material registered with PGRC will also be sent by the developer to the relevant Director, PD/PC or NAGS with request for sowing/planting of registered germplasm in demonstration plots for annual field days and multiplication.

(iii) The institution associated with the development of the germplasm is also mandated with the maintenance of working stock of registered germplasm for supply to bona fide users.

5.4. De-registration: A registration may be repealed by the PGRC in case of false claim(s). Appeal for counter claim, if any, should reach to the Member Secretary, PGRC, within a period of three months of the publication of brief note in the Indian Journal of Plant Genetic Resources.

5.5. Procedure for submission of proposal/ germplasm material

Submission of Application and Germplasm

(i) All plant germplasm proposed to be registered should be submitted online on http://www.nbpgr.ernet.in:8080/registration/Login.aspx along with the recommendation of the IGIC and scanned signature of Head of the institution with official seal and documentary evidences. The germplasm accompanied with the hard copy of the online application along with relevant documents should be sent to:

The Director

ICAR-National Bureau of Plant Genetic Resources

Pusa Campus, New Delhi-110012

Phone: 011-25843697; FAX: 011-2584 2495

Email: director.nbpgr@icar.org.in

(ii) The Form-A must be accompanied by complete description of the germplasm material using standard descriptors (as per concerned crop AICRP or ICAR- NBPGR descriptors). It may include photograph(s) of plant/plant parts/crop and preferably fingerprints (DNA or biochemical profile etc. using reproducible markers wherever reported/ published).

(iii) A declaration to the effect that working-stock for supply to users would be maintained by the institution associated with the development of the material. It may be ensured by the Director/PD/PC or Competent Authority of the concerned organization.

(iv) A declaration that such germplasm does not contain any gene or gene sequence involving terminator technology would also be mandatory.

5.6. Guidelines for Submitting the Orthodox Seed Germplasm: Orthodox seed that can be dried to low moisture level without loss of seed viability. Seed spices such as coriander, cumin, fennel, fenugreek, ajwain, and nigella have orthodox seeds.

(i) A minimum number of 6000 seed in case of cross-pollinated crop species, 4000 in self-pollinated and 100-1000 in difficult species, such as some vegetables, medicinal and aromatic plants, wild relatives etc. should be submitted.

(ii) The seed should be supplied from a fresh harvest and should not be more than 60 days old.

(iii) The seeds supplied should be, healthy and physiologically mature and collected/ harvested from healthy plants.

(iv) For providing good quality healthy seeds, it is advised to dry the seed material in shade immediately after the harvest.

(v) The potential viability of seeds should be equal or more than 85% in most crop species except in special cases, such as cotton, forage grasses, sugarcane some vegetable crops etc.

(vi) Seed should not be treated or fumigated with any chemicals (pesticides, fungicides, naphthalene balls).

(vii) Seeds should be packed in good quality paper, muslin cloth or plastic packet(s) with proper identity label. If required, the packets should be packed in card-board boxes to minimize damage and moisture absorption during transit.

5.7. Guidelines for Submission of Propagules:

In case of vegetatively propagated crop species, the germplasm material/propagules (tubers, bulbs, rhizomes, cuttings etc.) has to be supplied to the concerned crop-based designated NAGS (Annexure I) for initial establishment and conservation[1]. An acknowledgement to this effect has to be obtained from concerned NAGS to accompany the proposal. Additionally, following guidelines need to be followed for safe supply and conservation of germplasm:

(i) At least 10-25 propagules and for horticultural crops (10-20 propagules) (depending on crop)[1] should be supplied to the concerned NAGS for their maintenance in field gene bank or in vitro gene bank (if available) with a request for an acknowledgement. No compromise should be made by the depositor in the number of propagules to be supplied in NAGS for establishment.

(ii) The concerned NAGS should be informed in advance about the supply of material to facilitate processing and establishment of germplasm.

(iii) The genetic material, stocks, propagules of non-orthodox seed producing crops are generally being maintained in the form of grafts, slips, propagules, and plants.

While supplying this germplasm following steps and precautions should be followed depending on the crop:

(a) The slips, grafts, propagules or plants supplied to the NAGS should be free from insects, weeds and diseases as far as possible. The material should be well-labelled and packed properly in aerated polythene bags. During the dry summer the grafts of crafts should be wrapped in moist moss grass to retain the moisture.

(b) In case of crops like coconut and arecanut, the material should be sent either as seed nuts or seedlings (in case of hybrids). If the embryos need to be transferred from the field, the embryos embedded in the endosperm should be packed in the sterile plastic bag with sterile moist cotton. These should be kept in the refrigerator overnight and transferred in the same box with proper labels on it.

(c) The material should be packed in small wooden/card-board boxes with proper aeration. Also, these boxes should be well marked with labels at 3 or 4 places "To be handled carefully: seedlings" in order to avoid any damage during transit.

(d) The material should be sent to the NAGS immediately after harvest. To avoid any delay in transfer, use speed post or reliable courier services or air-freight.

References

- Government of India. (2023). Indian Minimum Seed Certification Standards, Volume II. Central Seed Certification Board, Department of Agriculture & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, New Delhi, India.
- ICAR-NBPGR. (2023). Guidelines for Registration of Plant Germplasm (3rd ed.). Plant Germplasm Registration Committee, ICAR–National Bureau of Plant Genetic Resources, Pusa Campus, New Delhi, India.
- Khare, D. and Bhale, M.S. (2016). Seed Technology (2nd revised and enlarged ed.). Scientific Publishers, Jodhpur, India. 944 p. ISBN: 978-81-7233-883-1.
- Tandon, J.P., Sharma, S.P., Sandhu, J.S., Yadava, D.K., Prabhu, K.V. and Yadav, O.P. (2015). Guidelines for Testing Crop Varieties under the All-India Coordinated Crop Improvement Projects. Indian Council of Agricultural Research (ICAR), Directorate of Knowledge Management in Agriculture, New Delhi, India.
- Trivedi, R.K. and Gunasekaran, M. (2013). Indian Minimum Seed Certification Standards. Central Seed Certification Board, Department of Agriculture & Co-operation, Ministry of Agriculture, Government of India, New Delhi, India, 569 p.

ANNEXURE-I

Proforma for Submission of Proposals for Identification of Crop Varieties/ Hybrids by Workshops

1	Name of the crop and species	:	
2	a) Name of the variety under which tested in AICRP trials	:	
	b) Proposed name of the variety	:	
3	Sponsored by (institute)	:	
4	a) Institution or agency responsible for developing variety (with full address)	:	
	b) Name of the person who helped in the development of the variety Developers Collaborators	:	
5	a) Parentage (with details of its pedigree including source from which variety/Inbred/ A, B and R lines of hybrid has been developed)	:	
	b) Source of material in case of introduction	:	
	c) DNA profile of variety/hybrid/inbred/A, B, R line of hybrid vis-à-vis check variety/ line		
	d) Breeding method used	:	
	e) Breeding objective	:	
6	State the varieties which are most closely resemble the proposed variety in general characters	:	
7	Recommended productions ecology (Rainfed/Irrigated; high/low fertility; season)	:	
8	Specific area of its adaptation (zones and states for which variety is proposed) and recommended productions ecology	:	
9	Description of hybrid/variety	:	
	a) Plant height	:	
	b) Distinguishing morphological characters	:	
	c) Maturity (range in number of days) (from seedling/ transplanting to flowering, seed to seed)	:	
	d) Maturity group (early, medium and late wherever such classification exists)	:	
	e) Reaction to major diseases under field and controlled conditions (reaction to physiological strains/ races/pathotypes/ bio-types to be indicated wherever possible)	:	
	f) Reaction to major pests (under field and controlled condition including store pests)	:	

	g) Agronomic features (e.g. resistance to lodging, shattering, fertilizer responsiveness, suitability to early or late sown conditions, seed rate etc.)	:			
	h) Quality of produce	:			
	Grain quality	:			
	Fodder quality	:			
	i) Reaction to stresses	:			
10	Description of the parents of the hybrid	:	A line/ Inbred 1	B line/ Inbred 2	R line
	a) Plant height (cm)	:			
	b) Distinguishing morphological characters	:			
	c) Days to flowering	:			
	d) Days to maturity (range in number of days – from seed to seed)	:			
	e) Is there any problem of synchronization? If yes, method to overcome it	:			
	f) Reaction to major diseases (under field and controlled conditions, reaction to physiological strains/ races/bio-types/ pathotypes to be indicated wherever possible)	:			
	g) Reaction to major pests (under field and controlled conditions including store pests)	:			
	h) Agronomic features (e.g. resistance to lodging, shattering, fertilizer responsiveness, suitability to early or late sown conditions, seed rate etc.)	:			
	i) Reaction to stresses	:			
11	a) Yield data in coordinated trials (breeding, agronomy, pathology, entomology, quality etc) regional/inter regional district trials year wise (levels of fertilizer application, density of plant population and superiority over local control/standard variety to be indicated (to be attached)	:			
	b) Yield data from national, demonstration/large scale demonstrations (to be attached)	:			
12	a) Agency responsible for maintaining breeder seed	:			
	b) Quantity of breeder seed in stock (kg) Variety A line B line R line Hybrid	:			
13	Specific recommendations, if any, for seed production (e.g. staggered sowing, plating ratio of parental	:			

	lines of hybrids in foundation and certified seed production, probable area of seed production)		
14	Vivid presentation (field view, close-up of single plant and seed/economic parts)		
15	Package of practices along with attainable yield levels		a) Sustainability of variety for the area; b) Selection of field/land preparation; c) Seed treatment; d) Sowing time; e) Seed rate/sowing method-line sowing with Row to row & Plant to Plant distance; f) Fertilizer doses; g) Weed control; h) Disease & Pest Control; i) Irrigation; j) Harvesting; k) Quality characteristics of the variety, if any
16	Any other pertinent information	:	

Signature of all contributors

Signature of Head of institution

ANNEXURE-II

Proforma for Submission of Proposal for Release of Crop Variety to Central Sub-Committee on Crop Standards Notification and Release of Varieties

1	Name of the crop and species	:	
2	a) Name of the variety under which tested in AICRP trials	:	
	b) Proposed name of the variety	:	
3	Sponsored by (institute)	:	
4	a) Institution or agency responsible for developing variety (with full address)	:	
	b) Name of the person who helped in the development of the variety Developers Collaborators	:	
5	a) Parentage (with details of its pedigree including source from which variety/Inbred/ A, B and R lines of hybrid has been developed)	:	
	b) Source of material in case of introduction	:	
	c) DNA profile of variety/hybrid/inbred/A, B, R line of hybrid vis-à-vis check variety/ line		
	d) Breeding method used	:	
	e) Breeding objective	:	
6	State the varieties which are most closely resemble the proposed variety in general characters	:	
7	Recommended productions ecology (Rainfed/Irrigated; high/low fertility; season)	:	
8	Specific area of its adaptation (zones and states for which variety is proposed) and recommended productions ecology	:	
9	Description of hybrid/variety	:	
	a) Plant height	:	
	b) Distinguishing morphological characters	:	
	c) Maturity (range in number of days) (from seedling/ transplanting to flowering, seed to seed)	:	
	d) Maturity group (early, medium and late wherever such classification exists)	:	
	e) Reaction to major diseases under field and controlled conditions (reaction to physiological strains/ races/pathotypes/ bio-types to be indicated wherever possible)	:	

	f) Reaction to major pests (under field and controlled condition including store pests)	:			
	g) Agronomic features (e.g. resistance to lodging, shattering, fertilizer responsiveness, suitability to early or late sown conditions, seed rate etc.)	:			
	h) Quality of produce	:			
	Grain quality	:			
	Fodder quality	:			
	i) Reaction to stresses	:			
10	Description of the parents of the hybrid	:	A line/ Inbred 1	B line/ Inbred 2	R line
	a) Plant height (cm)	:			
	b) Distinguishing morphological characters	:			
	c) Days to flowering	:			
	d) Days to maturity (range in number of days – from seed to seed)	:			
	e) Is there any problem of synchronization? If yes, method to overcome it	:			
	f) Reaction to major diseases (under field and controlled conditions, reaction to physiological strains/ races/bio-types/ pathotypes to be indicated wherever possible)	:			
	g) Reaction to major pests (under field and controlled conditions including store pests)	:			
	h) Agronomic features (e.g. resistance to lodging, shattering, fertilizer responsiveness, suitability to early or late sown conditions, seed rate etc.)	:			
	i) Reaction to stresses	:			
11	a) Yield data in coordinated trials (breeding, agronomy, pathology, entomology, quality etc) regional/inter regional district trials year wise (levels of fertilizer application, density of plant population and superiority over local control/standard variety to be indicated (to be attached)	:			
	b) Yield data from national, demonstration/large scale demonstrations (to be attached)	:			
12	a) Agency responsible for maintaining breeder seed	:			
	b) Quantity of breeder seed in stock (kg) Variety	:			

	A line B line R line Hybrid		
13	Specific recommendations, if any, for seed production (e.g. staggered sowing, plating ratio of parental lines of hybrids in foundation and certified seed production, probable area of seed production)	:	
14	Vivid presentation (field view, close-up of single plant and seed/economic parts)		
15	a) Whether recommended by any workshop, seminar, conference, state seed committee etc.	:	
	b) If so, its recommendations with specific justifications for the release of proposed variety	:	
16	c) Specific area of its adaptation	:	
17	Acknowledgement of submission of seed sample of variety/hybrid/inbred/ A, B and R lines of hybrid from NBPGR and IC numbers		
18	Package of practices along with attainable yield levels		a) Sustainability of variety for the area; b) Selection of field/land preparation; c) Seed treatment; d) Sowing time; e) Seed rate/sowing method-line sowing with Row to row & Plant to Plant distance; f) Fertilizer doses; g) Weed control; h) Disease & Pest Control; i) Irrigation; j) Harvesting; k) Quality characteristics of the variety, if any
19	Information on acceptability of the variety by farmers/ consumers/ industry	:	
20	Any other pertinent information	:	

Signature of all contributors

Signature of Head of institution

ANNEXURE-III

Specification for Certification Tag

Length : 15 cm
Breadth : 7.5 cm

Quality: It shall be made of durable material such as thick paper, paper with cloth lining, wax coated paper, plastic coated paper or any other material which is durable in nature and water and tear resistant.

Colour: Both sides shall be white for Foundation class and blue (ISI No.104-Azure blue) for Certified class.

Contents and layout

Tag No.....
Kind.....
Variety.....
Lot No.....

CA's Emblem
Name & Address of Certification Agency

Certified Seed
Class of seed.....
Certificate No.....
Date of issue of Certificate.....
Date of test.....

"Use of the seed after expiry of the validity period by any person is entirely at his risk and the holder of the certificate shall not be responsible for any damage to the buyer of seed. No one should purchase the seed if seal or the certification tag has been tem-pered with"

Certificate valid up to.....

(Provided seed is stored under cool and dry environment)

Validity of certificate further extended upto

.....

Name and Full Address of the Certified Seed Producer.....

N.B. If tag is to be affixed on a smaller container then the size of the tag may be reduced proportionately. However, length and breadth ratio and contents would remain the same.
(CA's: Certification Agency's)

ANNEXURE-IV

PROCEDURE FOR CONSTRUCTION OF LOT NUMBERS

The lot number will have four parts. Each part will signify and conform to the details given as under:

1. First Part:

This shall be called the "Month-Year Code" and will indicate the month and year in which the concerned seed crop was harvested. The month will be represented by its abbreviated form and the year will be represented by the last two digits of the calendar year, such as 89 for 1989 A.D., 90 for 1990 A.D., 00 for 2000 A.D. and 01 for 2001 A.D. The abbreviated form to be used for each month is given as under:

Month	Abbreviated form
January	JAN
February	FEB
March	MAR
April	APR
May	MAY
June	JUN
July	JUL
August	AUG
September	SEP
October	OCT
November	NOV
December	DEC

2. Second Part

This shall be called the "Production Location Code" and will indicate the State or Union Territory, where the concerned seed field(s) was/were located. For this purpose, each State and Union Territory is allotted a permanent numerical as shown below:

Numerical	State/Union Territory
01	Andhra Pradesh
02	Arunachal Pradesh
03	Assam
04	Bihar
05	Goa
06	Gujarat
07	Haryana
08	Himachal Pradesh
09	Jammu & Kashmir
10	Karnataka

11	Kerala
12	Madhya Pradesh
13	Maharashtra
14	Manipur
15	Meghalaya
16	Mizoram
17	Nagaland
18	Odisha
19	Punjab
20	Rajasthan
21	Sikkim
22	Tamil Nadu
23	Tripura
24	Uttar Pradesh
25	West Bengal
26	Andaman & Nicobar Islands
27	Chandigarh
28	Dadra & Nagar Haveli
29	Delhi
30	Daman & Diu
31	Lakshadweep
32	Puducherry
33	Uttarakhand
34	Chhattisgarh
35	Jharkhand

3. Third Part

a. This shall be called the "Processing Plant Code" and will indicate the seed processing plant where the relevant lot was processed. For this purpose, the Certification Agency shall allot a numerical commencing from 01 to each seed processing plant within its jurisdiction irrespective to whom it belongs.

b. In crops like groundnut, potato, sweet potato, tapioca etc. which may not be brought to the processing plant for post-harvest operations including grading, sorting, packing etc. the individual centre where such operations are carried out will be treated as a "Processing Plant" for assigning the Processing Plant Code.

4. Fourth Part

This shall be called the "Seed Produce Code". It will indicate ultimate serial number of an individual lot. The procedure for assigning this code will be based on unit of certification. For this purpose, the Certification Agency shall allot a numerical commencing from 01 to each unit of certification.

However, if seeds of more than one unit are bulked together then bulked unit will be treated as one unit. If the quantity of the seed from one unit of certification exceeds the maximum limit of lot size, it will be further sub-divided into a separate lot, in such cases Roman numerical commencing from (i) will be suffixed with seed produce code within brackets, for example if 586 quintals wheat seed is obtained from one unit of certification, it will necessitate the sub-division of the produce into three separate lots (200, 200 and 186 qtls.) if 01 is allotted to "Seed Produce Code", then sub-divided lots will be represented as 01 (i), 01(ii) and 01(iii).

All the four parts of the lot number shall be written in series with a 'dash (-)' between first, second, third and fourth parts to distinctly indicate the code number of each part. An example is shown below:

Lot No. --- MAY 88-12-01-01

MAY 88 --- Seed harvested in May 1988.

12 --- Seed crop raised in Madhya Pradesh

01 --- Seed processed in a processing plant identified as number 01 by the Madhya Pradesh State Seed Certification Agency.

01 --- Seed Produce Code which will trace to the particular unit of certification.

ANNEXURE-V

GROW-OUT TEST FOR CULTIVAR PURITY

I. Object

To determine the genetic purity of a given seed lot of a released cultivar, and the extent to which the submitted sample conforms to the prescribed standards.

II. Sampling

The samples for grow-out test are to be drawn simultaneously with the samples for other quality tests and the standard procedure shall be followed.

The size of the submitted sample will be as follows:

maize, cotton, groundnut, soybean and species of other genera with seeds of a similar size;	1,000 gm
sorghum, wheat, paddy and species of other genera with seeds of similar size;	500 gm
Beta and species of other genera with seeds of similar size	250 gm
bajra, jute and species of all other genera	100 gm
seed potato, sweet potato and other vegetatively propagating crops	250 tubers/planting stakes/roots/corms

III.Procedure

While raising the desired population, standard and recommended agronomic/cultural practices (e.g., field preparation, size of the plot, row length, distance between rows, distance between plants, irrigation, fertilization etc.) in respect of individual crops are to be followed both for the unknown sample and its control.

The possibility to prove the genuineness of a cultivar by grow-out test is based on hereditary characteristics of the plants. Usually the cultivar differences are more distinct if growth conditions are favourable. Crop should be so grown that the genetical difference express themselves as clearly as possible. In self-fertilizing species the individual of a cultivar may be theoretically identical whereas the individual of a cultivar in cross-fertilizing species may not be genetically similar, but comprise a number of types. Therefore, it is easier to determine the cultivar purity in self-fertilizing species than in cross-fertilizing species where the examination for greater part is based on the mutual comparison between the samples to be tested and the standard sample. Hence, it is essential to sow the various samples of the same cultivar in succession and standard samples are sown at suitable intervals (for example, one standard sample for every ten samples to be tested). The size of plots, row length etc. will differ crop to crop. However, the specifications for different crops are indicated in the following table. The Certification Agency may change the specification if considered necessary:

The seed rate may be adjusted depending on the germination percentage of individual samples and the sowing may be done by dibbling. Subsequent thinning is not recommended.

The test crop may be raised along with the control either in the areas recommended for the variety or in off-season nurseries. The authentic control sample from the originating plant breeder/breeding

institute is to be maintained by the testing station/Agency following standard procedures. A minimum of two hundred plants from control sample will be raised along with the test crop.

.	Crop	Row length (m)	Plant to plant distance (cm)	Space between rows (cm)	Space between plots(cm)	No. of replications
1.	Wheat, barley, oats	6	2	25	50	2
2.	Pea, cowpea	6	10	45	90	2
3.	Chickpea, green gram, black gram	6	10	30	60	2
4.	Maize	10	25	60	90	2
5.	Hybrid cotton	5	10	45	45	2
6.	Paddy:					
	(a) very early to medium	6	15	20	45	2
	(b) late and very late	6	25	30	60	2
7.	Pearlmillet	6	10	60	90	2
8.	Sorghum	6	10	45	60	2

IV. Observations

(a) All plants are to be studied keeping in view the distinguishing characters described for the cultivar both in the test crop as well as the control. Necessary corrections may be incorporated if the control is found to be heterogenous.

(b) Observations are made during the full growing period, or for a period specified by originating breeding institute and deviations from the standard sample of the same variety are recorded. At suitable development stage the plots are examined carefully and plants which are obviously of other cultivar are counted and recorded.

The specification of the field plot, row length etc. may be determined from the information given in para III above. And on the basis of the number of plants required for taking observations is dependent on maximum permissible off types which are as follows:

Maximum permissible Off-types (%)	Minimum genetic purity (%)	Number of plants required per sample for observation
0.10	99.9	4,000
0.20	99.8	2,000
0.30	99.7	1,350
0.50	99.5	800
1.00 and above	99.0 and below	400

V. Calculation, Interpretation and reporting of the result

Percentage of other cultivars, other species or aberrant found may be calculated upto first place of decimal.

While interpreting the result, use of tolerance may be applied by using the reject Table given below at serial No. VII.

VI. Analysis for grow-out test

The analysis employed for conducting 'grow-out test' should possess the basic qualification as identified under Seeds Rules, 1968.

VII.Reject number for prescribed standards and sample size.

Standard	Reject numbers for sample size of	
	800	400
99.5 (1 in 200)	8	*
99.0 (1 in 100)	16	8
95.0 (5 in 100)	48	24
90.0 (10 in 100)	88	44
85.0 (15 in 100)	128	64

**Indicates that the sample size is too small for a valid test.*

ANNEXURE-VI

SPECIFICATION FOR CERTIFICATION TAG

Length : 15 cm

Breadth: 7.5 cm

Quality---it shall be made of durable material such as thick paper, paper with cloth lining, wax coated paper, plastic coated paper etc.

Colour—Both sides shall be white for Foundation class and blue (ISI No.---Azure blue) for Certified class.

Contents and layout

TAG No…….. KIND…….. Variety……. Lot No……	CA's EMBLEM Name & Address of Certification Agency	Certified Seed Class of seed…….. Certificate No…… Date of issue of Certificate……. Date of test……
"Use of the seed after expiry of the validity period by any person is entirely at his risk and the holder of the certificate shall not be responsible for any damage to the buyer of seed. No one should purchase the seed if seal or the certification tag has been tempered with"		Certificate valid up to…….. (Provided seed is stored under cool and dry environment) Validity of certificate further extended upto
Name and Full Address of the Certified Seed Producer……		……

N.B. If tag is to be affixed on a smaller container then the size of the tag may be reduced proportionately. However, length and breadth ratio and contents would remain the same. (CA's : Certification Agency's)

ANNEXURE-VII

EXTENSION OF THE VALIDITY PERIOD

1. The extension of validity period of Certified seed shall be for a period of six months, at each subsequent validation as long as the seed conforms to the prescribed standards.

2. Holder of the certificate or his authorized representative may request for extension of the validity of certified seed before expiry of the previous validity period to a Certification Agency of the area in which the seed is located. He shall furnish the relevant information such as name of the crop, variety, class of seed, quantity of seed in lot, lot number, size and type of containers, number and date of certificate etc. to the Certification Agency at the time of submission of application.

3. The Certification Agency after receipt of application for extension of validity period shall verify that tags, labels and seals are intact on each seed container and arrange to draw samples and its analysis in a notified seed laboratory. The sample would be tested for physical purity, germination and insect damage.

4. If reprocessing and re-bagging at the time of extension of validity is requested to a Certification Agency which has not initially certified the seed, it may be permitted provided Certification Agency is of the opinion that such operation may improve the quality of seed and seeds are not badly invaded by fungus, pest etc. Infested seed lots shall meet the conditions laid down in para XXV of the General Seed Certification Standards. Whenever such operations are undertaken a sample from each lot will be drawn before the seed containers are opened and shall be divided into three equal parts and sealed. One part shall be retained by the Certification Agency, another part by holder of the certificate or his representative and remaining sample will be sent under Registered Post to Certification Agency which had initially certified the seed. Besides this, holder of the stock shall retain at least two bags/containers for smaller packing up to 10 kg and one bag/container above 10 kg in original packing of each seed lot being validated up to the next validation or till the stock is disposed off.

5. After analysis of sample, if seed is found to conform to the prescribed standards, the Certification Agency shall extend the validity of seed for a further period of six months from the date of expiry of previous validity period or date of test, whichever is earlier. The date of test and period of validity and name of Certification Agency who has extended the validity period must be rubber stamped on the tags affixed on the seed containers. However, if new tags are required to be issued due to reprocessing and re-bagging of the seed, the information indicated on the certification tags issued at the time of initial certification and name of the Certification Agency who performed the initial certification shall be recorded on the new tags. The serial numbers of new tags used for a seed lot shall be informed to the Certification Agency who performed the

initial certification. The Certification Agency shall preserve at least two tags out of the tags removed from a seed lot and ensure the destruction of remaining tags in its presence.

6. A complete record shall be maintained by the Certification Agency of each lot offered for extension of the validity period.

ANNEXURE VIII

List of Released/ Notified Spice Varieties

S. No.	Variety	Centre	Year	Area
	BLACK PEPPER			
1	Panniyur 1	Panniyur	1967	All pepper growing regions of India
2	Subhakara	Kozhikode	1990	Kerala, South Karnataka and Tamil Nadu
3	Sreekara	Kozhikode	1990	Kerala, South Karnataka and Tamil Nadu
4	Panniyur 2	Panniyur	1991	Kerala
5	Panniyur 3	Panniyur	1991	Kerala, Karnataka and Tamil Nadu
6	Panniyur 4	Panniyur	1991	Kerala, Karnataka and Tamil Nadu
7	Panniyur 5	Panniyur	1996	Kerala
8	PLD –2	Kozhikode	1996	Kerala
9	Panniyur 6	Panniyur	2000	Kerala
10	Panniyur 7	Panniyur	2000	Kerala, Karnataka and Tamil Nadu
11	Panchami	Kozhikode	2001	Kerala and Southern Karnataka
12	Pournami	Kozhikode	2001	Kerala and Southern Karnataka
13	IISR Shakthi	Kozhikode	2004	Kerala and Karnataka
14	IISR Thevam	Kozhikode	2004	Kerala, Karnataka and Tamil Nadu
15	IISR Malabar Excel	Kozhikode	2004	Kerala, Karnataka and Tamil Nadu
16	IISR Girimunda	Kozhikode	2004	Kerala, Karnataka and Tamil Nadu
17	Panniyur 8	Panniyur	2013	Kerala
18	Panniyur 9*	Panniyur	2017	Kerala, Karnataka and Andhra Pradesh
19	Panniyur 10	Panniyur	2019	Kerala
20	Kamakhya-1 (KKHP-13)	Kahikuchi	2023	Lower Brahmaputra valley zones of Assam
	CARDAMOM			
21	Mudigere 1	Mudigere	1984	All cardamom growing tracts of Karnataka
22	PV 1	Pampadumpara	1991	Cardamom growing tracts of Kerala
	Variety	Centre	Year	Area
23	ICRI 1	Myladumpara	1992	South Idukki zone of Kerala
24	ICRI 2	Myladumpara	1992	Kerala and Tamil Nadu
25	Appangala 1	Kozhikode	1993	Karnataka, Kerala and Tamil Nadu
26	ICRI 3	Myladumpara	1993	Cardamom growing tracts of Karnataka
27	Mudigere 2	Mudigere	1996	Hill zone of Karnataka
28	ICRI 4	Myladumpara	1997	Lower Pulney hills of Tamil Nadu & Wayanad, Kerala
29	IISR Avinash*	Kozhikode	1999	Kodagu, Hassan and Chikkamagaluru in Karnataka
30	PV 2	Pampadumpara	2001	Idukki area of Kerala
31	ICRI 6	Myladumpara	2006	Kerala and Tamil Nadu
32	ICRI 5	Myladumpara	2006	Kerala and Tamil Nadu
33	Mudigere 3	Mudigere	2010	Karnataka
34	ICRI 7	Myladumpara	2010	Kerala and Tamil Nadu
35	PV 3	Pampadumpara	2014	Cardamom Hill Reserves of Kerala

36	KAU PV-5	Pampadumpara	2018	Kerala
37	Appangala 2*	Kozhikode	2018	Kodagu, Karnataka and Wayanad, Kerala
38	IISR Manushree	Kozhikode	2022	Cardamom growing tracts of Karnataka and Kerala
	LARGE CARDAMOM			
39	ICRI Sikkim 1	Sikkim	2004	Sikkim and Darjeeling
40	ICRI Sikkim 2	Sikkim	2004	High-altitude regions in Sikkim and Darjeeling
	GINGER			
41	Suprabha*	Pottangi	1988	Odisha, Chhattisgarh, Andhra Pradesh and Madhya Pradesh
42	Suravi*	Pottangi	1991	Odisha, Chhattisgarh, Andhra Pradesh and Madhya Pradesh
43	Suruchi*	Pottangi	1992	Odisha and Chhattisgarh
44	IISR Varada	Kozhikode	1995	All ginger growing regions
45	IISR Mahima	Kozhikode	1995	All ginger growing regions
46	Himgiri	Solan	1996	Himachal Pradesh
	Variety	Centre	Year	Area
47	IISR Rejatha	Kozhikode	2004	Kerala and Karnataka
48	Sourabh	Pottangi	2016	Eastern plateau and hill regions
49	Solan Giriganga	Solan	2018	Eastern and Western Himalayas
50	Mohini*	Pundibari	2018	Kerala, Odisha, Himachal Pradesh and West Bengal
51	IISR Vajra*	Kozhikode	2020	Kerala, Karnataka, Odisha and West Bengal
52	Sas-Kevü*	Nagaland	2024	North Eastern states and Hilly areas of Andhra Pradesh.
	MANGO GINGER			
53	IISR Amrit	Kozhikode	2023	Kerala, Bihar, Odisha, West Bengal, Chhattisgarh, Gujarat and North Eastern Hills
	TURMERIC			
54	Roma*	Pottangi	1988	Odisha, Tamil Nadu, Himachal Pradesh, Andhra Pradesh and Kerala
55	Suroma*	Pottangi	1989	Odisha, Tamil Nadu, Himachal Pradesh, Andhra Pradesh and Kerala
56	Suguna	Kozhikode	1991	Odisha, Tamil Nadu, Himachal Pradesh, Andhra Pradesh and Kerala
57	Sudarshana	Kozhikode	1991	Odisha, Tamil Nadu, Himachal Pradesh, Andhra Pradesh and Kerala
58	Suvarna	Kozhikode	1991	Kerala, Karnataka and Andhra Pradesh
59	Rashmi*	Pottangi	1992	Odisha, Tamil Nadu, Himachal Pradesh, Andhra Pradesh and Kerala
60	BSR-2	Coimbatore	1994	Tamil Nadu
61	IISR Prabha	Kozhikode	1996	Kerala and Tamil Nadu
62	IISR Prathiba	Kozhikode	1996	erala, Tamil Nadu and other states
63	Suranjana	Pundibari	2000	West Bengal
64	IISR Alleppey Supreme	Kozhikode	2004	Kerala, Maharashtra, Karnataka and North Bengal
65	IISR Kedaram	Kozhikode	2004	Kerala, Maharashtra, Karnataka and West Bengal
66	Narendra Haldi –1	Kumarganj	2007	Uttar Pradesh
67	Narendra Haldi – 2	Kumarganj	2012	Uttar Pradesh
68	Duggirala Red	Kammarpally	2013	Andhra Pradesh
69	Narendra Haldi – 3	Kumarganj	2014	Uttar Pradesh

70	IISR Pragati*	Kozhikode	2016	Kerala, Karnataka, Andhra Pradesh, Chhattisgarh and Telangana
71	NDH-98	Kumarganj	2016	All the turmeric growing regions of the country
72	Narendra Sarayu	Kumarganj	2017	Uttar Pradesh
73	Co 3	Coimbatore	2017	Tamil Nadu, Uttar Pradesh and Chhattisgarh
74	Uttar Rangini	Pundibari	2018	West Bengal, Bihar and Tamil Nadu
75	Uttar Rupanjana	Pundibari	2019	West Bengal
76	Chhattisgarh Haldi-2	Raigarh	2019	Chhattisgarh
77	Rajendra Haldi 1	Jobner	2020	Bihar, Odisha and Andhra Pradesh
78	Lam Swarna (LTS-2)*	Guntur	2020	Andhra Pradesh, Telangana and Tamil Nadu
79	Pitambari	Navsari	2021	South Gujarat
80	Amravanti	Navsari	2021	South Gujarat
81	Jyoti	Navsari	2021	South Gujarat
82	Chattisgarh Raigarh Haldi 3	Raigarh	2021	Chhattisgarh, Andhra Pradesh, West Bengal, Odisha, Uttar Pradesh and Tamil Nadu
83	IISR Surya*	Kozhikode	2024	Kerala, Telangana, Odisha, Jharkhand and Arunachal Pradesh
	NUTMEG			
84	Konkan Sugadha	Dapoli	1998	Adaptable in Konkan region
85	IISR Vishwasree	Kozhikode	2002	All nutmeg growing areas of Kerala
86	Konkan Shrimanti	Dapoli	2003	Konkan region of Maharashtra
87	Konkan Swad	Dapoli	2003	Konkan region of Maharashtra
	Variety	Centre	Year	Area
88	IISR Keralasree*	Kozhikode	2012	All nutmeg growing areas of India
89	Konkan Sanyukta	Dapoli	2018	Maharashtra
	CLOVE			
90	PPI (CL) 1	Pechiparai	2012	Tamil Nadu
	Cinnamon			
91	Konkan Tej	Dapoli	1993	Hilly areas (500-1000 m above MSL)
92	IISR Navashree	Kozhikode	1995	All cinnamon growing areas of India
93	IISR Nithyashree	Kozhikode	1995	All cinnamon growing areas of India
94	YCD-1	Yercaud	1996	Hilly areas (500-1000 m above MSL)
95	PPI (C)-1	Pechiparai	2003	Hill regions of Tamil Nadu (100-500 m MSL)
	CASSIA			
96	IISR Cassia	Dapoli	2017	Suitable for Cassia growing regions of the country
	CORIANDER			
97	Swathi	Guntur	1989	Rainfed areas in Andhra Pradesh
98	Sadhana	Guntur	1989	Andhra Pradesh
99	Sindhu	Guntur	1991	Andhra Pradesh

100	CO 3	Coimbatore	1991	Tamil Nadu, Gujarat and Andhra Pradesh
101	Hisar Anand	Hisar	1993	Haryana
102	RCR 20	Jobner	1995	Rajasthan
103	RCR 436	Jobner	1995	Rajasthan
104	RCR 446	Jobner	1997	Rainfed areas in Rajasthan
105	RCR 435	Jobner	1999	Rajasthan
106	RCR 684	Jobner	1999	Rajasthan
107	Hisar Sugandh	Hisar	2001	Haryana and Rajasthan
108	Hisar Surabhi	Hisar	2006	Haryana and other states
109	Sudha	Guntur	2006	Andhra Pradesh (rainfed areas)
110	RCR 480	Jobner	2006	Haryana, Chhattisgarh and Bihar
111	RCR 475	Jobner	2006	Haryana, Chhattisgarh and Bihar
112	Hisar Bhoomit	Hisar	2007	All coriander growing areas of the country for green leaf production
113	Suguna*	Guntur	2012	Andhra Pradesh, Gujarat, Rajasthan, Tamil Nadu and Uttar Pradesh
114	DH 220	Hisar	2012	Haryana
115	Suruchi	Guntur	2013	Andhra Pradesh , Rajasthan, Tamil Nadu
116	Narendra Dhania-2	Kumarganj	2014	Uttar Pradesh, Rajasthan, Gujarat
117	Susthira*	Guntur	2015	Andhra Pradesh, Telangana and Tamil Nadu
118	RD 385 (RPCAU Dhania-1)*	Dholi	2016	All coriander growing regions of the country
119	Gujarat Coriander -3*	Jagudan	2017	Gujarat
120	Ajmer Coriander 2	Ajmer	2017	All coriander growing regions of the country
121	Ajmer Coriander 3*	Ajmer	2018	Rajasthan
122	Chhattisgarh Sri Chandrahasini Dhania-2*	Raigarh	2018	All coriander growing regions of the country
123	JD (SI)-1	Jabalpur	2018	Madhya Pradesh
124	Rajendra Dhania 3	Dholi	2018	All coriander growing regions of the country
125	Rajendra Dhania – 1	Dholi	2019	Bihar, Chhattisgarh, Rajasthan & Uttarakhand.
126	Rajendra Dhania – 2	Dholi	2019	Bihar, Chhattisgarh, Rajasthan & Uttarakhand.
127	Jawahar Dhaniya-10	Jabalpur	2021	—
128	CG Raigarh Dhania -3	Raigarh	2021	Bihar, Chhattisgarh, Madhya Pradesh, Rajasthan, Uttar Pradesh, Haryana, Gujarat, Uttarakhand, Tamil Nadu and Andhra Pradesh
129	Chhattisgarh Raigarh Dhaniya-3	Raigarh	2022	Chhattisgarh, Bihar, Madhya Pradesh, Rajasthan, Uttar Pradesh, Haryana, Gujarat, Uttarakhand, Tamil Nadu and Andhra Pradesh
	CUMIN			
130	RMt-1	Jobner	1988	Rajasthan
131	Gujarat Cumin 2	Jagudan	1991	North Gujarat and Sourashtra region of Gujarat
132	RZ-209	Jobner	1995	Rajasthan
133	Gujarat Cumin 3	Jagudan	1999	Gujarat and Rajasthan
134	RZ-223	Jobner	2004	Rajasthan
135	RMt-305	Jobner	2004	Rajasthan

136	Gujarat Cumin 4	Jagudan	2006	Cumin growing areas of the country
137	RZ-341	Jobner	2006	Rajasthan
138	Gujarat Cumin 5*	Jagudan	2018	Cumin growing areas of the country
139	Jodhpur Jeera-1 (JJ-1)*	Mandor	2024	Rajasthan
	FENNEL			
140	Gujarat Fennel -2	Jagudan	1997	North Gujarat and Sourashtra region
141	RF 101	Jobner	1999	Rajasthan
142	Pant Madhurika	Pantnagar	2001	Uttarakhand
143	RF 143	Jobner	2004	Rajasthan
144	Gujarat Fennel -11	Jagudan	2004	Gujarat
145	Hisar Swarup	Hisar	2004	Haryana under irrigation condition
146	RF 178	Jobner	2006	All fennel growing areas of Rajasthan
147	RF 205*	Jobner	2009	All fennel growing regions
148	JF 444-1	Jagudan	2010	All fennel growing regions
149	RF 281	Jobner	2012	Rajasthan
150	Lam Methi 3*	Guntur	2014	Andhra Pradesh and Telangana
151	Ajmer Fennel-2*	Ajmer	2015	All fennel growing areas
152	RF-157	Jobner	2015	Rajasthan, Gujarat and Haryana.
153	Ajmer Fennel-3*	Ajmer	2018	All fennel growing areas
154	RF-290	Jobner	2019	Rajasthan, Gujarat, Bihar, Haryana and Uttar Pradesh
155	RF-289	Jobner	2021	All fennel growing areas
156	Gujarat Fennel 13 (GF 13)*	Jagudan	2024	Gujarat, Rajasthan, Haryana, Bihar & Uttar Pradesh
	FENUGREEK			
157	Hisar Sonali	Hisar	1994	Haryana and Rajasthan
158	RMt-303	Jobner	1999	Rajasthan
159	Hisar Suvarna	Hisar	2001	Haryana and Rajasthan
160	Hisar Madhavi	Hisar	2001	Haryana and Rajasthan
161	Hisar Mukta	Hisar	2001	Haryana
162	Gujarat Methi-2	Jagudan	2006	All fenugreek growing regions
163	RMt-351	Jobner	2006	All fenugreek growing areas of Rajasthan state
164	RMt-361	Jobner	2009	All fenugreek growing areas of the country
165	HM 348	Hisar	2013	Hisar, Uttarakhand and Coastal AndhraPradesh
166	RMt-354	Jobner	2015	All fenugreek growing areas of the country
167	Narendra Methi 2	Kumarganj	2015	Uttar Pradesh
168	Hisar Manohar	Hisar	2016	Haryana
169	Ajmer Fenugreek 5	Ajmer	2017	All fenugreek growing areas of India
170	Narendra Richa	Kumarganj	2018	Uttar Pradesh and Andhra Pradesh
171	HM 425	Hisar	2018	All fenugreek growing areas of the country
172	Hisar Methi – 257	Hisar	2020	Haryana, Bihar, Rajasthan, Chhattisgarh and Gujarat
173	Lam Methi-2*	Guntur	2020	Recommended the variety for cultivation in Andhra Pradesh
174	Hisar Methi – 273	Hisar	2021	Haryana, Rajasthan, Chhattisgarh, Uttarakhand, Tamil Nadu and Gujarat
175	HM 257	Hisar	2021	—

176	Gujarat Methi-3 (JFg 2013-02) *	Jagudan	2021	Rajasthan, Andhra Pradesh, Uttar Pradesh, Bihar, Chhattisgarh, Uttarakhand, Tamil Nadu and Gujarat
177	HM 273	Hisar	2022	Chhattisgarh, Andhra Pradesh, West Bengal, Odisha, Uttar Pradesh, Gujarat and Tamil Nadu
178	Gujarat Methi 3	Jagudan	2022	Gujarat
179	Gujarat Methi 4 (Supriya)	Navsari	2022	Gujarat
	AJWAIN			
180	Ajmer Ajwain 73	Ajmer	2019	Rajasthan, Gujarat, Chhattisgarh, Haryana, Andhra Pradesh and Uttar Pradesh
181	Lam Varsha (LS-14-3)	Guntur	2021	Rajasthan, Gujarat and Andhra Pradesh
182	Lam Ajwain 3	Guntur	2022	Rajasthan, Gujarat and Andhra Pradesh.
183	Lam Ajwain-2	Guntur	2022	Andhra Pradesh
184	Chhattisgarh Ajwain-1	Raigarh	2023	Chhattisgarh
185	Gujarat Ajwain 3	Jagudan	2023	Rajasthan, Haryana, Gujarat, Uttar Pradesh, Chhattisgarh, and Andhra Pradesh.
186	Gujarat Ajwain 2	Jagudan	2023	Gujarat
	NIGELLA			
187	Hisar Kalonji-12	Hisar	2023	Rajasthan, Haryana, Uttar Pradesh, Chhattisgarh, and Uttarakhand
188	CG Karayat-1	Raigarh	2023	Chhattisgarh
	Saffron			
189	Shalimar Saffron-1 (SD-1-13)	Srinagar	2023	Kashmir
	Kalazeera			
190	Shalimar Kalazeera-1	Srinagar	2020	Kashmir

ANNEXURE IX

Spice Varieties/ Genotypes Registered under PPVFRA

S. No.	Variety	Type	Year
	BLACK PEPPER		
1	Thekkan	Farmer	2016
2	Agali Pepper	Farmer	2016
3	Kumbuckal Selection	Farmer	2016
4	IISR Malabar Excel	Extant (VCK)	2018
5	IISR Thevam	Extant (VCK)	2018
6	IISR Girimunda	Extant (VCK)	2018
7	IISR Shakthi	Extant (VCK)	2020
8	Adi	Farmer	2021
9	Sugandini	Farmer	2021
10	Zion Mundi	Farmer	2024
11	MDBP 16	Farmer	2024
12	VJ-1	Farmer	2024
13	VJ-2	Farmer	2024
14	VJ-3	Farmer	2024
15	VJ-4	Farmer	2024
16	Aswathi	Farmer	2025
17	Raza 1	Farmer	2025
18	Master Kare	Farmer	2025
19	Malli Sara	Farmer	2025
20	Basari Balli	Farmer	2025
21	Kurimala	Farmer	2025
	SMALL CARDAMOM		
22	Panikulangara Green Bold No.1	Farmer	2016
23	Panikulangara Green Bold No.2	Farmer	2016
24	Ela (Elarajan)	Farmer	2016
25	Wonder Cardamom	Farmer	2016
26	Thiruthali	Farmer	2016
27	Ela (White Flower Cardamom)	Farmer	2017
28	IISR Avinash	Extant (Notified)	2018
29	Appangala	Extant (Notified)	2012
30	IISR Vijetha 1	Extant (VCK)	2018
31	Patchaikai	Farmer	2024
32	Thadathil Gold	Farmer	2024
33	Pappalu	Farmer	2024
34	Arjun	Farmer	2024
35	Appangala 2 (Nhy 35)	Extant (Notified)	2025
36	PNS	Farmer	2026

	TURMERIC		
37	Varna	Extant (Notified)	2014
38	Sona	Extant (Notified)	2014
39	Punjab Haldi-1	Extant (Notified)	2017
40	Punjab Haldi-2	Extant (Notified)	2017
41	IISR Kedaram	Extant (VCK)	2019
42	IISR Pragati	New	2019
43	IISR Prabha	Extant (VCK)	2020
44	IISR Pratibha	Extant (VCK)	2020
45	IISR Alleppey Supreme	Extant (VCK)	2020
46	Phule Swarupa (DTS-222)	Extant (Notified)	2020
47	Santra	Farmer	2023
48	Kandaila Haldi	Farmer	2023
49	Gonda	Farmer	2023
50	Koirana	Farmer	2023
51	Hasgora Haldi	Farmer	2023
52	Budhram Haldi-1	Farmer	2023
53	Rashmi Haldi-1	Farmer	2023
54	Pahlu Haldi-2	Farmer	2023
55	Dehati Haldi	Farmer	2023
56	Siki Haldi	Farmer	2023
57	Futi Halood	Farmer	2024
58	916-Turmeric	Farmer	2024
59	Pahlu Haldi-1	Farmer	2024
60	Manoj-T	Farmer	2024
61	Srikant-Safed	Farmer	2024
62	Ragini-T	Farmer	2024
63	Chitrasen Haldi	Farmer	2024
64	SK-4	Farmer	2024
	GINGER		
65	IISR Mahima	Extant (VCK)	2020
66	IISR Rejatha	Extant (VCK)	2020
67	IISR Varada	Extant (VCK)	2020
68	Aadi-LO	Farmer	2023
69	Sitaram Adrak	Farmer	2023
70	Vaijnath Adrakh (Desi)	Farmer	2024
71	Devangarh Aadi	Farmer	2024
72	Kaldev Aadi	Farmer	2024
73	Nasari Desi	Farmer	2024

74	Pankaj Adrakh-1	Farmer	2024
75	IISR Vajra	Extant (Notified)	2025
76	Hattee Saunth	Farmer	2025
77	Desi Aada	Farmer	2026
	NUTMEG		
78	Kochukudy	Farmer	2023
79	Pullan	Farmer	2023
80	Poothara	Farmer	2023
81	Mundathanam	Farmer	2023
82	Shradhha	Farmer	2024
83	Kajal	Farmer	2024
84	Neelkanth	Farmer	2024
85	Thottanal Jathi	Farmer	2024
86	Nova Nutmeg	Farmer	2024
87	Punnathanam Jathy	Farmer	2025
88	KOPS	Farmer	2025
89	Nutmeg Kelshi-1	Farmer	2025
90	BPT-16	Farmer	2025
91	Namo-16	Farmer	2025
92	Sharda-Rd	Farmer	2025
93	Kinattukara	Farmer	2025
94	VPP-16	Farmer	2025
95	Geetarose	Farmer	2025
96	Tendoli Samarth-I	Farmer	2025
97	Tendoli Samarth-Ii	Farmer	2025
98	Cheripurath Nutmeg Variety	Farmer	2025
	CORIANDER		
99	Punjab Sugandh	Extant	2018
100	Bhagvat Dhania-2	Farmer	2023
101	Ramaipur Dhaniya	Farmer	2023
102	Dhaniya Satish	Farmer	2023
103	Sadhaniya-102	Farmer	2023
104	Pal Dhaniya	Farmer	2023
105	Ramtol Deshi Dhaniya	Farmer	2023
106	Shiv Dania	Farmer	2023
107	Desi Dhaniya Chouthi	Farmer	2024
108	Dhaniya Sahab	Farmer	2024
109	Amar Dhana	Farmer	2024
110	Badkawa Guru	Farmer	2024
111	Mahaku	Farmer	2024
112	Khushabu	Farmer	2024

113	Sangi	Farmer	2024
114	Harin	Farmer	2024
115	Gayaprasad Dhaniya	Farmer	2024
116	Dhaniya Barati	Farmer	2024
117	Katnahia Dhania	Farmer	2024
118	Sufi Dhaniya	Farmer	2024
119	Samandar Dhaniya/Chhoti Dhaniya	Farmer	2024
120	CSAB-77	Farmer	2024
121	CLCM-81	Farmer	2024
122	Brij Dhani-C2	Farmer	2024
123	GS1999	Farmer	2024
124	Dhani-BHL	Farmer	2024
125	ACr-2 (Ajmer Coriander-2)	Farmer	2024
126	Dhaniya Parbana	Farmer	2024
127	Biran	Farmer	2024
128	DHOINNA	Farmer	2025
129	K-5	Farmer	2025
130	Desi Dhaniya	Farmer	2025
131	Dhani Praveen	Farmer	2025
132	Ajmer Coriander-1 (ACr-1)	Farmer	2025
	FENNEL		
133	Abu Saunf 440	Farmer	2025
	FENUGREEK		
134	Jatni	Farmer	2021
135	Methua	Farmer	2023
136	Karvi	Farmer	2023
137	Jagruti-1	Farmer	2023
138	Purnwa	Farmer	2024
139	Kalmegha	Farmer	2024
140	Ramiya Ram Khelawan	Farmer	2024
141	Pipri	Farmer	2024
142	FLCM-288	Farmer	2024
143	AFg-5 (Ajmer Feenugreek-5)	Extant (Notified)	2024
144	Sugandhit Methi	Farmer	2025
145	PhuleKasturi (GKF-3)	Extant (Notified)	2025
146	Desi methi	Farmer	2025
147	Nagauri Paan Methi	Farmer	2026
	AJWAIN		
148	Ajmer Ajwain-73 (AA-73)	Extant (Notified)	2025
149	Rama Ajwain	Farmer	2025
150	Desi Jwain	Farmer	2025

ANNEXURE X

Unique Spice Germplasm Registered under ICAR-NBPGR, New Delhi

S. No.	National Identity	Year	Developing Institute	Novel Unique Features
	BLACK PEPPER			
1	IC316598	2003	ICAR-Indian Institute of Spices Research, Kozhikode, Kerala	Field tolerant to foot rot disease
2	IC370011	2004	ICAR-Indian Institute of Spices Research, Kozhikode, Kerala	High oleoresin content and bold berries
3	IC547018	2006	ICAR-Indian Institute of Spices Research, Kozhikode, Kerala	High Caryophyllene (41.8%)
4	IC398868	2008	ICAR-Indian Institute of Spices Research, Kozhikode, Kerala	Trans-sexual species male to bi-sexual type, piper species occurring in bush form
5	IC563950	2008	ICAR-Indian Institute of Spices Research (ICAR-IISR)	Novel spike variant with 100% proliferating spikes
6	IC0266417	2010	ICAR-National Bureau of Plant Genetic Resources (NBPGR) Regional Station, Thrissur, Kerala	Oval shaped berries
7	IC0619910	2019	ICAR-Indian Institute of Spices Research, Kozhikode, Kerala	Black pepper cultivar with very long spike (29.3 cm; reported range is 3.7 to 17.1 cm).
8	ICIC599082	2024	ICAR-Indian Institute of Horticultural Research, Bengaluru, Karnataka	Approved: Highest berry recovery Percentage (37.22 %).
9	IC316610	2026	ICAR-IISR Regional Station, Appangala, Heravanadu, Karnataka	Approved: Thin pericarp (1.21 mm) High pericarp dry recovery (43.24 %)
	CARDAMOM			
10	IC349541	2006	ICAR-IISR Regional Station, Appangala, Heravanadu, Karnataka	Compound panicle type with high yield
11	IC349544	2006	ICAR-IISR Regional Station, Appangala, Heravanadu, Karnataka	Basal branching of panicles and bold capsules
12	IC349599	2006	ICAR-IISR Regional Station, Appangala, Heravanadu, Karnataka	Resistance to Katte mosaic virus
13	IC349634	2006	ICAR-IISR Regional Station, Appangala, Heravanadu, Karnataka	Resistance to rhizome rot
14	IC584058	2023	ICAR-IISR Regional Station, Appangala, Karnataka	Approved: Compact flowering. Bold capsules (80% of capsules >7mm). Relative tolerance to moisture stress.
15	IC349362	2026	ICAR-Indian Institute of Spices Research, Marikunnu PO, Kozhikode	Approved: Resistance to thrips (<15% capsule damage)
	GINGER			
16	IC624537	2017	Medicinal Aromatic and Economic Plants Division, CSIR-North East Institute of Science and Technology (NEIST), Jorhat, Assam	High rhizome yields 10 tones/ha. Dry rhizome recovery. High essential oil.

17	IC432866	2004	ICAR-Indian Institute of Spices Research, Marikunnu PO, Kozhikode	High essential oil (3.5%)
18	IC640711	2021	CSIR-North East Institute of Science and Technology, Jorhat, Assam	The identified germplasm has high essential oil yielding characteristics. The average rhizome essential oil was found to be 0.75% on fresh weight basis.
	TURMERIC			
19	IC640709	2021	CSIR-North East Institute of Science and Technology, Jorhat, Assam	Approved: The rhizome essential oil content on fresh weight baisis is more than 0.8%.
20	IC296550	2003	ICAR-Indian Institute of Spices Research, Marikunnu PO, Kozhikode	High yield (14.9kg) and 7.5 % curcumin
21	IC0615165	2016	Uttar Banga Krishi Viswavidyalaya, P.o.-Pundibari, Cooch Behar, West Bengal-736165	Highly tolerant to leaf spot and leaf blotch.
22	IC	2021	CSIR-North East Institute of Science and Technology, Jorhat, Assam	Approved: This is a high leaf essential oil yielding variety with essential oil yield more than 1.2%.
23	IC654557	2025	ICAR Indian Institute of Spices Research, Kozhikode, Kerala	Approved: Rich in major and minor compounds: -zingiberene (21.07%), ß-sesquiphellandrene (14.13%), 1,8-cineole (3.42%), a-humelene (6.30%), Demethoxy-curcumin (DMC).
	NUTMEG			
24	IC537220	2010	ICAR-Indian Institute of Spices Research, Marikunnu PO, Kozhikode	High sabinene
25	IC0537218	2014	ICAR-Indian Institute of Spices Research, Marikunnu PO, Kozhikode	For bold nut and high sabinene and myrecene content.
26	IC645756	2022	ICAR-Indian Institute of Spices Research, Marikunnu PO, Kozhikode	Approved: Monoecious nutmeg. Monoecious, Fruits borne in clusters of 2 to 7. High yielding.
27	IC438344	2004	ICAR-Indian Institute of Spices Research, Marikunnu PO, Kozhikode	Dwarf plant type
28	IC370415	2005	ICAR-Indian Institute of Spices Research, Marikunnu PO, Kozhikode	High bark oleoresin (10.5%)
29	IC370425	2006	ICAR-Indian Institute of Spices Research, Marikunnu PO, Kozhikode	High bark oil (4.9%) and high cinnamaldehyde content (90.5%)
30	IC370400	2008	ICAR-Indian Institute of Spices Research, Marikunnu PO, Kozhikode	High cinnamaldehyde content
	CUMIN			
31	IC632088	2020	Seed Spices Research Station, Sardarkrushinagar Dantiwada Agricultural University, Jagudan, Gujarat	White flower. Compact plant.

32	IC632089	2020	Seed Spices Research Station, Sardarkrushinagar Dantiwada Agricultural University, Jagudan, Gujarat	Hairy cumin seed. Spreading plant
33	IC640712	2023	ICAR-Central Arid Zone Research Institute, Jodhpur, Rajasthan	Approved: Flowering primodia initiation in 30 days , days to flowering initiation is 40 days and genotypes matures in 100 days under normal condition
	FENUGREEK			
34	IC296791	2001	CCS, Haryana Agricultural University (CCSHAU), Hisar, Haryana	Light green narrow leaves, downy mildew resistant, quick germination, fast initial growth, long pod, bold seed with green tan seed coat colour
35	IC296792	2001	CCS, Haryana Agricultural University (CCSHAU), Hisar, Haryana	Tall, erect plant type with multi-branched habit, whitish green stems, dark green narrow leaves, powdery mildew resistant and downy mildew tolerant
36	IC0624520	2023	ICAR-NBPGR Regional Station, Jodhpur, Rajasthan	Approved: Extra early maturing (93 days).
37	IC0633362	2025	ICAR-National Research Centre on Seed Spices, Ajmer, Rajasthan	Approved: Dark green seed colour containing high chlorophyll (0.678 mg/g) in seed.

For Further Information

Project Coordinating Cell
ICAR-All India Coordinated Research Project on Spices (ICAR-AICRPS)
ICAR - Indian Institute of Spices Research,
Kozhikode, Keralam,
India - 673012.
Phone: 0495-2731410
Email: aicrpspices@gmail.com
Website: www.aicrps.res.in