

Effect of Different Mulching on Growth, Yield and Quality of Bottle Gourd

Sukhpal Kaur

Research Scholar M.Sc Agriculture Doon PG College Dehradun, India

Abstract

The research investigation entitled, "The affect mulching on yield and quality of bottle gourd [*Lagenaria siceraria* (Mol) Standl]" was conducted at the Department of Vegetable crops, Baba farid college Bathinda 2015- 2016. The experiment was conducted to standardize the date of planting of bottle gourd to get early and high yield. The experiment comprised of three main plot treatments and six sub-plot treatments. Main plot treatments comprised three mulch applications: black polythene mulch (M₁), straw mulch (M₂) and Transparent mulch (M₃) and M₄ (Control). sub-plot treatments comprised tow different varieties of bottle gourd (V₁)punjab long 1997 and (V₂)Punjab komal 1988 The experiment was conducted in split plot design replicated thrice. The information were recorded in regard to different parameters of development, yield and quality for example vine length (m), number of branches per plant, number of organic products per plant, normal natural product weight (g), days taken to bloom inception, early natural product yield (q/air conditioning), all out natural product yield (q/air conditioning) dry issue content (%) and mineral substance (%) and dissected measurably. With remunerating conceivable outcomes of mulching in upgrading crop development, present examinations were done in summer squash to research the impact of mulching on development, yield and quality parameters in various assortments.

Introduction

Mulch application can impact the development of heat increasing or decreasing it, depend on colour. Mulching reduce weed population, increase soil retention and soil moisture, modify soil temperature making it conducive for growth of crop, prevents soil erosion. Plastic mulch can be spread before planting and covers the row for a width of 1.0 m or more intervals, small openings are made in the plastic to permit the insertion of seed into the soil. The plastic mulch should be spread when adequate moisture is available in the hills (Robinson and Walters 1999).Beneficial effects provided by mulches to plants vary with the material used, the type of soil, the kind of plant and the cultural practices used. The plant growth under polythene mulch exhibited better vegetative growth, advanced and increased the yield as compared to control (Minghua *et al* 2000). Thus, production per unit area can be increased to a great extent by doing protected cultivation. Also, crop can be taken over a wide period of time as compared to normal season (Anonymous 1985).

This low cost technology for offseason cultivation of cucurbits is suitable and may be quite cost effective for the growers in northern parts of the country, where the night temperature during winter season goes below 8°C for a period of 30 to 40 days (Mackroth 1996)

India share 14.78% generation of squashes, pumpkins and gourds to universes absolute creation and stands at second position after China (22.83%) (Anonymous, 2016). Notwithstanding having apparent generation, efficiency is extremely low in India which is a noteworthy worry in business development of summer squash and the principle factors contributing towards low profitability are weeds invasion, creepy crawlies, bugs and dampness stress. To battle every one of these issues in ecofriendly way, mulching offers remunerating conceivable outcomes as utilization of escalated compound estimates prompts aggravation of environmental equalization. Covering of soil with various mulch materials is an effective strategy for soil and water protection alongside weed the executives (Bobby et al., 2017). Plastic mulches are received on substantial scale in business vegetable generation because of their extensive scale impacts in increasing higher yield with better quality which may be because of diminished water dissipation, expanded soil temperatures, less weed invasion (Coolong, 2010 and Gordon et al., 2008). Dark plastic mulch is compelling in expanding soil temperature (Mahadeen, 2014) and in this way improved the yield of summer squash by 74% over control (Bhatt et al., 2011) and straightforward mulch helps in soil solarisation by expanding soil temperature that lead to yield increase of 25-28% in melon crop over control (Patil et al., 2013; Ekinci and Dursun, 2009). Daylight can go through the straightforward mulch so weeds can develop under them and should be constrained by splashing appropriate herbicide before applying mulching (Anonymous, 2011). Then again, natural mulches when connected to soil in thick layer increment the dampness content and lessen the weed populace yet when it is utilized in vegetable harvests amid warm season, it demonstrates the unfavorable impacts on development and yield (Coolong, 2012). In this way, relating to the need of advancing the jug gourd because of its better supplement arrangement and significant vegetable source, present examinations were arranged and completed with the goals of assessing the effect of various mulch materials on development and yield of container gourd and to survey the varietal execution under various mulch routines. Materials and Methods The experiment conducted The research investigation entitled, "The affect of time of sowing and mulching on yield and quality of bottle gourd [*Lagenaria siceraria* (Mol) Standl]" was conducted at the Department of Vegetable crops, Baba farid college Bathinda 2015-2016. The experiment was conducted to standardize the date of planting of bottle gourd to get early and high yield. The experiment comprised of three main plot treatments and six sub-plot treatments. Main plot treatments comprised three mulch applications: black polythene mulch (M₁), straw mulch (M₂) and without mulch (M₃) (Control) M₄. and tow variety of bottle gourd (V₁)punjab long 1997 and (V₂)Punjab komal 1988 The experiment was conducted in split plot design replicated thrice. The data were recorded in respect to various parameters of growth, yield and quality i.e. vine length (m), number of branches per plant, number of fruits per plant, average fruit weight (g), days taken to flower initiation, early fruit yield (q/ac), total fruit yield (q/ac) dry matter content (%) and mineral content (%) and analyzed statistically..

Results and Discussions

The discoveries of the present investigation showed that diverse sorts of mulching materials had huge outcomes on the container gourd (V₁)punjab long 1997 and (V₂)Punjab komal 1988 development parameters of jug gourd viz., rise rate, plant stature and number of leaves per plant. Among various mulch medications, M₂ (Transparent

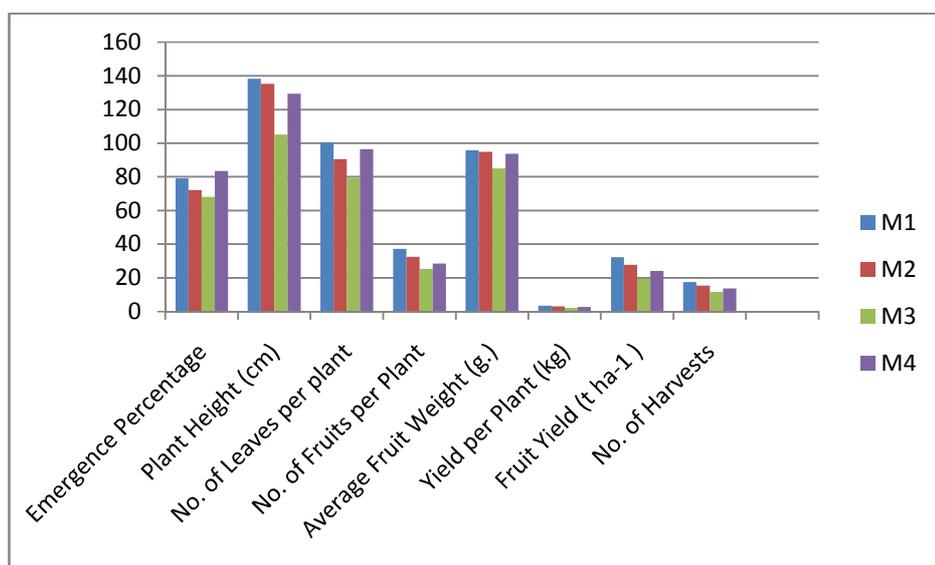
Mulch) brought about greatest rise (83.33%), While the plant stature (138.22 cm) and number of leaves per plant (100.42) were recorded most noteworthy in M1 (Black Plastic Mulch). All the development parameters are predominant under dark plastic mulch aside from rise rate that is most astounding under M2 (Transparent Mulch) yet observed to be factually at standard with M1 (Black Plastic Mulch) (79.12%) and M2 (Blue Plastic Mulch) (72.22%), though all the development parameters were recorded least in M4 (Control). This may be because of the plants developed under plastic mulch experienced higher soil temperature, hotter microclimate and weed free condition when contrasted with straw mulch and control, which brought about higher development of plants. Plastic mulches impede the dissipation and moderate the dirt temperature and dampness conditions that helps in better root advancement and supplement take-up by plant that eventually improves the plant development. The discoveries of present examination are in close concurrence with the discoveries of Khan et al., (2015) in wiper gourd and Bhatt et al., (2011) in summer squash.

Among the assortments, development rate (81.11%) and plant tallness (122.94 cm) were observed to be unrivaled in T1 (Punjab long), while number of leaves per plant (92.20) were recorded greatest in T2 (Punjab komal). Though development rate (68.66%), plant tallness (118.31 cm) and number of leaves per plant (86.40) in were most minimal in T1 (Punjab long). The distinction in development parameters may be because of the differential ability to ingest supplements and contrast in photosynthetic proficiency of the diverse assortments that could be credited to their hereditary cosmetics. These outcomes may be because of the hotter soil microclimate, accessible dampness, less weed pervasion under the plastic mulches than control joined with better hereditary capability of Punjab long assortment (V1) than others which reproduced in to ideal conditions for better plant development, as expressed by of Alenazi et al., (2015) in muskmelon and Andino and Motsenbocker (2004) in Bottle gourd. Mulching materials had likewise demonstrated noteworthy outcomes for different yield parameters. M1 (Black Plastic Mulch) took minimal number of days taken for first reaping (41.50 days from sowing) and gave the most noteworthy outcomes to number of organic products per plant (37.36), normal natural product weight (95.82 g), yield per plant (3.58 kg plant⁻¹), yield for each hectare (32.36 t ha⁻¹) and number of harvests (17.58) and the mediocre outcomes were gotten from the control for every one of these parameters. The outcomes got from present examination may be because of the impact of improved soil microclimate, weed free condition, low dissipation and higher dampness accessibility in root zone that helped in better supplement take-up by plant bringing about ahead of schedule and better vegetative development which at that point upgraded the photosynthesis rate and translocation of orchestrated nourishment from leaves to organic products, brought about early collecting and expanded number of natural products per plant under dark plastic mulch. These outcomes are in close concurrence with discoveries of Webber et al., (2017) and Bhatt et al., (2011) in summer squash; Khan et al., (2015) in wiper gourd.

Table 1. Effect of mulch Mulch materials on growth and yield Guard

Mulching Material	Emergence Percentage	Plant Height (cm)	No. of Leaves per plant	No. of Fruits per Plant	Average Fruit Weight (g.)	Yield per Plant (kg)	Fruit Yield (t ha ⁻¹)	No. of Harvests	TSS (°Brix)
M1	79.17	138.22	100.42	37.36	95.82	3.58	32.26	17.58	3.83
M2	72.22	135.30	90.67	32.42	94.81	3.07	27.67	15.42	3.58
M3	68.06	105.25	79.50	25.28	85.02	2.15	19.37	11.67	3.42
M4	83.33	129.30	96.25	28.58	93.83	2.68	24.13	13.67	3.33

M1: Black Plastic Mulch, M2: Rice Straw Mulch, M3: Transparent Mulch, M4: Control.



Figur No.1 grapcal represtion on Effect of Mulch Materials on Growth and Yield of Bottle guard

Table. 2 Effect of Varieties on Growth and Yield of Bottle guard

Variety	Emergence Percentage	Plant Height (cm)	No. of Leaves per plant	No. of Fruits per Plant	Average Fruit Weight (g.)	Yield per Plant (kg)	Fruit Yield (t ha ⁻¹)	No. of Harvests	TSS (°Brix)
V1	72.22	122.02	90.20	29.40	89.81	2.66	23.92	13.73	3.33
V2	81.11	122.94	89.60	31.13	93.70	2.94	26.48	14.8	3.33

v1 punjab long, V2 Punajb komal

Table.3 Effect of Mulch Materials and Variety on Growth and Yield of Bottle guard

Treatment	Emergence Percentage	Plant Height (cm)	No. of Leaves per plant	No. of Fruits per Plant	Average Fruit Weight (g.)	Yield per Plant (kg)	Fruit Yield (t ha-1)	No. of Harvests	TSS (°Brix)
M1 V1	77.78	136.54	95.67	36.11	94.83	3.43	30.84	17.33	3.67
M1 V2	88.89	146.12	113.33	40.22	98.1	3.95	35.52	19.33	4.33
M2 V1	72.22	134.21	90.00	31.11	93.92	2.92	26.28	15.00	2.33
M2 V2	77.78	140.46	101.33	34.44	97.68	3.63	30.27	16.67	3.67
M3 V1	66.67	109.49	82.33	26.22	85.97	2.26	20.31	12.00	4.00
M3 V2	77.77	102.8	68.33	26.78	89.86	2.41	21.69	12.67	2.67
M4 V1	83.33	131.34	102.67	29.78	90.37	2.69	24.21	13.67	4.33
M4 V2	94.44	125.26	93.33	29.78	98.11	2.92	26.28	14.67	3.00

Similar observations were recorded by Keerthika et al., (2016) in cucumber; Sithole et al., (2015) in bottle gourd and Ashwini (2014) in snake gourd.

The association impact of mulch materials and assortments brought about non-critical discoveries for the days taken to first reaping, while the other yield parameters viz., number of organic products per plant, normal natural product weight, yield per plant, yield ha-1 and absolute number of harvests indicated noteworthy outcomes. Number of natural products per plant (40.22), yield per plant (3.95 kg plant-1), yield for every hectare (35.52 t ha-1) and all out number of harvests (19.33) were observed to be best in M1 V2 (Black Plastic Mulch + Punjab komal assortment) and the normal organic product weight (98.11 g) was greatest in M3 V2 (Transparent Mulch + Punjab komal) pursued by M1 V2 (Black Plastic Mulch + Surya assortment) (98.10 g). Every one of these parameters demonstrated the mediocre outcomes in M4 V1 (Control + Punjab long). Increment in vegetative development of plant related with expanded rate of photosynthesis action greatly affected yield per plant. Comparative perceptions were additionally recorded by Alenazi et al., (2015) and Ekinci and Dursun (2009) in melon. Mulch materials, assortments and their connection demonstrated the noteworthy outcomes for all out solvent solids (TSS). Among the mulch materials M1 (Black Plastic Mulch) (3.830Brix), among the assortments V4 (Desi) (3.800Brix) and among collaboration M1 V1 (Black Plastic Mulch + Punjab long) (4.670Brix) brought about

most elevated TSS content. These outcomes are close affirmation with the discoveries of Parmar et al., (2013) in watermelon; Ekinci and Dursun (2009) and Deoraoji and Chandrashekhar (2003) in musk melon. From the present outcomes it very well may be presumed that plastic mulches effectsly affect development and yield in summer squash where dark plastic has increasingly articulated impacts in contrast with other mulch materials so can be prescribed on business premise in the locale where contemplate was directed (Malwa district of Punjab). Among assortments, Punjab komal with its preferable execution over different assortments can be proposed for business development. Subsequently for improving business development of summer squash with better yield and quality „Punjab komal“ assortment ought to be developed under dark plastic mulch.

References

- Alenazi, M., Abdel-Razzak, H., Ibrahim, A., Wahb-Allah, M. and Alsadon, A. 2015. Response of muskmelon cultivars to plastic mulch and irrigation regimes under greenhouse conditions. *J. Anim. Plant Sci.* 25(5): 1398-1410
- Anonymous (1985) *Plasticulture: Technologies, Applications, scope for development and perspective plan-2000 AD. National Committee on the use of plastics in agriculture.* Government of India, Ministry of Petroleum, New Delhi.
- Anonymous (2010) *Package of practices for cultivation of vegetables.* Pp 1-2 Punjab Agricultural University, Ludhiana.
- Al-Rawahi, M., Al-Said, F.A., Khan, I.A. and Al-Khanjary, S. 2011. Diversity of cucumber accessions in Oman. *Int. J. Environ. Agric. Res.* 13(4): 505-510.
- Andino, J.R. and Motsenbocker, C.E. 2004. Colored plastic mulches influence cucumber beetle population s, vine growth, and yield of watermelon. *HortScience.* 39 (6): 1246-49.
- Ashwini, K. 2014. Studies on the performance of F1 hybrids and their parents in snake gourd (*Trichosanthes anguina* L.) for yield and yield attributing characters. <http://krishikosh.egranth.ac.in/handle/1/69482> .
- Bhatt, L., Rana, R., Uniyal, S.P. and Singh, V.P. 2011. Effect of mulch materials on vegetative characters, yield and economics of summer squash (*Cucurbita pepo*) under rainfed mid - hill condition of Uttarakhand. *Vegetable Science.* 38(2): 165-168.
- Bobby, A., Prashanth, P., Seenivasan, N. and Mishra, P. 2017. Effect of Different Mulch Materials on Weed Control in Cucumber (*Cucumis sativus* L.) Hybrid “Multistar” Under Shade Net Conditions. *Int. J. Pure Appl. Biosci.* 5(5): 1246-1251.
- Coolong, T. 2010. Performance of paper mulches using a mechanical plastic layer and water wheel transplanter for the production of summer squash. *HortTechnology.* 20(2): 319-324.

- Coolong, T. 2012. Mulches for Weed Management in Vegetable Production, Weed Control, Dr. Andrew Price (Ed.). pp. 57-73. Dhaliwal, M.S. 2012. Handbook of Vegetable Crops. 2nd revised edition. New Delhi: Kalyani Publishers. P 116-17.
- Ekinici, M. and Dursun, A. 2009. Effects of different mulch materials on plant Growth, some quality parameters and yield in Melon (*Cucumis melo* L.) Cultivars in high altitude environmental condition. *Pak J Bot.* 41(4): 1891-1901. Gomez, L.A. and Gomez, A.A. 1984. Statistical procedure for agricultural research. 3rd edition. Singapore: John Wiley and Sons. 680 p.
- Keerthika, T., Devaki, C.S., Suma, F. and Urooj, A. 2016. Studies on the nutritional and quality characteristics of *Cucumis sativus* varieties. *Agric. Sci. Res. J.* 6(4): 79-85.
- Khan, S., Pal, M. and Kumar, V. 2015. Influence of different mulches on growth and yield of sponge gourd (*Luffa cylindrica* L.). *Plant Archives.* 15(1): 393-395.
- Keerthika, T., Devaki, C.S., Suma, F. and Urooj, A. 2016. Studies on the nutritional and quality characteristics of *Cucumis sativus* varieties. *Agric. Sci. Res. J.* 6(4): 79-85. Khan, S., Pal, M. and Kumar, V. 2015. Influence of different mulches on growth and yield of sponge gourd (*Luffa cylindrica* L.). *Plant Archives.* 15(1): 393-395.
- Mahadeen A.Y. 2014. Effect of polyethylene black plastic mulch on growth and yield of two summer vegetable crops under rain-fed conditions under semi-arid region conditions. *Amer. J. Agric. Biol. Sci.* 9(2): 202-207.
- Parmar, H.N., Polara, N.D. and Viradiya, R.R. 2013. Effect of mulching material on growth, yield and quality of watermelon (*Citrullus lanatus* thunb) cv. Kiran. *Univers. J. Agric. Res.* 1(2): 30-37.
- Mahadeen A.Y. 2014. Effect of polyethylene black plastic mulch on growth and yield of two summer vegetable crops under rain-fed conditions under semi-arid region conditions. *Amer. J. Agric. Biol. Sci.* 9(2): 202-207.
- Patil, S.S., Kelkar, T.S. and Bhalerao, S.A. 2013. Mulching: A soil and water conservation practice. *Res. J. Agric. Forest. Sci.* 1(3): 26-29.
- Sarhan, T.Z., Mohammed, G.H. and Teli, J.A. 2011. Effect of bio and organic fertilizers on growth, yield and fruit quality of summer squash. *Sarhad J. Agric.* 27(3): 377-383.
- Sithole, N.J., Modi, A.T. and Mabhaudhi, T. 2015. Seed quality of selected bottle gourd landraces compared with popular cucurbits. *S. Afr. J. Plant & Soil.* 33(2): 133-139.
- Webber, C.L., White Jr, P.M., Spaunhorst, D.J. and Petrie, E.C. 2017. Comparative Performance of Sugarcane Bagasse and Black Polyethylene as Mulch for Squash (*Cucurbita pepo* L.) Production. *J. Agric. Sci.* 9(11): 1-9.