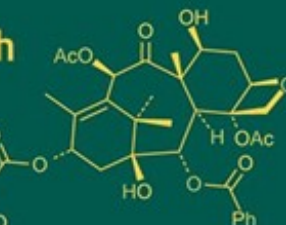


International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
ISSN Online: 2617-4707
NAAS Rating (2026): 5.29
Indexing: Embase
IJABR 2026; SP-10(9): 1915-1918
www.biochemjournal.com
Received: 16-06-2026
Accepted: 09-08-2026
Published: 23-09-2026

SD Magar

Assistant Professor,
Department of Horticulture,
MPKV., Rahuri (M.S.), India

AV Kshirsagar

Assistant Professor,
Department of Horticulture,
MPKV., Rahuri (M.S.), India

VR Pawar

Junior Research Assistant,
Department of Horticulture,
MPKV., Rahuri (M.S.), India

PD Dalve

Horticulturist, AICRP on Fig
and Custrda apple,
Jadhavwadi, Purandar, Pune,
Maharashtra, India

Effect of different mulching material on growth, yield and quality attributes of strawberry: A review

SD Magar¹, AV Kshirsagar², VR Pawar³, PD Dalve⁴

DOI: <https://www.doi.org/10.33545/26174693.2026.v10.i9Sx.10126>

ABSTRACT

Mulching is a horticultural and agricultural practise that involves the use of organic materials. This approach is highly useful for protecting plant roots from heat and cold. Mulch is applied to the soil surface surrounding plants to produce a favourable environment for growth. A search for materials to improve various factors like yield, quality, fruit size, etc been pushed by the need to increase food production while improving the quality of our environment, improved nutrient availability, suppression in number and growth of weeds, protection from frost injury. This study provides an overview of research and development related to the use of various types of mulch materials in strawberry production to increase the growth, yield and quality attributes. Mulch paper lowers the need of chemical fertilizers and herbicides, as well as weed control and maintaining the temperature of the ground. This article summarises the research on mulches that has been published and explores the possibilities for them to solve the problem in agriculture.

Keywords: Mulching, Strawberry cultivars, Plastic mulch, Plant Growth and yield

Introduction: Strawberry (*Fragaria × ananassa* Duch.) is one of the most important temperate fruits which can also be grown in tropical and sub-tropical climates with limited effort. It is very much liked for its attractive shape, distinct pleasant aroma and refreshing nature (Ali *et al.*, 2007) [1]. Strawberry is amongst the few crops, which give quick and very high returns per unit area on the capital investment, as the crop is ready for harvesting within six months of planting. It is an important soft fruit after grapes and being preferred by people around the world due to its attractive colour, pleasant flavor and aroma. Botanically strawberry fruit is termed an aggregate fruit called etaerio of achenes. It requires a well-drained medium loam soil, rich in organic matter. Soil should be slightly acidic with pH of 5.7-6.5. Temperate climate is ideal for strawberry cultivation. Generally, between 10-25 °C temperature is supportive for this crop. Retentive power of flower commences at minimum of 15 °C and it is sluggish after more than 37 °C. The area and production of strawberry in the world have increased logarithmically during the last two decades as much of the crop is being grown under protected structures. In India, strawberry is cultivated on a commercial scale in the states of Maharashtra, Punjab, Haryana, Delhi, parts of Himachal Pradesh, Jammu & Kashmir, Uttarakhand, Uttar Pradesh, West Bengal (Darjeeling hills) and Rajasthan (Rana *et al.*, 2003) [2]. Currently in India total area under strawberry is 3000Ha and 14000 MT production (Anonymous, 2022) [3]. Maharashtra is the largest strawberry producing state in India, accounts for 85% of the total production. Satara districts famous for the country's 85% strawberry production. The fruits are grown mainly in Mahabaleshwar, Wai and Panchagani areas. In recent years, strawberry is being cultivated successfully in plains of Maharashtra around Pune, Nashik and Sangali towns.

Strawberry is a small fruit crop of great nutritional and medicinal value. Scientifically strawberry is said to be an aggregate fruit as it is derived from receptacles rather than the plant ovary. The achenes (apparent seed) which occurs on the fruit surface is basically the ovaries of the flower with seed inside it. It is rich source of vitamin A, B, C, niacin and minerals like phosphorus, potassium, calcium and iron and has a tantalizing flavour and aroma. Mulching is an important cultural practice followed in strawberry. Besides conserving soil moisture, mulching also improves growth and fruit quality of strawberry (Hassan *et al.*, 2000) [4]. Different types of organic and inorganic mulches are used. Organic mulches are derived from plant and animal materials. The most frequently used organic mulches include plant residues such as straw, hay, peanut hulls, leaf mold compost, wood products such as sawdust, wood chips and shavings, and animal manures. Polythene mulches play a vital role in strawberry cultivation as it helps in conserving moisture, controlling weeds.

Mulch is any material used to cover the surface of garden soil. Mulching has a strong influence on yield, quality and duration of harvesting which is due to improved nutrient availability, suppression in number and growth of weeds, protection from frost injury and reduction in number of dirty and diseased berries (Sharma *et al.*, 2004) [5]. Mulching can also improve water and nitrogen efficiency. As a result, mulching can improve

Corresponding Author:**SD Magar**

Assistant Professor,
Department of
Horticulture, MPKV.,
Rahuri (M.S.), India

crop yields, especially in arid and semi-arid areas where land is less fertile and water supply is limited. To protect the strawberry crop from adverse weather conditions, sheltered cultivation under a poly-house or poly-tunnel is a better option.

Importance of mulching in strawberry

Mulching is an important cultural practice for growing strawberries. Polyethylene mulch plays an important role in planting strawberries because they help retain moisture, kill weeds, regulate hydrothermal regimes and protect dangerous fruits from direct contact with the soil. Mulching can reduce soil evaporation and increase yield by increasing water efficiency. Currently, the use of black polyethylene plates for mulching strawberries is common practice. Various researchers have also used different colour plastic mulches, saying they have improved crop yields and quality. Plastic mulches also directly affect the microclimate around the plant by modifying the radiation budget and decreasing the soil water loss. It enhances crop production by increasing fruit quality, gross yield, and earlier production. Mulching can also improve water and nitrogen efficiency. As a result, mulching can improve crop yields, especially in arid and semi-arid areas where land is less fertile and water supply is limited. Plastic mulches influence plant microclimate by adjusting the dirt energy balance and limiting soil water vanishing influencing plant development and yield.

Types of mulches use in strawberry production

Organic mulches

Organic mulches are those derived from plant and animal materials. Those most frequently used include plant residues such as straw, hay, peanut hulls, leaf mold and compost, wood products such as sawdust, wood chips and shavings and animal manures. Organic mulches such as straw-vetch providing environmental benefits such as increased nitrogen, recycling of nutrients, weed emergence, reduced of soil erosion, addition organic matter to the soil, reducing soil temperature during hot summer days and acting as a slow-released fertilizer (Abdul-Baki *et al.*, 1993) [6].

i. Straw mulch

Straw mulch is, of course, the classic mulch for strawberry plants. A 1"-2" thick layer of clean straw will keep weeds down and hold strawberries up off the soil. straw is a byproduct of grain farming. The straw itself is the stalk of grain plants like wheat, oats, or barley that's left over once the grain is removed. The stalks of legume plants like soybeans can also be used as a straw. Straw is available in bales or in smaller bags at garden center. Choose seed-free straw instead of a hay product whenever possible. Hay contains seeds that easily germinate in strawberry beds, defeating the purpose of mulching to deter weedy plant growth. True straw should be free of seeds.

ii. Pine needle mulch

Pine needles, also called pine straw, are a proper mulch for strawberries and slightly increase the acidity of the soil as they decompose. They are an ideal alternative to plastic mulch for strawberry patches with slug problems. As with grain straw, a 1"-2" thick layer of pine needles makes an excellent mulch for the berry patch. Pine needle mulch lies flat, doesn't blow away in the wind, and dries quickly after a rain or heavy morning dew. It also has a slightly darker colour than most straws, helping it to match the rest of the garden better in the spring months before the strawberry foliage has really taken off.

iii. Shredded leaves

Shredded leaves can be used as a growing season mulch for strawberries (where available). As with grass clippings, shredded leaves do best as mulch when dried out a bit before use. They also tend to mat together better when applied in thin layers rather than being dumped on all at once. Use a [mulching lawn mower with a bag](#) to shred and collect leaves on the lawn, or choose a [powerful leaf shredder vacuum](#) for collecting and mulching leaves in garden beds.

Inorganic mulch

Inorganic mulch includes plastic mulch and accounts for the greatest volume of mulch used in commercial crop production. The plastic materials used as mulch are poly vinyl chloride or polyethylene films. Owing to its greater permeability to long wave radiation it can increase temperature around the plants during night in winter. Plastic mulch helps prevent soil water loss during dry years and sheds excessive water away from the crop root zone during periods of excessive rain fall.

i. Black plastic mulch

Black plastic mulch is the most available and most used of others. It absorbs efficiently UV (Ultraviolet), visible, and infrared wavelengths of solar radiation released from the sun. It showed significant impact in increasing soil heat by absorbing high amount of radiation. (Lamont, 2017) [7]. Black plastic mulch used to increase light and temperature absorption, white to reflect, and clear one to produce large heat. (Sonkar *et al.*, 2012) [8].

ii. Red plastic sheet

Red plastic mulch is the most efficient in absorbing global solar radiation than black, blue, green, and yellow plastic mulches. Based on the order of global solar radiation transmittance, black < blue < yellow < green < red < transparent plastic mulches (Alkayssi *et al.*, 1991) [9].

Red plastic mulch treatments were found to be the most effective in terms of fruit growth, weight, and yield. Comparing red plastic mulch to other mulching treatments, the yield is increased dramatically. Red plastic mulch had the highest yield (11.4 tonnes/ha), followed by black plastic mulch (9.3 tonnes/ha), which had a greater yield than the control (Mann *et al.*, 2017) [10].

iii. Yellow plastic mulch

Yellow strawberry mulch provided better moisture conservation, optimum soil temperature and nutrient supply in weed -free plots during fruit development in strawberry. Yellow plastic mulch significantly increased number of fruits, effected early and higher total yield compared to black or silver-over-purple plastic mulches. Un-mulched bed produced lowest yield and fruit quality (Shylla *et al.*, 2010) [11].

Effect of mulching on crop growth and yield

Under polyhouse conditions, maximum and earliest yields were observed under yellow polythene mulch, while, better quality fruits were obtained under black polythene mulch. Till date, strawberry cultivation in the mid-hill zone of Himachal Pradesh is practiced only in open fields where bulk of the fruit production usually occurs in April-May, fetching a low price in the market. Hence, results obtained in the present trial offer a possibility of producing off-season, good quality strawberry under polyhouse during winter months in the mid-hill zone of Himachal Pradesh. This can fetch a better price and prove to be highly remunerative to strawberry farmers (Shylla *et al.*, 2010) [11]. Coloured plastic mulches (black, red and yellow) significantly increased the growth of strawberry plants as compared to control. Red and yellow plastic mulches significantly extended the duration of flowering and fruiting and improved the fruit set. Though red and yellow plastic mulches increased fruit yields, fruit size, weight and improved fruit chemical composition, but red plastic mulch was found to be most effective for increasing yield and improving fruit quality of strawberry under protected cultivation (Sharma *et al.*, 2013) [12]. Black polythene mulch resulted in maximum growth, yield and quality as well as reduction in weed population. The highest yield per plant was observed under black mulch with a yield of 143.38g per plant followed by transparent mulch 115.20g and control with a yield of 60.22g per plant which was lower than that of saw dust and paddy straw 82.58g and 98.73g respectively (Bakshi *et al.*, 2014) [13]. Transparent polythene mulch, black polythene mulch, leaf mulch and paper mulch etc. significantly affected the growth of strawberry plants with respect to different plant growth parameters like plant

height, number of leaves, leaf size, canopy diameter etc. Highest plant height, greater plant canopy, higher leaf size has been observed under transparent polythene mulch. Thus, transparent polythene mulch may be used for better vegetative growth of strawberry (cv. *Tioga*) under Red and Lateritic zone of West Bengal (Deb *et al.*, 2014) [14]. Maximum single fruit weight 13.66g was recorded for the saw dust mulch, maximum fruit diameter 3.83 cm was noted for saw dust mulch, followed by the 3.56 cm for the pine needle mulch, maximum number of fruit plant⁻¹ 24.60 was observed for the saw dust mulch, followed by the 19.80 for the pine needle mulch and the highest total yield 4.01 t ha⁻¹ was recorded for the saw dust mulch, followed by 3.28 t ha⁻¹ noted for the pine needle mulch. From the experiment it is concluded that strawberry crop mulched by straw dust gave maximum fruit size and yield under the agro-climatic conditions of Baffa, Mansehra, hence recommended for the said area for increase in the production of strawberry (Rehman *et al.*, 2015) [15]. Different mulches differed in their soil warming ability during the study. Among the different mulches used, mean RZT (Root Zone Temperature) was highest under black polythene mulch and lowest in bare soil. Plants mulched with black polythene had better growth than other mulched used. It attributed to better soil hydrothermal regimes, better moisture conservation and suppression of weeds (Pandey *et al.*, 2015) [16]. Grass mulch proved to be more suitable for improving in the studied parameters such as number of buds, growth of runners, flower development etc. However, grass mulch produced the highest weight of fruits also, showed that mulches help in water conservation in strawberry production, the mulches promote increase in plant growth, which is reflected in the yields thus mulches should be used for better strawberry yields (Aprodisia *et al.*, 2018) [17]. Black polythene mulch had the best results in terms of yield, quality and growth of strawberry cv. Winter Dawn. So, black polythene mulch may be recommended under protected condition for strawberry cultivation (Kumar *et al.*, 2018) [18]. Green mulch increased 'fruit set %,' 'yield per plant,' 'fruit weight,' 'fruit length,' 'fruit girth,' and 'fruit shape index' among the other mulching treatments. The improvement in certain yield parameters was linked to the plant's correct growth and development, which was reflected in yield regimes. The highest number of fruits per plant was observed under silver mulch with a yield of 254.04 g/per plant followed by red mulch 207.17 g/per plant and followed by yield of black mulch 203.63 g/plant (Singh *et al.*, 2018) [19]. Maximum number of flower (43.2) and fruit formation (38.5) were obtained with black polythene mulch (T8). Also, highest record of fruit length (4.23 cm), fruit width (3.52 cm) and runner formation (6.8 nos.) were again obtained in black polythene mulch (T8) along with maximum fruit weight (20.24 g)(Ngente *et al.*, 2021) [20]. Highest yield has been observed under black polythene mulch (Treatment T₁₁). Thus, black polythene mulch may be used for obtaining better yield and quality fruits of strawberry (cv. Winter Dawn) under Prayagraj region of U.P. (Singh *et al.*, 2023) [21]

Effect of mulching on quality parameters of strawberry

TSS

Highest soluble solids were produced under black polythene (7.63) followed by cut grass (7.30) and was lowest in control (6.67) (Bakshi *et al.*, 2014) [13]. Fruits treated with black polythene which gave us the highest total soluble solids (7.30), followed by other treatment with sawdust (6.65) and was seen lowest under control (5.38) (Kumar *et al.*, 2018) [18]. Fruits were treated with black polythene and FYM which gave us the highest total soluble solids (11.167), followed by other treatment with black polythene and vermicompost (10.00) (Singh *et al.*, 2022).

Acidity

Highest acidity was reported under control (0.80) followed by black plastic (0.82) and was found lowest in red plastic mulch (0.72) (Bakshi *et al.*, 2014) [13]. Sharma *et al.* (2015) reported that the high-

est acidity was reported under control (0.85) followed by black plastic (0.82) and was found lowest in red plastic mulch (0.72).

Ascorbic acid

Kumar *et al.* (2018) [18] reported that the highest ascorbic acid was found in black mulch (41.68) followed by saw dust (39.00) and was lowest under control (32.90).

Total sugar

Mann *et al.* (2017) [10] the highest levels of total sugar were found in the treatments using red plastic mulch (7.46) in which reducing sugar (2.55) and non-reducing (5.64) and was recorded lowest under control (6.24) with reducing sugar (1.98) and non reducing (4.16).

Sujatha *et al.* (2018) [22]. Investigated that the effect of different mulching materials on quality of strawberry cv. Camarosa and the treatments comprised of coconut husk, black polyethylene, paddy straw, card board sheets, dried banana leaves, paddy husk, silver polyethylene and no mulch (Control). Among the treatments paddy straw recorded maximum TSS (8.83 °Brix), juice % (83.05 %), specific gravity (1.15 g/cm³), vitamin-C content (58.88 mg/100g), total sugars (9.50 %) and minimum physiological loss in weight (13.5% at 1 DAH and 25.30% at 2 DAH), titrable acidity (0.61 %) and very less Albinism disorder (0.28%) as compared to other mulching treatments and control.

Conclusion

From the above cited information regarding the use of mulches in strawberry crop, it may be concluded that the different kinds of mulches were useful in altering the hydrothermal regime of the soil and provide favourable soil environment for plant growth. However, black polythene mulch was more pronounced for altering soil environment than all the other mulches. It significantly enhanced plant height, plant spread, number of leaves, number of fruits and increases yield per plant. It was also observed that maximum anthocyanin content and maximum TSS was observed in black polythene mulch.

References

1. Ali A, Gaur GS. Effect of mulching on growth, fruit yield and quality of strawberry (*Fragaria x ananassa*). Asian J Hort. 2007;2(11):149-151.
2. Rana RK, Chandel JS. Effect of bio-fertilizer and nitrogen on growth, yield and fruit quality of strawberry. Prog. Hort. 2003;35(1):23-30.
3. Anonymous. National Horticultural Board, database. (2nd advance estimate). Ministry of Agriculture, Government of India. 2022.
4. Hassan GI, Godara AK, Kumar J, Huchehe AD. Effect of different mulches on yield and quality of 'Oso Grande' strawberry. Indian J Agric. Sci. 2000;70:184-185.
5. Sharma RR, Sharma VP. The strawberry. ICAR, New Delhi, India; 2004.
6. Abdul-Baki AA, Teasdale JR. A no-tillage tomato production system using hairy vetch and subterranean clover mulches. Hort Science: A publication of the American Society for Horticultural Science (USA). 1993.
7. Lamont WJ. Plastic mulches for the production of vegetable crops. A Guid to Manuf Performance. Potential Plast Agric. Brussels: Plastics Europe (PEMRG). 2017.
8. Sonkar P, Ram RB, Meena ML. Effect of various mulch material and spacing on growth, yield and quality of strawberry. Hort Flora Research Spectrum. 2012;1(4):323-7.
9. Alkayssi AW, Alkaraghoul AA. Influence of different colour plastic mulches used for soil solarization on the effectiveness of soil heating. Soil solarization (Eds JE Vay, JJ Staplet CL Elmore). FAO Plant Prod Prot Pap. 1991;109:297-308.

10. Mann AS, Kachwaya DS, Kuchi VS, Vikas G, Kumar S, Raturi HC. Effect of different types of mulches on growth, yield and fruit quality of strawberry (*Fragaria* × *ananassa* Duch.). *Progressive Horticulture*. 2017;12(3):2047-2049.
11. Shylla B, Sharma CL. Evaluation of mulch colour for enhancing winter-strawberry production under polyhouse in mid-hills of Himachal Pradesh. *J. Hortl. Sci.* 2010;5(1):34-37.
12. Sharma NC, Sharma SD, Spehia RS. effect of plastic mulch colour on growth, fruiting and fruit quality of strawberry under polyhouse cultivation. *International Journal of Bio-resource and Stress Management*. 2013;4(2):314-316.
13. Bakshi P, Bhat DJ, Wali VK, Sharma A, Iqbal M. Growth, yield and quality of strawberry (*Fragaria* x *Ananassa*Duch.) Cv. Chandler as influenced by various mulching materials. *African Journal of Agricultural Research*. 2014;7:701-6.
14. Deb P, Sangma DK, Prasad BVG, Bhowmick N, Dey K. Effect of different mulches on vegetative growth of strawberry (cv. *Tioga*) under Red and Lateritic zone of West Bengal. *International Journal of Basic and Applied Biology*. 2014;2(2):77-80.
15. Rehman A, Zakaria MSK, Malik AA, Shahid AAM. The effect of different mulching material on the fruit size and yield of the strawberry under the agro-climatic condition of Mansehra. *Journal of Natural Sciences Research*. 2015;5(11):106-108.
16. Pandey S, Tewari GS, Singh J, Rajpurohit D, Kumar G. Efficacy of mulches on Soil modification, growth, production and quality of Strawberry (*Fragaria* x *ananassa* Duch.). *Int. J. Sci. and Nat.* 2015;7(4):813-820.
17. Aprodisia K, Maina M. Effects of Grass and Plastic Mulch on Growth and Yield of Strawberries (*Fragaria* x *ananassa*) in Kiambu County, Kenya. *Journal of Animal & Plant Sciences*. 2018;38(1):6129-6137.
18. Kumar S, Sarkar T, Sarkar SK. Influence of mulching materials on strawberry grown under protected condition. *Journal of Crop and Weed*. 2018;14(1):58-63.
19. Singh A, Senthilkumar S, Sharma M, Singh SK. Impact of mulching and planting density on phenology, yield and fruiting characters of strawberry (*Fragaria* × *ananassa* duch.) Cv. Winter dawn. *Plant Archives*. 2018;18(2):1899-1904.
20. Ngente V, Khawlhling C, Vanlalngurzaauva T. Utilization of different mulch materials on strawberry (*Fragaria* x *Ananassa* Dutch.) cultivation under open condition in Mizoram. *J Krishi Vigyan*. 2021;9(2):245-250.
21. Singh A, Prasad VM, Bahadur V, Mishra S, Kumar A, Jain S. Effect of various mulching material on yield and yield attributes of strawberry (*Fragaria* x *ananassa* Duch.) cv. Winter Dawn. *The Pharma Innovation Journal*. 2023;12(7):1270-1274.
22. Sujatha S, Suchitra V, Swami DV, Subbaramamma P, Uma Krishna K, Saravanan L. Influence of mulching materials on fruit quality of strawberry (*Fragaria ananassa* Duch.) cv. Camarosa grown under shade net conditions of coastal Andhra Pradesh. *Internat. J. agric. Sci.* 2018;14(1):128-132.

How to cite this article: Magar S, Kshirsagar A, Pawar V, Dalve P. Effect of different mulching material on growth, yield and quality attributes of strawberry: A review. *International Journal of Advanced Biochemistry Research*. 2026;SP-10(9):1915-1918. doi: <https://www.doi.org/10.33545/26174693.2026.v10.i9Sx.10126>