



### Mulching in Vegetable Crops: Types and Benefits

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Mulching is an agricultural technique that involves placing organic or synthetic materials on the soil around plants to provide a more favorable environment for growth and production.

#### Introduction

Mulch is a layer of material applied to the surface of an area of cultivated soil or it is any material used to cover the surface of cultivated soil to protect plant roots from heat, cold, or drought, to keep fruit clean, or to control weeds. Mulches help to make more attractive, higher yielding vegetable gardens. The practice of mulching depends upon season, nature of crop grown, purpose of mulching and availability of mulching material. Mulches act as an insulating barrier between the soil and the air and thus play obvious role in moderating soil temperature. Mulches soil remains cooler in summer and comparatively warmer in the winter than the adjacent unmulched soil. The other benefits including improvement of soil physical and chemical properties, increment the soil organic matter, the suppression of weeds and insect pest's pressure may favor the cultivation.

#### Types of Mulch/Mulching Materials

There are many types of mulching materials, but they can be divided into two general categories: natural or organic mulches and synthetic. Natural mulches are materials such as leaves, straw, hay, compost, composted bark, bark chips, newspaper, grass clipping, saw dust, rice husk, onion and garlic scales, whereas, synthetic mulches are plastics, sand gravel, stones etc.

#### A. Organic mulches

Organic mulches consist of organic plant and/or animal residue or by-products. They are generally spread over the ground surface around established plants or over the entire growing area in a layer 2 to 5 inches deep. Organic mulch applied immediately after a final cultivation often suppresses later emerging weeds until the crop has passed through its minimum weed-free period. Organic mulches generally lower soil temperatures and conserve soil moisture by slowing evaporation while allowing rainfall to penetrate. Normally, organic mulch is left in the field after harvest and, as it breaks down, it helps build soil organic matter. Commonly available organic mulches include:

**Leaves:** Leaves from deciduous trees, which drop their foliage in the autumn/fall. They tend to be dry and blow around in the wind, so are often chopped or shredded before application. As they decompose they adhere to each other but also allow water and moisture to seep down to the soil surface.

**Grass clippings:** Grass clipping make excellent mulch for the vegetable garden. Apply fresh clipping in thin layers and allow each layer to dry before adding more. The clippings quickly dry down and additional layers can be added weekly. A few layers will stop weed seed germination. Do not place fresh clipping in thick piles, as they will mat, reducing water and air infiltration stink and may become hydrophobic. Do not use clipping from lawns that have been treated with herbicides or

other pesticides in the past month. A couple of sheets of newspaper may be used under the clipping to help control weeds.

**Peat moss:** Peat moss or sphagnum peat is long lasting popular as mulch. When wetted and dried, it can form a dense crust that does not allow water to soak in. When dry it can also burn, producing a smoldering fire. It is sometimes mixed with pine needles to produce mulch that is friable. It can also lower the pH of the soil surface, making it useful as mulch under acid loving plants.

**Wood chips:** Wood chips are a byproduct of the pruning of trees by arborists, utilities and parks, they are used to dispose of bulky waste. Tree branches and large stems are rather coarse after chipping and tend to be used as mulch at least three inches thick. The chips are used to conserve soil moisture, moderate soil temperature and suppress weed growth. The decay of freshly produced chips from recently living woody plants, consumes nitrate, this is often off set with a light application of a high-nitrate fertilizer. Wood chips are most often used under trees and shrubs. When used around soft stemmed plants, an unmulched zone is left around the plant stems to prevent stem rot or other possible diseases. They are often used to mulch trails, because they are readily produced with little additional cost outside of the normal disposal cost of tree maintenance. Wood chips come in various colors.

**Bark chips:** Bark chips of various grades are produced from the outer corky bark layer of timber trees. Sizes vary from thin shredded strands to large coarse blocks. The finer types are very attractive but have a large exposed surface area that leads to quicker decay. Layers two or three inches deep are usually used, bark is relatively inert and its decay does not demand soil nitrates. Bark chips are also available in various colors.

**Straw mulch/field hay:** Straw mulch or field hay are light weight and normally sold in compressed bales. They have an unkempt look and are used in vegetable gardens and as a winter covering. They are biodegradable and neutral in pH. They have good moisture retention and weed controlling properties but also are more likely to be contaminated with weed seeds. Straw mulch is also available in various colors. Weed free (seed free) straw makes excellent mulch for potatoes. The straw protects tubers growing near the surface from sunlight, so the potato plants do not have to be mounded. (When a potato tuber is exposed to sunlight, it turns green, becoming mildly poisonous.)

**Cardboard / newspaper:** Cardboard or newspaper can be used as mulch. These are best used as a base layer upon which heavier mulch such as compost is placed to prevent the lighter cardboard/newspaper layer from blowing away. By incorporating a layer of cardboard/newspaper into mulch, the quantity of heavier mulch can be reduced, whilst improving the weed suppressant and moisture retaining properties of the mulch. However, additional labour is expended when planting through a mulch containing a cardboard/newspaper layer, as holes must be cut for each plant. Sowing seed through mulches containing a cardboard/newspaper layer is impractical. Application of newspaper mulch in windy weather can be facilitated by briefly pre-soaking the newspaper in water to increase its weight.

**Composted sawdust:** Some organic mulches require changes in methods of garden fertilization. Sawdust, wood shavings, and ground corncobs are low in nitrogen. As they decompose, nitrogen is drawn from the soil, causing a shortage of nitrogen in the mulched vegetables. When it is time to side-dress, pull the mulch back from plants and apply fertilizer to the soil surface. With sawdust, compost, or bark, apply fertilizer to the mulch surface and water it in.

**Compost:** A few growers use compost as mulch, although the quantities required for effective weed suppression may not be economically feasible. Fully composted materials are used to avoid possible phytotoxicity problems. Materials that are free of seeds are ideally used, to prevent weeds introduced by the mulch.

**Onion/Garlic scale:** Onion and garlic scales are also used as mulch.

**Other organic residues:** Crop residues- especially like rice husk, cotton gin waste, groundnut hulls are used as mulch.

**Living Mulch:** Using cover crops as living mulch is a relatively recent management strategy that is currently being refined and evaluated in a wide range of vegetable. It is interplant or under sown with a main crop, and intended to serve the function of mulch, such as weed suppression and regulation of soil temperature. Examples of living much can be Velvet Bean, Subabool, Barnyard grass, White Clover, Ryegrass, etc.

### B. Synthetic mulches

Synthetic mulch like black polyethylene film is most widely used as plastic mulch. It is widely available, relatively inexpensive, and comes in various widths and lengths. Plastic mulch is laid on a prepared seedbed just before transplanting or seeding a vegetable crop through holes or slits cut into the mulch. Plastic mulches are springtime mulches. They help warm the soil, permitting early planting, promote rapid growth, provide for early harvest and provide weed control. Plastic mulches reduce loss of soil moisture and protect vegetable plant fruit and leaves from soil-borne diseases. Warm-season vegetables like cucumbers, melons, squash, tomatoes, peppers, and eggplant grow better and produce more when grown on black plastic mulch than when grown on bare soil. Transplants can be set through plastic mulch by cutting holes with a sharpened bulb planter. Use the same tool to plant seeds of widely spaced vegetables like squash and melons. While frequently used with warm-season vegetables, it can be used with cool-season vegetables like cabbage, broccoli, and cauliflower to promote early growth. It is not used with vegetables that are closely spaced in the rows.

### When to Apply Mulch

Mulches are best applied from mid- to late spring and autumn, when the soil is moist and warm. It is best to avoid applying mulches in winter and early spring as the soil is too cold, and in summer, when it will be dry. They can be applied around new plantings or to established beds and specimen plants. Some commonly used mulched materials along with practical hints on their application are mentioned here as under:

Mulch material	Thickness of mulching	Remarks
Compost	3-4 inches	Improve water retention and physical property of soil
Green leaves	3-4 inches	Chopped leaves are better
Dry leaves	6 inches	Chopped leaves are better
Grass clipping	2-3 inches	Thick layer undergoes rotting. It becomes slimy and smelly.
Bark	2-4 inches	Good for use around trees and shrubs, smaller chips are convenient to use
Wood chips	2-4 inches	Fresh wood chips are vulnerable to termite attack. Mix it with a lot of leaves and its use after composting may be beneficial.
Newspaper	¼ inch	Use text pages of newspaper which are imprinted with black ink only. Colour pages may harm the soil flora and fauna, if composted and used. Use 3-4 sheets together and cover it lightly with grass clipping, and other mulch materials, soil may be used to anchor the newspaper.
Onion/Garlic scale	2-3 inches	Cover it with soil to anchor

### How to Apply Mulch

Mulch should be applied little bit away from the plants. Beds and borders can be mulched entirely, taking care not to smother low growing plants or to pile mulches up against the stems of woody

plants. Before apply mulch, remove weeds and water thoroughly. To be effective, biodegradable mulches need to be between at least 5 cm (2 inch) and ideally 7.5cm (3 inch) thick. Lay mulches over moist soil, after removing weeds, including their roots, when the soil is not frozen

### **Benefits of Mulching**

Depending on the type of mulch used, there are many benefits of mulching including:

- Conservation of soil moisture
- Suppression of weed growth/weeds control
- Improvement in soil texture
- Regulation of soil temperature
- Encouragement of beneficial soil organisms
- Improved quality of crops to provide a barrier for edible crops coming into contact with soil and resulting rotting.
- Mulching also fertilises the soil
- Reduces evaporation
- Reduction in fertilizer losses, especially flood and furrow irrigation techniques tend to leach nitrogen and other water soluble nutrients below the root zone. Since plastic mulch techniques generally include drip irrigation, nutrient loss is kept to a minimum. Nutrients can be injected into the drip system and accurately delivered to the root zone as needed.
- Control of pest and disease
- Prevention of soil erosion
- Mulching prevents root/tuber crops such as potatoes, radishes etc. from turning green.

### **Conclusion**

The use of mulches may be recognized as an important part of crop management to reduce the application of chemicals for weed and pests control as well as to decrease need of water and even mineral fertilizers. Mulching is environment friendly application to the integrated and organic systems of vegetable production.