

SEED SAMPLE TESTING FEE SCHEDULE

Standard Operating Procedure or Seed Testing

Seed lot approved for testing by Seeds Certification Officer (SCOs)

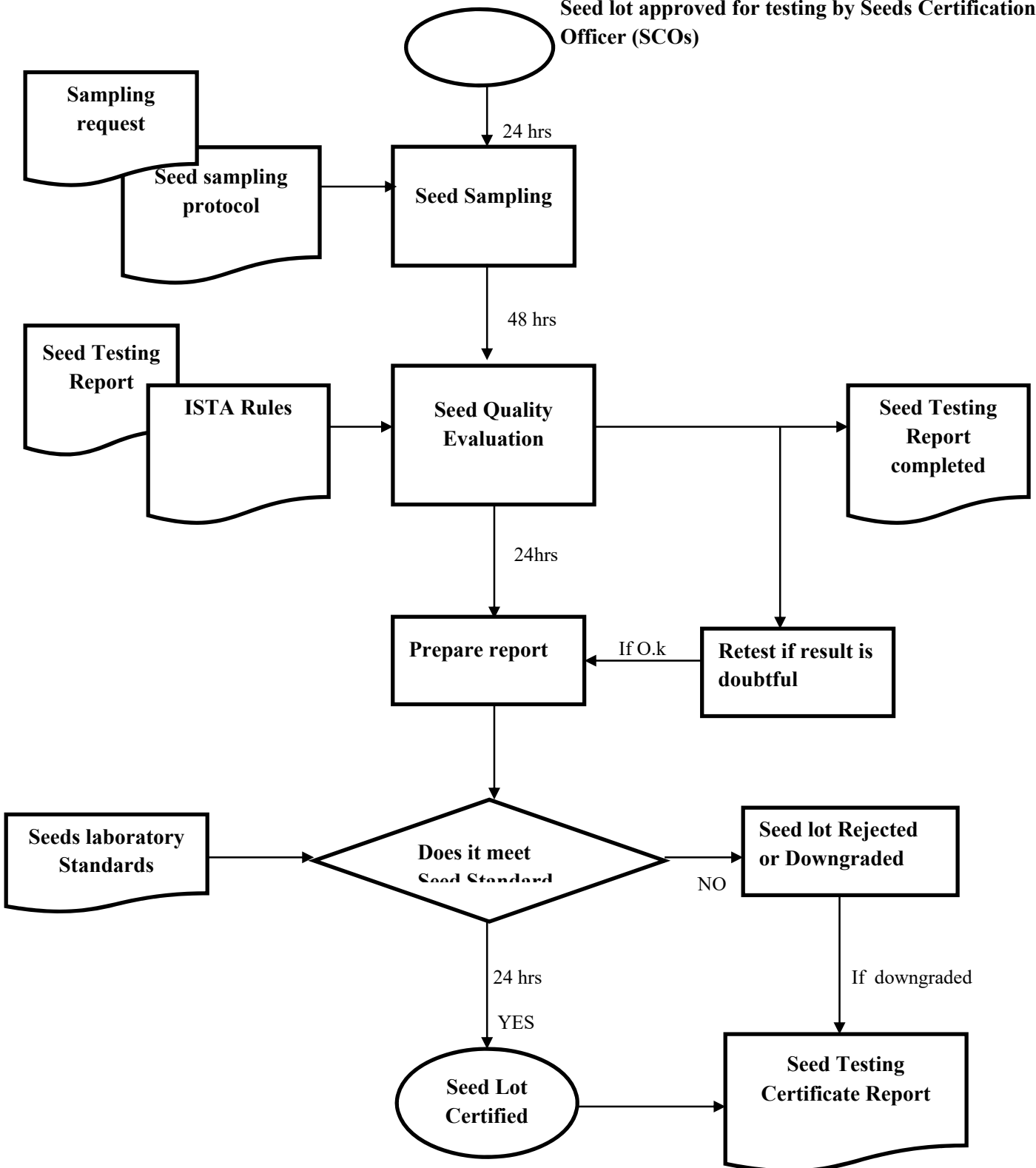


Table 1: General information on sample reception and documentation

Seed Testing Station	<p>Seed samples may be submitted to:</p> <p>i) Central Seed Testing Laboratory National Agricultural Seeds Council Sheda-Abuja, Nigeria. Telephone: +234906474863; +2348034484228</p> <p>ii) North-West Regional Office ABUTH, Funtua Road Samaru, Zaria, Kaduna State Telephone: +2348065430206; +23408117155572</p> <p>iii) North-Central Regional Office Agwan Dada Bukuru Bye Pass Jos, Plateau State Telephone: +234803403677; +2348036009313</p> <p>iv) North- East Regional Office Gombe, Gombe State Telephone: +2348065789022; +2348034788536</p>	<p>v) South-West Regional Office Monatan, Iwo Road, Ibadan, Oyo state Telephone: +2348039246576; +23434038222</p> <p>vi) South-East Regional Office NRCRI Premises Umudike, Umuahia, Abia State Telephone: +23434087657; +2348034311944</p> <p>vii) South-South Regional Office Federal Secretariat, Asaba, Delta State Telephone: +2348032719598; +2348039739860</p>
Information to be Submitted with the Sample	<p>A service sample request form or coupon bearing the listed information should be submitted with the sample: Applicant's name/Senders' name (company or individual), mailing, contact address and phone number, crop name, variety or cultivar, lot number (if any), and lot size (Quantity of seed in tons), class of seed (BS, FS or CS) (if certified seeds), seed treatment if any (name of fungicide used if treated), requested tests such as purity, germination, moisture, etc., and other special instructions and information.</p>	
Test Procedure	<p>Test procedure from International Seed Testing Association (ISTA) Rules for Seed Testing is preferred in the laboratory.</p>	
Available Tests	<p>Moisture content determination, Standard Warm Germination, Tetrazolium (Viability), Analytical Purity, Other seeds by number, 1000 seed weight, Seed Health, Conductivity, Accelerated ageing, Mechanical Quality Tests, Species and Variety Testing. For other tests, please contact the laboratory.</p>	

Table 1 con't

Reporting Timeline	Depending on the arrival time on test schedule list and the number of sample submitted, applicant(s) shall receive the report of the test results within 48 hours after expiration of the test duration.
Test Request	Please indicate what tests are being requested. Sample for moisture content may be submitted in packages other than moisture proof bags. See table 2 and 4 for information on quantity of seeds to be submitted for laboratory analysis.
Test Results	The laboratory 'Seed Testing Report' may be mailed to the applicant's address on request with additional cost.
Billing Information	All test fees may be mailed to the applicant's address on request with additional cost.

Table 2: Seed Testing Price List for Agricultural and Vegetable Seeds.

S/n	Crop	Submitted sample(g) (purity analysis)	Test Price / Sample (#)				
			1000 Seed Weight	Analytical Purity	Standard Germination	Tetrazolium	Seed Health (minimum)
1	Amaranth	10	350	500	350	-	1000
2	Beniseed	70	250	500	350	1000	1000
3	Corchorus	150	250	500	500	-	1000
4	Cotton	1000	350	500	500	750	1000
5	Cowpea	1000	250	500	500	750	1000
6	Cucumber	150	250	500	500	-	1000
7	Egg-plant	1000	250	500	500	-	1000
8	Groundnut	1000	250	500	500	750	1000
9	Kenaf	1000	250	500	500	-	1000
10	Maize	1000	250	500	500	750	1000
11	Melon	1000	250	500	500	750	1000
12	Millet	150	350	500	500	-	1000
13	Okra	1000	250	500	500	-	1000
14	Onion	80	350	500	500	-	1000
15	Pepper	150	250	500	500	-	1000
16	Rice	700	250	750	500	1000	1000
17	Sorghum	900	250	500	500	750	1000
18	Soybean	1000	250	500	500	750	1000
19	Sunflower	1000	250	500	500	-	1000
20	Tomato	15	250	500	500	-	1000
21	Watermelon	1000	250	500	500	-	1000
22	Wheat	1000	250	500	500	750	1000
23	Roselle	1000	250	500	500	-	1000
24	Underutilized crops	1000	250	500	500	750	1000

Table 3: Seed Testing Price List for Tree; Forage and Pasture seeds; Roots and Tuber

S/n	Crop	Submitted sample (g) (purity analysis)	Test Price / Sample (#)				
			1000 Seed Weight	Analytical Purity	Standard Germination	Tetrazolium	Seed Health (min.)
1	All tropical tree seeds	1000	250	500	500	750	1000
2	Forage and pasture seeds	1000	250	500	500	750	1000
3	Roots and Tubers	1000	250	500	500	750	1000
4	Flower seeds	1000	250	500	500	750	1000

Table 4: Additional Test

Tests 1, 2 and 3 require a minimum working sample size of approximately 400 seed units (unless otherwise stated). Test 4 (Other seeds by number determination) require minimum working sample of 25,000 seed units (700 g).

S/n	Test	Description	Type available	Crop Tested	Price (#)
1	Seed Vigour	Seed vigour is used to monitor seed quality during different phases of seed production. The result can be used to select high quality seedlots in meeting the consumers demand. Results are compared to the standard germination results done on the same seed lot prior to vigour testing. Results of which are included in the final report.	Accelerated Ageing	Maize, rice, cowpea, soybean, groundnut, sorghum.	1,000
			Conductivity	Maize, rice, cowpea, soybean, groundnut, sorghum.	1,000
			Speed of germination	All listed crops	1,000
			Seedling Vigour	Maize, rice, cowpea, soybean, sorghum.	1,000
			Seedling Growth (Dry weight)	All listed crops	1,000
2	Mechanical quality	This is done to determine the level of seed damage during conditioning.	Fast-green and hypochlorite.	Maize, soybean and cowpea	750
3	Other Seed by Number	This is done to examine seeds of all contaminating plant species. Results are expressed as number of contaminants found per kg of pure seeds.		Specialized for detecting red rice seed in a sample.	Fee is included with purity analysis. In case of other crops contact laboratory.

Table 4 cont'd

4	Moisture Content Determination	Gives the estimate of the available water content of the seeds samples that can allow safe storage. Sample for moisture content may be submitted in packages other than moisture proof bags.	Direct Method (Oven Dry Method)	Maize, rice, cowpea, soybean, groundnut, sorghum.	500
			Indirect Method	Maize, rice, cowpea, soybean, groundnut, sorghum.	250
5	Species and Variety Testing	This is to determine the extent that the submitted sample conforms to the species or variety as requested by the applicant in accordance to International Seed Testing Association (ISTA) standard.	Laboratory and Field plot only. Contact laboratory for more information.	Grain crop seeds Maize, rice, cowpea, soybean, groundnut, sorghum.	15,000

SPECIAL INFORMATION

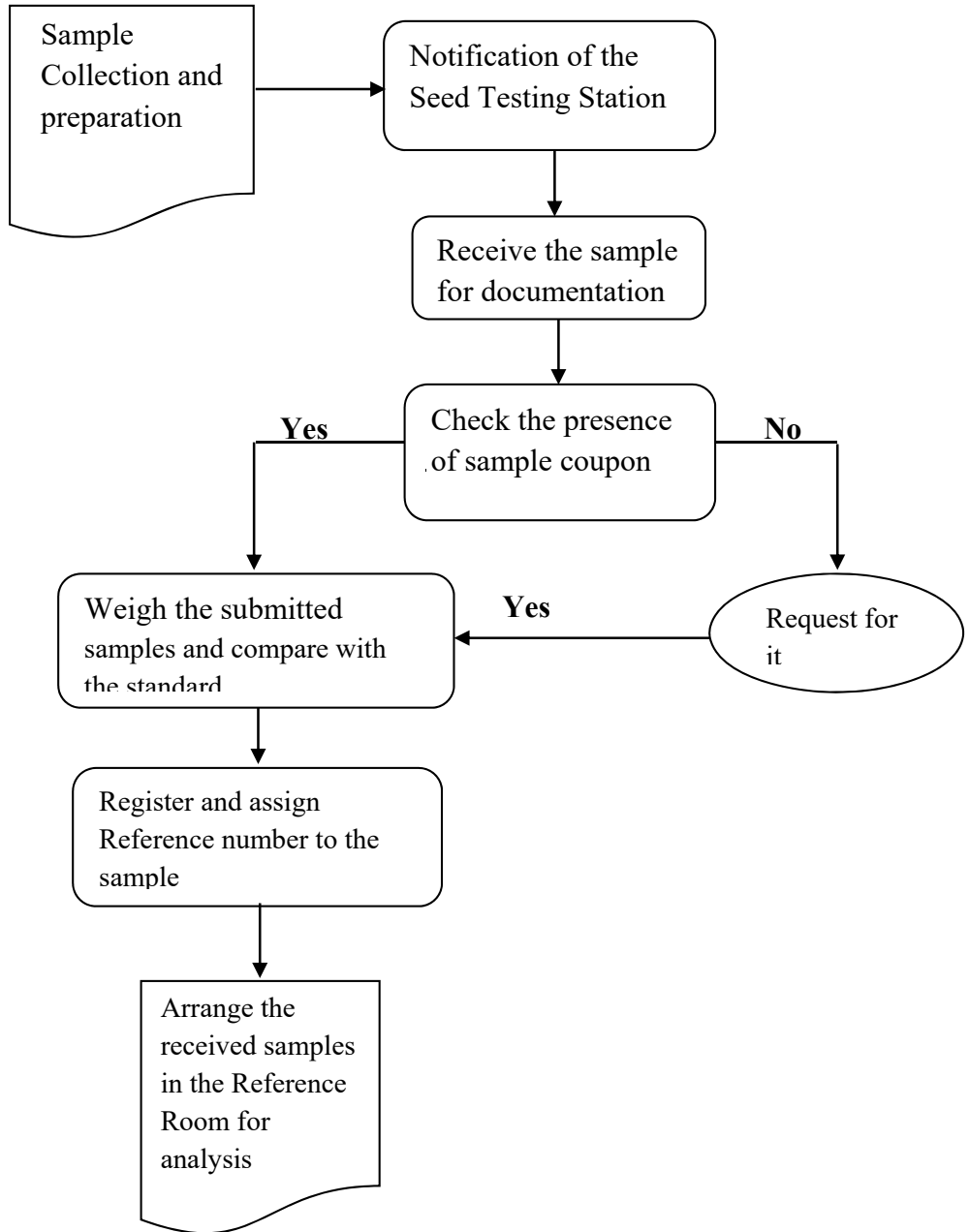
- (1) Prices vary based on the species (kind of seeds) and time it takes to perform the test.
- (2) Price for tests on seed kinds not listed will be based on the cost of a similar test and on the time required to run the test.
- (3) Seed kinds that are exceptionally dirty will attract additional N200 per sample.
- (4) For germination tests that involve mixtures of two or more kinds of seed, the price will be the sum of the price tagged for individual component of the mixture.
- (5) For samples submitted for purity, germination, TZ and seed health testing, seeds used for the testing is taken from the pure seed portion of the purity analysis.
- (6) For seed health testing, pricing is based on percentage of infection. Individual pathogen identification will attract additional N1,000. If blotter method is demanded the price is less N50.
- (7) For Species and Variety testing, submitted sample for laboratory analysis and field plot shall be 1,000 g and 2,000 g respectively.
- (8) In case of occurrence of abnormalities during test periods which can make the test results unreliable, retest shall be conducted. Note: based on the species, retest shall attract additional days depending on the recommended duration of test requested for.
- (9) For more information on standard operation procedure for other available tests contact the seed laboratory.
- (10) Apart from the listed standard testing services, we offer a wide range of customized testing and seed based research services. Please contact us on further information.

Table 5: Duration of tests and reporting timeline

S/n	Crop	Test duration (days)					
		Moisture Content*	1000 Seed Weight)	Analytical Purity	Standard Germination	Tetrazolium	Seed Health minimum
1	Amaranth spp	1	1	1	14	-	7
2	Beniseed	1	1	1	6	1	7
3	Corchorus	1	1	1	5	-	7
4	Cotton	1	1	1	12	1	7
5	Cowpea	1	1	1	8	1	7
6	Cucumber	1	1	1	8	-	7
7	Egg-plant	1	1	1	14	-	7
8	Groundnut	1	1	1	10	1	7
9	Kenaf	1	1	1	5	-	7
10	Maize	1	1	1	7	1	7
11	Melon	1	1	1	14	1	7
12	Millet	1	1	1	7	-	7
13	Okra	1	1	1	21	-	7
14	Onion	1	1	1	12	-	7
15	Pepper	1	1	1	14	-	7
16	Rice	1	1	1	14	1	7
17	Sorghum	1	1	1	10	1	7
18	Soybean	1	1	1	8	1	7
19	Sunflower	1	1	1	10	-	7
20	Tomato	1	1	1	14	-	7
21	Watermelon	1	1	1	14	-	7
22	Wheat	1	1	1	8	1	7
23	Roselle	1	1	1	8	-	7
24	Underutilized crops	1	1	1	14	1	7

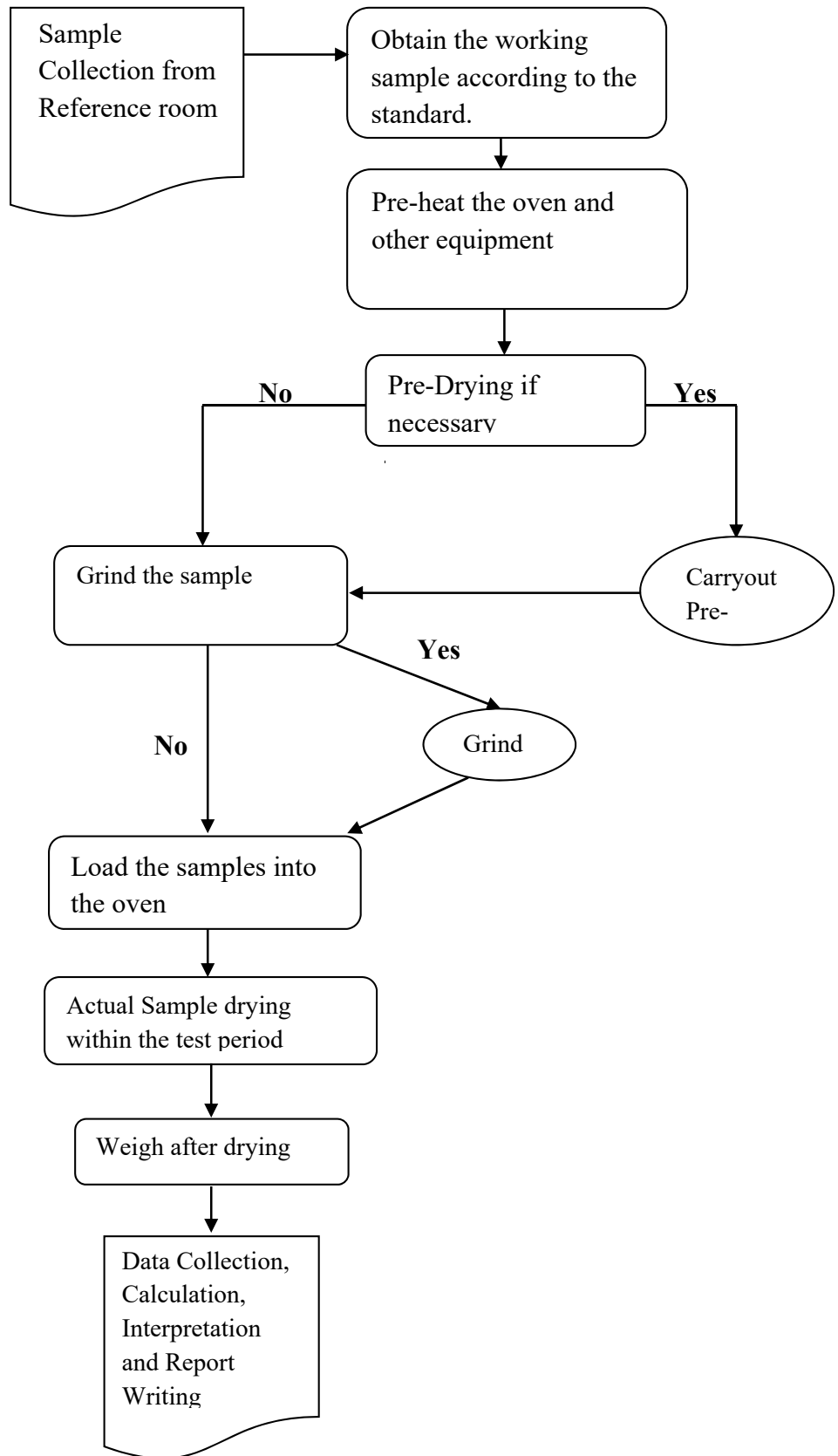
*Irrespective of type of submitted seed crop.

Flow Chart for Sample Reception



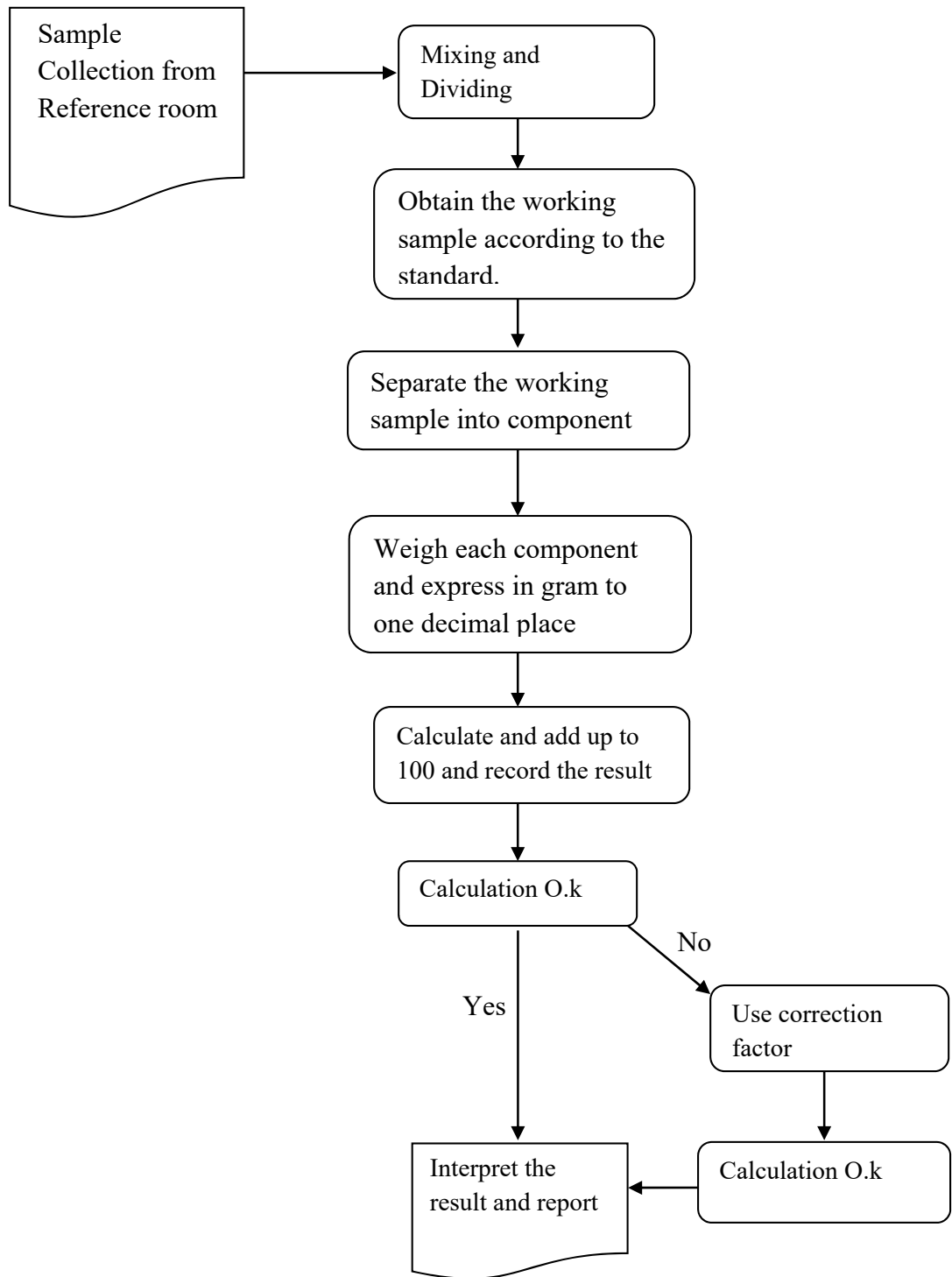
Note: See table 6 in Appendix I for detail.

Flow Chart for Moisture Content



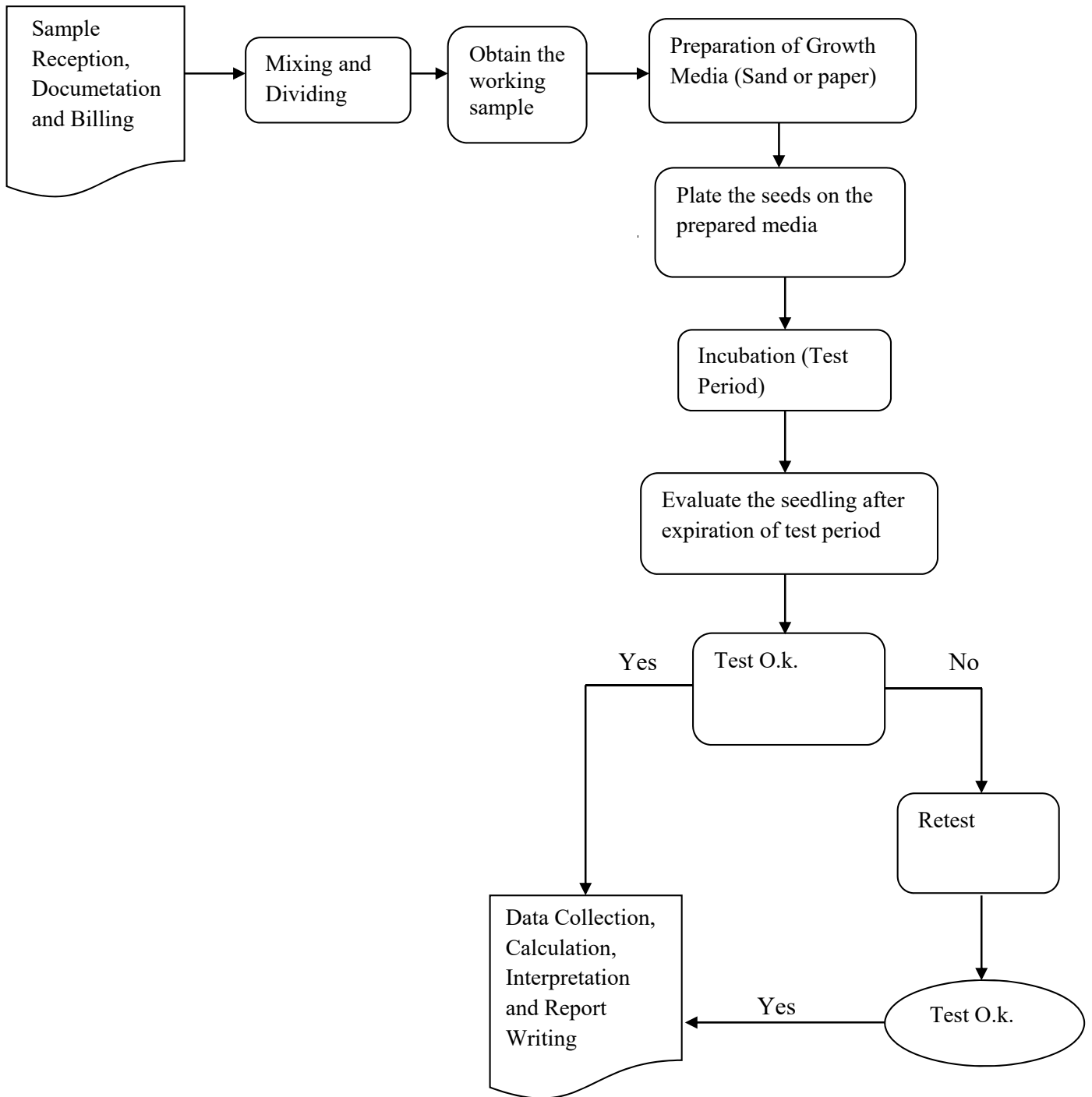
Note: See table 7 in Appendix I for detail.

Flow Chart for Analytical Purity Test



Note: See table 8 in Appendix I for detail.

Flow Chart for Germination Test



Note: See table 9 in Appendix I for detail.

Appendix 1

Table 6: Standard Operating Procedure for Sample Reception

S/n	Step	Procedure
1	Equipments	<ul style="list-style-type: none">▪ Reception Register, Weighing balance, chair, table, pen, sampling bags and shelves.
2	Reception of Submitted Samples	<ul style="list-style-type: none">▪ Receive the submitted seed sample by the seed analyst.▪ Check the condition of the packaging material (Request for a fresh sample if the container is damaged)▪ Weigh the submitted sample (Note: the submitted sample should meet the minimum prescribed weight in ISTA rules).▪ Examine the sample coupon carefully.▪ Register the accepted submitted samples in the sample entry register.
3	Submitted Sample Registration	<ul style="list-style-type: none">▪ Assign a Reference Number on the paper label and fix on the container that contained the submitted sample.▪ Enter the sample information into the register and electronic register at the reception.
4	Packaging	<ul style="list-style-type: none">▪ After the working sample has been taken, ensure the label that bears the Reference number are securely affixed properly on the bag and another well placed inside the bag.▪ Arrange accordingly in the shelves before transferring to Reference room thereafter.

Table 7: Standard Operation Procedure for Moisture Content

S/n	Step	Procedure
1	Equipment	Oven, Non-corrosive drying container with tight fitting lids (metal or glass), grinding mill, Analytical balance, Desiccators, Glove.
2	Sample collection	<ul style="list-style-type: none"> ▪ Collect the moisture content sample in a moisture proof container. ▪ Collect the well-received sample from reception section. Arrange according to the Reference Number. (Note: Avoid moisture gain or loss). ▪ Ensure the moisture determination is carried out within 24 hours of reception.
3	Equipment maintenance	<ul style="list-style-type: none"> ▪ Clean the working areas. ▪ Ensure the oven is clean. Set to the prescribed temperature and check the power supply. ▪ Ensure that all equipment are in good conditions
4	Weight of the container	<ul style="list-style-type: none"> ▪ Dry the containers at 130⁰C for one hour and allow them to cool in the desiccators for one hour. ▪ Label and weigh each container, including the lid, and record the weights as M1 on the data sheet.
5	Loading the samples	<ul style="list-style-type: none"> ▪ Depending on the diameter of the containers used: the working sample shall be 4 to 5 g for container with <8 cm diameter and 10 g for container with diameter >8 cm. Place two sub-sample (pre-dried and ground if necessary), into two separate containers, which will serve as two replicates. Replace the lids, weigh again and record the weights as M2. Place the containers with the lids removed in an oven maintained at 130⁰ – 133⁰C.
6	Sample Drying	<ul style="list-style-type: none"> ▪ Dry the seeds in the oven using the recommended temperature range for the specified species (has specified in ISTA rule).
8	Weight after drying	<ul style="list-style-type: none"> ▪ Record the weight of the containers, including the samples to 3 decimal places as M3
9	Calculation of Result	<ul style="list-style-type: none"> ▪ Calculate the moisture content on a dry-weight basis and express it as a percentage to one decimal place, using the following formula below: <p style="text-align: center;">Moisture content (%) = $\frac{M2 - M3}{M2 - M1} \times 100$ where,</p> <p>M1 = weight of container with lid; M2 = weight of container with lid and sample before drying; and M3 = weight of container with lid and sample after drying.</p> ▪ Re-test if the moisture content between the two replicates differs by more than 0.2%.

Table 8: Standard Operation Procedure for Analytical Purity Test

S/n	Step	Procedure
1	Equipment	<ul style="list-style-type: none"> Working bench, purity board, spatula, glove, Analytical balance, container with lid, pen, label, mixer / divider, sieve.Grinding-mill
2	Sample collection	<ul style="list-style-type: none"> Collect the sample from the reception and arrange accordingly.
3	Equipment maintenance	<ul style="list-style-type: none"> Clean the working areas. Ensure that all equipments are in good conditions.
4	Mixing and Dividing	<ul style="list-style-type: none"> Mix the sample thoroughly and divide into two equal halve.
5	Weighing the Sample	<ul style="list-style-type: none"> Weigh to obtain the working sample and record the weight of the working sample and express to four decimal places.
6	Seed component separation	<ul style="list-style-type: none"> Place the weighed working sample on the purity board and physically separate into pure seed, inert matter and other crop seed.
7	Weighing the Components	<ul style="list-style-type: none"> Weigh each component part and expressed in grams to one decimal place.
8	Calculation and expression of results	<ul style="list-style-type: none"> Add together the weight of all the component fractions from the working sample. The sum must be compared with the original weight as a check against gain or loss using the formula below: <p style="text-align: center;"> $\frac{\text{Weight of each component} \times 100}{\text{sum of weight}}$ </p> Retest if the difference is more than 5% of the initial weight and report the result of the retest. Convert the calculated values into percentage and express the values to one decimal place. Percentages must be based on the sum of the weights of the components not on the original weight of the working sample. Add together the percentages of all fractions. If the sum does not equal 100.0% (either 99.9 or 100.1) then add or subtract 0.1% from the largest value (normally the pure seed fraction). Check for calculation error if a correction of more than 0.1% is necessary.Report components that is less than 0.05% as Trace and exclude the value from the calculation. Other fractions when added together should be 100.0%.
9	Packing Reference Sample	<ul style="list-style-type: none"> Pack the pure seed, inert matter and weed seeds separately in a container and label them. Store the packaged sample in the reference room at Temperature range of 15 - 20°C for a period of one year after which it is disposed off.

Table 9: Standard Operation Procedure for Standard Germination Test

S/n	Step	Procedure
1	Equipment	<ul style="list-style-type: none"> ▪ Germinator (if any), water, seed planter, sterilized sand, paper, germination tray, marker, walk in germinators.
2	Working sample preparation	<ul style="list-style-type: none"> ▪ Count 100 seeds into 4 replicates from the well-mixed pure seed fractions and label. (Ensure that there is no selection of seeds that may cause biased results). Return the excess into the sampling bag.
3	Test condition for paper substrate	<ul style="list-style-type: none"> ▪ Between paper: moist the paper and drain off excess water. Plate the seeds evenly in between 4 papers down and cover with 2 papers. Roll the paper loosely and arrange accordingly in a tray inside the germination cabinet and allow for the specific period depending on the species.
4	Testing for paper quality	<p>A. Presence of toxic substances</p> <ul style="list-style-type: none"> ▪ Cut the paper to size and place in a 9cm Petri dish. ▪ Moisten the paper with sufficient water. ▪ Test using seeds of sensitive species like tobacco (<i>Nicotiana tabacum</i>) to observe germination on the moistened paper. ▪ Evaluate root development after five days. ▪ Symptoms of paper toxicity include shortened and discoloured root tips. <p>B. Paper strength</p> <ul style="list-style-type: none"> ▪ Moisten the paper and hold it in the air from one corner. ▪ The paper should not fall apart. <p>C. Moisture absorption</p> <ul style="list-style-type: none"> ▪ Cut the paper into 10-mm wide strips. ▪ Hold vertically with about 20 mm of the paper immersed in water. ▪ Measure the height above the level that the moisture has risen to. ▪ The minimum standard is a 30 mm rise in two minutes. (It is important that high-quality paper be used as a substrate in order to obtain uniform germination and reproducible results. ▪ The paper used as substrate should not be toxic to developing seedlings. ▪ It should be able to absorb and supply sufficient moisture for the seeds to germinate. ▪ It should be strong enough not to disintegrate when handled, and not to be penetrated by the roots of developing seedlings.

		<ul style="list-style-type: none"> ▪ It should have a neutral pH of 6– 7.
5	Testing condition for sand	<ul style="list-style-type: none"> ▪ Sieve the sand and sterilize at 200°C for 6hours. ▪ Allow to cool after sterilization for 10 - 15minutes. Water the sand until it is moist. Do not use excess water. ▪ Make holes in a regular equidistant pattern at about the same depth as the size of the seeds. Ideally, the distance between holes should be at least three to five times the seed diameter. ▪ Prepare a paper label with the accession number, date of sowing and replicate number, and attach it on each tray where water cannot spill on it. ▪ Place one seed in each hole and cover the holes with sand. ▪ Place the trays in appropriate light and temperature for the species. Keep the substrate moist during tests by adding water, but donot over-water.
6	Duration of test	<ul style="list-style-type: none"> ▪ Run the test for the period recommended for the species.
7	Evaluation	<ul style="list-style-type: none"> ▪ Count the number of seeds that have sprouted. ▪ Carefully assesses the seedlings which have reached a stage with all the essential structures present and remove during the first and final counting and record as normal seedlings. Seedlings without all the essential structures present are counted and recorded as abnormal seeding. Decayed seedlings shall be counted and recorded as dead seedlings. (remove badly decayed seedlings in order to reduce the risk of secondary infection) ▪ Leave the abnormal seedlings with defects on the substrates until the final count).
8	Re-testing	<p>Re-test when:</p> <ul style="list-style-type: none"> ▪ Dormancy is suspected using ISTA rules for breaking dormancy. ▪ Germination tests are not reliable because of spread of fungus or bacteria. ▪ There is evidence of errors in the seedling evaluation /counting. ▪ The differences exceed the tolerance limit. (Note: results are reliable if the difference between the highest and the lowest replicate is within the accepted tolerance according to ISTA rules).
9	Calculation of Result	<ul style="list-style-type: none"> ▪ Calculate the mean percentage germination of the sample from the results of all the replicates to determine the number of <i>normal seedlings</i> produced. Repeat the germination test if the difference between the two replicates exceeds 10% or the maximum tolerance exceeds2.5% probability. Once a seed has been germinated, the resulting seedling can bediscarded or transplanted for regeneration when the number of seeds in storage is critically low.