MULCHING:
ADVANCE TECHNIQUE OF PRODUCTION IN VEGETABLES

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INTRODUCTION

India is the second largest country in the world in vegetable production. Vegetable occupies 10.29 million hectares with production of 176.17 MT. Mulching is the process or practice of covering the soil/ ground by using farm waste and plastics for the purpose of maintaining temperature in root zone, conserving moisture and suppressing weed growth. The main benefit from mulching is that the conserve soil moisture and soil temperature in the planting bed is raised, promoting faster crop development and earlier harvest.

The development of polyethylene as a plastic film in 1938 and its subsequent introduction as a plastic cover in the early 1950s revolutionized the commercialization of selected vegetable crops. Over the years that followed, research, expansion, and industry workers, as well as farmers, listed the benefits of using a plastic cover as part of a complete "powerful" vegetable production program. Varieties of vegetables such as muskmelon, honeydews, melons, squash, cucumbers, tomatoes, peppers, eggplant, okra, sweet corn, and cole plants have shown significant increases in yield, overall yield and quality. Mulching is generally a beneficial method of crop production. Mulch is simply a protective layer of material that is spread over the surface of the soil. It enriches and protects the soil and provides a better growing environment. At the same time, they act as a barrier to the movement of moisture in the soil. Mulching supports the infiltration of flowing water and irrigation water as the lumps protect the area under the influence of raindrops that prevent soil compaction. Vegetable cultivation in India is affected by many pathogenic chemicals and among them, the losses caused by viral diseases are very high. Although, the use of pesticides reduces pest damage, leading to the problem of pesticides residues in fruits and vegetables.

Insect-borne pathogens often reverse the resistance of widely used pesticides, which require additional control measures. In addition, the overuse of pesticides has led to the development of undesirable problems, such as the destruction of natural enemies, the revitalization of pests, and the failure of control strategies that have led to the emergence of pests. Under such conditions, mulching coverage is an effective method of vector-vector control to control yield losses. It also helps to have a good quality product.

OBJECTIVES OF MULCHING

- Mulches are used for a variety of purposes but water conservation and soil erosion control are the most important targets for their agricultural use in arid regions.
- Other reasons for high use of fertilizers include changes in soil temperature, soil conservation, nutrient supplementation, soil structure improvement, weed control and crop quality control.

TYPES OF MULCHING-

1. Organic mulches
2. Inorganic mulches

1. ORGANIC MULCHES

- The use of plant and animal residues to protect the surface of the soil and provide a good environment for plant growth.
- Organic mulches decompose over time and returning nutrients to the soil.
- Organic mulches, such as straw, leaves, manure or sawdust.

Types of Organic mulches

- Paper mulch
- Dry leaf
- Saw dust
- Straw mulch
- Dry coconut husk
- Dry grass
- Water hyacinth mulch

Paper mulch:

- Shredded and whole papers are used.
- Apply two or three layers of paper at a time and cover with a living thing like leaf mulch or pieces of grass to hold it.

Dry leaves mulch:

- Leaves work best if shredded before applying as mulch.
- Example- Sugarcane or banana leaves and other leaves.
- Readily available and inexpensive.

Sawdust mulch:

- It can decompose at fast rate and compact upon itself but that need higher nitrogen to decompose.
- Sawdust is applied after treated against termite.

Straw and hay mulch:

- Good for winter protection.
- If use in summer, be sure to add extra nitrogen to the soil.
- Example- paddy straw

2. INORGANIC MULCHES

- Inorganic mulches are generally used to create barriers to weeds.
- These are also used for decorative purposes.
- Inorganic mulch, such as rocks or gravel and plastic films does not readily decompose

Types of Inorganic Mulches-

Basically, there are two types of mulches depending upon material used as material. They are as under-

1. Plastic mulches-

By proper selection of plastic mulch composition- colour and thickness, it possible to control the soil environment.

a). Black plastic mulch:

- Black plastic film does not allow sunlight to pass through the ground. Therefore, photosynthesis does not occur in the soil in the absence of sunlight under a dark film. Therefore, arrest weed growth.
- A black plastic cover helps to conserve moisture and control weed growth. However, it can increase soil temperature.
- It provides early harvest for 7-14 days.
- It also helps to increase yields especially for leafy vegetables.

b). Clear and transparent plastic mulch:

- Let sunlight pass through and grow weeds, however, by using an herbicide coating on the inner side, weed growth can be checked.
- It is very effective as a solar-reinforcing film to kill germs in the soil to reduce soil-borne diseases and other weeds. This is an application for growing a nursery by planting sun beds before sowing seeds to grow a nursery, which provides almost 100% germination and a disease-free nursery.
- Film Invisible film works in hilly areas to increase soil temperature in cold winter weather.

c). Two side colour plastic mulch:

- Also known as wavelength selective/ photo selective film are designed to absorb specific wavelengths of the sun radiation, which change the spectrum of the sunlight passing through the film or being reflected back into the plant canopy.
- It had marked effect on plant growth and development.
- The effects are warming of soil temperature and suppress weed growth.
- Examples-

  yellow/ black,
  white/ black,
  silver/ black,
  red/ black

Red/black mulch:

- Partially translucent allowing radiation to pass through & warm soil but also reflect radiation back into plant canopy changing the ratio of R:FR light, which results in changes in plant vegetative, flower development & metabolism to early fruiting and increased yield.
- This mulch especially used in tomato crops.
- **Yellow/black:** attract certain insects & thus act as trap for them, which prevent disease.
- **White/black:** Cool the soil.
- **Silver/black:** repels aphid and thrips.

2. Degradable mulches:

1. Photo-degradable mulch

- These mulches break down under ultraviolet light.
- The mulch contains iron and copper compounds that break down after exposure to light and degrade very slowly.

2. Bio-degradable mulch

- Get disintegrated under natural environmental condition and gets mixed in soil after mulching period.
- Mulches made of a combination of starch and biodegradable plastic.

3. Aluminum foil or Aluminum painted mulch:

- This mulch is reflecting light on the undersides of leaves may repel the aphids and thrips.
- When vector insects are repelled, transmission of viruses is also reducing.

4. Rock mulch:

- Stones do not retain moisture but conserve heat in soil.
- It is mostly used in home and kitchen garden.

Laying of mulch films:

Tractor mounted mulch laying machines have been developed and are in use.

Selection of mulch films:

The choice of color of the film depends on a specific objective such as weed control, soil temperature or cooling or disease control or improved plant growth etc. A 90 cm and 120 cm wide film is widely used.

THICKNESS OF MULCH:

Thickness of mulch should be in accordance with type & age of crops.

Mulch material	Thickness of mulching
Compost	3-4 inches
Green leaves	3-4 inches
Dry leaves	6 inches
Grass clippings	2-3 inches
Paper	3-4 sheets
Onion/ Garlic scale	2-3 inches
Plastics	
Annuals- short duration crop	20-25 micron
Biennial- medium duration crop	40-50 micron
Perennial- long duration crop	50-100 micron

CONCLUSION:

Mulching can be applied for various purposes i.e. retaining moisture, reducing soil erosion, maintaining temperature, suppressing weed growth and providing plant nutrients as the material decomposes. So finally, we can say that mulching is profitable for common farmers if this practice used in vegetable production and we get high yield with quality fruits.