

Class-6 (Agriculture)

Chapter-3

Agricultural Inputs

Lecture-3 Date-13.05.2020

Lesson: 8-12

❖ What is meant by seed?

- Seed means fertilized and mature ovule which can grow into a new plant. The seed is the medium of plant breeding.
- In broad sense, seed means any living part of plants which is used as the medium of propagation. Such as, stalk a sweet potato, stem of sugarcane, leaf of air plant, onion, potato, etc.



Fig- Seeds of maize



Fig- Seeds of cucumber



Fig- Seeds of black gram



Fig- Rice seeds



Fig- Different varieties of rice seeds

❖ Characteristics of good seeds:

- **Purity of seed:** Expected crop seeds should be free from any kind of other crop seeds, weed seeds, stone particles, etc.
- **Variety purity:** Seeds should be free from mixture of different breeds. When any seed sample contains seeds of other varieties of the same crops, purity of seed is lost.
- **Seed colour:** A good seed should have normal bright independent colour. Normal bright colour is the primary symptom for identification of good seeds.

- **Germination capacity:** Seeds germination rate will be minimum 80% for any good quality seeds.
- **Vigorousness of seeds:** When the seedlings of the sample are vigorous, living and healthy and can grow under adverse conditions, the seeds are called high vigorous seeds.
- **Humidity of seed:** The seed moisture keeps seeds living. 8 -10% moisture is better to keep cereal seed grains well.

❖ **Germination capacity or germination rate of seed:**



Figure- Good germination rate

- The percentage of seed able to complete germination in a particular sample is referred as germination capacity or germination rate of seed.
 - The quality of seeds depends on the germination capacity of seeds.
 - Seeds germination rate will be minimum 80% for any good quality seeds.
- ❖ **Seed moisture:**
The percentage of moisture contained in the seeds of the sample is called seed moisture.

❖ **Classification of seeds:**



Figure- Agronomical seeds [potato, sugarcane stem and zinger bulb]

1. According to use, seeds are divided into 2 classes:

a) Botanical seed:

- According to plant scientists fertilized and mature ovule is called botanical seed.
- For example, rice, jute, wheat etc. seeds.

b) Agronomical seed:

- According to agronomical scientists, any plant part that under favorable conditions can produce new plants of self variety is called agronomical seeds.
- For example, zinger and turmeric bulbs, vine of sweet potato, teasel gourd root, sugarcane stem, etc.

2. Based on the presence of seed coat, seeds are divided into 2 categories:



Fig- Pine tree



Fig- Pine seeds

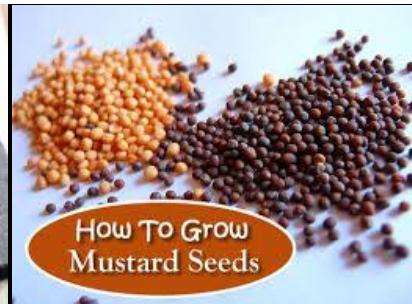


Fig- Mustard seeds

a) Seeds without seed coat:

- There are no seed coats in these seeds.
- For example, pine, cycus, etc.

b) Seeds with seed coat:

- Seed coats are present in these seeds.
- For examples, rice, mustard, etc.

3. According to **cotyledon**, seeds are divided into **3 divisions**:



Figure- Rice seeds (Mono cotyledonous)

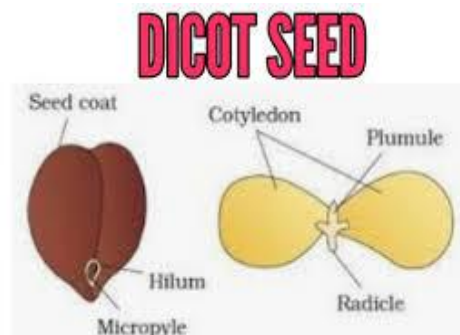


Figure- Gram seed(Di cotyledon)

a) Mono cotyledonous seeds:

- Only one cotyledon is present in these seeds.
- For examples, rice, wheat, maize, etc.

b) Di cotyledonous seeds:

- Two cotyledons are in these seeds.
- For examples, gram, mango, jackfruit, etc.

c) Poly cotyledonous seeds:

- More than two cotyledons are in these seeds.
- For example, pine seed.

❖ **Fertilizer:**

- A **fertilizer** is any material of natural or synthetic origin that is applied to soil or land to increase its fertility to supply one or more plant nutrients essential to the growth of plants.
- Many sources of fertilizer exist, both natural and industrially produced.

We use fertilizer to:

- Provide nutrients not available in the soil.
- Replace nutrients removed at harvest.
- Balance nutrients for better product quality and higher yield.

❖ **Classification of fertilizers:**

Based on its sources, fertilizers are classified into **2 categories:**

1. Organic or natural fertilizer.
2. Chemical or synthetic fertilizer.

❖ **Organic fertilizer:**



Figure- Procedures to make organic fertilizers

- The fertilizer which is produced from bodies of living beings, that is, from remains and by-products of plants and animals is called **organic fertilizer**.
- Cow-dung, compost fertilizer, green manure, oil-cake, etc are examples of organic fertilizers.
- All necessary food elements of plants are available in the organic fertilizer.



Figure- Oil-cake

Figure- Different organic fertilizers



Figure- Functions of fertilizers

❖ **Advantages of using organic fertilizer in the land:**

- All the necessary plant nutrients are available in the organic fertilizer.
- It increases fertility of the soil.
- It increases the activities of the soil micro-organisms.
- It develops soil structure.
- It increases water absorption capacity of soil.
- It increases the air movement of the soil.

❖ **Chemical Fertilizer:**

Chemical fertilizer is defined as any inorganic material of wholly or partially synthetic origin that is added to soil to sustain plant growth.

The table below shows a list of some fertilizers and the nutrients:

Name of fertilizers	Names of nutrients
Urea	Nitrogen
TSP	Phosphorus, calcium
MOP	Potassium
DAP	Nitrogen and phosphorus
Zipsum	Sulphur
Zinc	Zinc, sulphur



Figure- Urea fertilizer



Figure- TSP



Figure- MOP

❖ **Advantages of applying chemical fertilizer:**

- Have fast release capability and always ready for immediate supply of nutrients to plants if situation demands.
- Have an equal distribution of essential nutrients, such as phosphorous, nitrogen, potassium etc.
- Right amount of nutrients are added to the soil as the plant require.
- Increase crop production.
- Mostly come in a convenient solid granular form, which makes them well suited to transport and application by the farmer.

❖ **Disadvantages to apply chemical fertilizer**

- It can harm soil and crop if not applied evenly.
- It increases production cost.

- Excessive use of chemical fertilizer pollutes the environment.
- Chemical fertilizer, applied without organic additions, decreases soil structure and its natural fertility.
- Chemicals need to be used safely.

❖ **Comparison between organic and chemical fertilizer:**

Organic fertilizer	Chemical fertilizer
<ol style="list-style-type: none"> 1. Organic fertilizers are made from materials derived from living things. 2. Prepared naturally. One can prepare organic fertilizers, themselves or can also buy. 3. Have slow release capability. 4. Have unequal distribution of essential nutrients. 5. Organic fertilizers support the growth of nitrogen –fixing bacteria. 6. Improves soil structure and fertility. 	<ol style="list-style-type: none"> 1. Chemical fertilizers are manufactured from synthetic material. 2. Artificially prepared. 3. Have fast release capability and always ready for immediate supply of nutrients to plants if situation demands. 4. Chemical fertilizer has an equal distribution of essential nutrients, such as phosphorous, nitrogen, potassium. 5. Several chemical fertilizers have high acid content that results in the destruction of nitrogen-fixing bacteria. 6. Changes soil structure and its natural fertility.

❖ **Use of fertilizer in agricultural activities:**

Fertilizers have been required to meet the increasing food requirements of a growing world population. Plants that grow in nutritionally deficient and unfertilized soil will often be smaller and grow slower than plants from healthy soil. The global population is increasing day by day. Increasing crop yields is essential if we are going to be able to produce enough food for everyone. This increase is not possible without carefully planned fertilizing.

Some **factors are to be considered** to apply the right quantity of **any specific fertilizer:**

- Condition of soil fertility
- Type and variety of the crop
- Time and methods of applying fertilizer
- Degree of fertilizer loss
- Level of soil moisture



Figure- application of chemical fertilizer

Related Questions:

1. What is meant by seed?
2. Describe the characteristics of good seeds.
3. What is called seed moisture?
4. What is meant by variety purity of seed?
5. What is called germination rate of seed?
6. What are known as vigorous seeds?
7. Describe the classifications of seeds.
8. What is fertilizer?
9. Why fertilizers are beneficial for crop production?
10. What is organic fertilizer?
11. Mention the advantages to apply organic fertilizers to the land.
12. What is chemical fertilizer?
13. Mention the advantages and disadvantages to apply chemical fertilizers to the land.
14. Mention the factors that are to be considered to apply the right quantity of any specific fertilizer.