



Seed Health Proficiency Test

(*Munesh Kumar and Kana Ram Kumawat)

Rajasthan State Seed and Organic Certification Agency, Jaipur, Rajasthan-302005

*muneshbhu94@gmail.com

Seed health concerns the overall condition of seeds. It includes pathogenic infection of seed, insect infestation, morphological and physiological disorder, inert matter etc.

Seed health testing

Seed health testing is a procedure by which can be determined whether the seed is healthy or diseased or it is a procedure by which the presence or absence of seed borne pathogen(s) in a seed lot can be determined.

Objectives of Seed health testing

1. Seed health testing is necessary for the improvement of seed stock in certification scheme.
2. It is necessary to satisfy quarantine requirement of a country.
3. It is done to know the planting value of a given seed lot in order to forecast the field emergence and predict the health of the mature crop.
4. It is necessary to know the storage quality or feeding value of a seed lot.
5. It is necessary for checking the advisability of seed treatment.
6. It is done to know the efficacy of seed treating chemicals.

Methods of seed health testing

1. Dry inspection method
2. Microscopic examination of samples obtained by
 - Washing test method
 - Whole embryo count method
3. Incubation tests
 - Blotter method
 - Agar plate method
 - Deep freezing blotter method
 - Water agar plate method
 - Test tube agar method
4. Seedling symptom test
 - Hiltner's bricks stone method
 - Sand methods
 - Standard soil method
 - Test tube agar method
5. Growing on test
6. Serological tests
7. Indicator plant test
8. Electron microscopy

Dry inspection method: It is a very simple and preliminary method for testing the seed health.

Procedure

The dry seed samples were examined for impurities such as

- Inert matter:** It includes plant debris, spotted, unfilled & chaffy grains, sclerotia, galls, smut balls, insects etc. It should also be incubated either on blotters or, agar media and examined, after a standard period of infection.
- Symptoms:** Such as (Discoloration, staining, necrosis, malformation and similar indications of infections, including fruiting bodies of fungi, resting hyphae on the seed-surface, spore or bacterial masses on the seed as well as mechanical damage.

Blotter method/test: The blotter test is a combination of the in vitro and the in vivo principles of investigation. In this method, the seeds are sown in petridishes other suitable containers on moistened absorbent blotting paper, usually three layers to provide enough moisture for duration of the test.

Advantages/Usefulness of blotter test

1. Pathogens can be detected quickly by observing their growth characters.
2. It is economic
3. Pathogenic potentials of the associated fungi can be determined by observing the signs and symptoms produced by them on the germinating seeds and seedlings.
4. It can be applied for detecting wide range of fungal pathogens from all different kinds of seeds.
5. Results obtained by it, is more reliable because it is the combination of in vitro and in vivo.
6. Blotter method is widely used while agar plate method is impracticable.

Disadvantages/Limitations of Blotter method

1. Examination may be hampered due to the fast growth of certain Fungi over the slow growing ones.
2. Pathogenic bacteria can not be detected.
3. It is time consuming.
4. Pathogenicity cannot be detected.
5. Symptoms may not be detected.

Earthen dish newsprint method: This method is, in fact, the modification of f3lc3ttcr microflora of seed health testing (in this method earthen dish and old newspaper are used in stead of petridish and filter papers, respectively).

Agar plate method: This method is the modification of blotter incubation method. In this method, nutrient agar, malt extract agar or potato dextrose agar (PDA) are used in place of blotting papers. But generally PDA is used for the growth of fungal pathogens and Nutrient agar is used for bacteria.

Table: Agar plate method of Seed Health Testing

Nature of disinfection	%Germination	% Pre-emergence death	% Post emergence death	No. of colonies	Pathogen(s) associated
Without surface sterilized					
With surface sterilized					

The percentage of healthy seed in the sample tested=

% Germination- (% pre-emergence death + % post emergence death)

Advantages/Usefulness of Agar plate method

1. This method is useful only for selective pathogens.
2. Fruiting structures of fungi can develop quickly on agar.
3. The fungi that not identified by blotter method, can easily be identified by agar plate method.
4. Pathogenic bacteria can be detected by this method.
5. Agar plate method provides adequate conditions for the mycelial growth, sporulation and symptoms on seedlings and seeds than blotter method.

Disadvantages

1. The method is costly, laborious and time consuming.
2. Slow-growing fungi can be suppressed by the rapidly growing ones.
3. Pathogenic potentials of the associated organisms cannot be determined as no disease symptoms are produced on the poorly germinated seeds and seedling on agar.
4. The analysts need experience to perform the test.