Naveen Shodh Sansar (An International Refereed / Peer Review Multidisciplinary Research Journal)
RNI No.- MPHIN/2013/60638, ISSN 2320-8767, E- ISSN 2394-3793, Scientific Journal Impact Factor (SJIF)- 8.054,
April to June 2026, E-Journal, Vol. I, Issue LIV (54), ISO 9001:2015 - E2024049304 (QMS)

Organic Mulching-Physical Properties and Adoption in Nimar Region

Kumud Dubey* Avinash Dube**

*MLC Govt. Girls P. G. College, Khandwa (M.P.) INDIA
** PMCoE Shri Neelkantheshwar Govt. P. G. College, Khandwa (M.P.) INDIA

Abstract: Organic mulching is a simple, effective, easily applicable agricultural practice. Organic mulching is a highly beneficial practice that support soil conservation, water saving, weed control and improved plant growth. Due to economic and environmental benefits this technique is considered as an essential practice. It is seen that it is widely used by farmers inNimar Region due to its low cost and ecofriendly nature.
Keywords: Organic Mulching, Mulch Materials, Ecofriendly.

Introduction - Agriculture is backbone of our country and economy. New technology highly affected the agriculture, with adoption of smart practices. Organic mulching is a widely adopted agricultural and horticulture practice that involves covering the soil surface with naturally available materials like straw, leaves, crop residuals, wood chips, compost etc.

The technique is used to improve soil health, conserve moisture and support sustainable farming. Layers of materials in the form of mulch act as a protective layer over the soil, reducing water evaporation and maintaining a stable soil temperature.Ondecomposing of mulch materials nutrients and organic materials added in the soil, which improve soil fertility. It reduces the need for frequent irrigation and protects plants from extreme weather conditions. Organic mulching helps prevent soil erosion caused by wind and rain. It helps healthy plant growth without relying heavily on chemical fertilizers.

Farmers of Nimar Region has also adopted organic mulching practices. As the area is with a semi-arid climate and with an average rainfall, organic mulching helps conserve soil moisture and protects crops from excessive heat.The present study is made to analyze adoption of organic mulching and physical properties of the material used for mulching as it is a cast effective and environmentally friendly technique that is essential for sustainable farming.

Technique of Organic Mulching: The technique begins with cleaning of field and irrigation if the soil is dry. Available organic materials like dry leaves, straw, gross- clippings, compost bark, farmyard manure, plant part trashes etc. collected and evenly spread on the soil surface.The mulch layer is usually applied 5-10 cm thick around crops or garden plants and trees.

As the organic material decompose with action of moisture, they add humus and nutrients to the soil. It improves soil structure and microbial activity. Mulching helps reduce evaporation, maintain soil moisture for a longer time. Mulching also regulates soil temperature.

Physical Properties of Organic Mulch: Organic mulch totally composed natural materials. Organic mulch materials vary with places to places. The physical properties include bulk density, water holding capacity, thermal conductivity, permeability, decomposition rates.

1. **Bulk density:** Bulk density refers to the mass of mulch per unit volume. Organic mulches generally have low bulk density, making them light and porous. This enhances soil actions and reduces soil compaction. Mulching significantly decreases soil bulk density while increases porosity, allowing better root penetration and gas exchange.
2. **Porosity:** Organic mulch materials contain many pore spaces that allow air and water movement. High porosity in soil improves aeration which promote healthy root growth. It also helps in retaining moisture by reducing evaporation from the soil surface. It also provides suitable conditions for the microbe's growth.
3. **Water Holding Capacity:** Organic materials can absorb and retain large amount of water. Dry grasses, straw and compost can hold moisture for a long time, helping plants survival during dry periods. It helps in conserve water, prevents rapid runoff and increases water infiltration in to the soil.
4. **Texture:** Components of mulch may vary in texture. It may be coarse or fine. Texture influences water infiltration, aeration and the ability of mulch to suppress weeds. Fine mulches breakdown quickly and improves soil structure faster, while coarse mulches allow better air circulation.
5. **Thermal Properties:**organic mulches act as insulating

materials that moderate soil temperature. It helps to keep soil cool in hot weather by reducing direct sunlight, and in winter it helps to keep soil warmth, protect plant root system from cold injury. The thermal property creates a stable environment for microbial activitiesand for seed germination.

6. Surface Reflectivity: Dark coloured mulches absorb more solar radiation and warm the soil faster, while light-coloured mulches reflect sunlight and keep the light cooler. The colour of mulch therefore affects plant growth and seasonal soil management practices. For example, dark compost may increase soil temperature in cooler climate and straw mulch helps in reducing heat buildup in tropical regions. Light blocking ability of mulches are highly effective in controlling weed growth via reducing the germination of weed seeds, because a thick mulch layer prevents sunlight from reaching the seeds.

Benefits of Organic Mulching: Farmers have practical mulching for centuries because of its numerous advantages. Common organic mulching materials includes straw and hay, dry leaves, bark, wood chips, compost, saw dust, crop residues, dry grasses, husk etc. The layer with these materials acts as a protective layer between the soil and the atmosphere. There are many advantages of using organic mulching, some of which are:

a) Soil Structure Improvement: As organic matter decomposes, it binds soil particles and increase soil porosity, It also prevents soil hardening. The structure of soil support healthy root growth and increases the ability of plants to absorb water and nutrients more efficiently.

b) Soil Moisture Prevention: The mulch layer reduces evaporation from the soil surface by blocking direct sunlight and wind exposure. So, soil can retain water for a larger time,irrigationrequirement become less. Soil moisture conservation improve plant growth.

c) Weed Control: The mulch blocks sunlight to reach in soil so prevents seed germination of weed plants. Crop face less competition for nutrients, water and space.

d) Soil Fertility: As organic mulches decompose; it adds humus and nutrients to the soil. Microbes and earthworms also develop in the soil.

Present scenerio in Nimar Region: The Nimar Region of Madhya Pradesh is predominating a rainfed agricultural area where Soyabean, Cotton, Wheat, Maize and Pulses are major crops. The area with an average rainfall of 910 mm. In recent years the adoption of organic mulching has emerged as an important component of sustainable and organic farming systemsin the region.

Farmers of the area are increasingly recognizing the ecological, economic and agronomic benefits of mulching. Farmers have reported that mulched fields retain moisture for longer periods. Farmers also observed improvement in soil fertility and crop yield quality after using crop residues and biomass as mulch.

The role of farmer training and extension services has been crucial in promoting mulching practices in the region. The adoption pattern in the area also varies as the areas where better availability of biomass has higher acceptance of mulching practices. It means local resource availability strongly influences the success of organic mulching adoption.

Limited availability of biomassfor mulching become limitation for adoption. Crop residues are mostly used as fodder for cattle. Availability of labour, lack of awareness and technical knowledge among farmers also limits adoption of rates.

Concluding Remarks: Organic mulching makesuse of agricultural waste and biodegradable materials. By recycling these materials mulching reduces environmental pollution and support sustainable farming. Mulch materials are having unique features which make organic mulching ecofriendly.

References:-

1. Mairata A. etal.(2024), Organic mulching versessoil conservational practices in Vineyards. A comprehensive study on plant physiology. Agronomic and Grape quality effects, Agronomy, Vol.14 (10), 2014.
2. Md. Mollah etal. (2025), Potential organic Mulches for Sustainable Agricultural Production and Improving Soil Environment, Int. Journal of Environmental Sciences, Vol 11 (8).
3. Parida PK etal (2023), Effect of organic mulches on yield water Productivity and economy of gardens pea cultivators, International Journal of Environment and Climate Change, Vol 13(8), pp 1773-1783.
4. Rossi G. etal. (2024), Organic Mulching: A sustainable Technique to Improve soil quality, Sustainability, Vol.16(23) , pp 1-11
5. Solanki S & Singh GS (2025), Effect of different types of organic mulches on growth and yield of Turmeric, Journal of Advances in Biology and Biotechnology, Vol.28(10), pp 1623-1628.
6. Vanella etal (2025), Effect of organic Mulching and regulated deficit irrigation on crop water status, soil and yield features in an arrange arched under Mediterranean climate, Science of the total environment, Vol. 958 (1).
7. Zhang P. etal. (2023), Effect of organic mulching on moisture and temperature of soil in green house production of tomato under unheated greenhouse cultivation in the cold zone of china, Food Science and Nutrition, Vol. 11 (8), pp 4829-4842.

****