



Effect of Black Polythene Mulches on Growth and Yield of Green Chilli (*Capsicum annuum*) in Tumkur District, Karnataka

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ABSTRACT

A field study was conducted during Rabi season in 2014-15 in the Krishi Vignana Kendra Hirehally, Tumkur District to study the effect of mulches. The experiment was conducted in 4 replications of black polythene mulched and unmulched treatment in green chilli, hybrid MHCP 317-Sierra, variety of Mahyco company. Primary and secondary branches were maximum in black polythene mulched (14 & 23), and least in unmulched (10 & 17) plots. The significant increase of 38% green chilli yield in mulched, compared to unmulched plots, was maximum (20.20 tonne per ha and 12.50 tonne per ha respectively). Mulched treatment reduces labour cost up to 39% compared to unmulched, which is highest among variable costs. The use of black polythene mulch in sweet pepper brought the benefit cost ratio from 2.61 to 2.81.

INTRODUCTION

Chilli (*Capsicum annuum* L.), the most widely used and universal spice of India, belongs to the "Solanaceae" family. The nutritive value of chilli is excellent and is rich in vitamins, especially in vitamin A and C. Chilli is considered as one of the commercial spice crops. It is the most widely used universal spice, named as wonder spice. Different varieties are cultivated for varied uses like vegetable, pickles, spice and condiments. In daily life, chillies are integral and the most important ingredient in many different cuisines around the world as it adds pungency, taste, flavour and colour to the dishes. Indian chilli is considered to be world famous for two important commercial qualities, its colour and pungency level. The largest producer of chillies in the world is India accounting for 11 lakh tons of production annually followed by China with a production of around 4 lakh tons. Mexico and Pakistan produce 3 lakhs tonnes each of chilli every year.

In India, chilli is grown in an area of 8.82 lakh ha and annual production of 11.0 lakh tones with an average productivity of 1200 kg/ha and export of chillies during the year 2001-02 has fetched a foreign exchange of Rs. 255.84 crores with production of 75,000 quintals (Anonymous 2002). Among chilli producing states in the country, Andhra Pradesh stands first and also constitutes the maximum acreage for chilli cultivation in the country. It occupies 49% share in the Indian total production and produces around 2.7 lakh

tons of chillies followed by Orissa (18%), Karnataka (15%), Maharashtra (6%), West Bengal (5%), Rajasthan (4%) and Tamil Nadu (3%) (www.ikisan.com). Karnataka state stands 3rd in the contribution of chilli production to the country. We have different chilli varieties such as F1 hybrids, Byadagikaddi, Byadag-idabbi, Guntur (G-4), Pusa jwala; KDSC-1, etc. which are cultivated by farmers.

Mulch is a covering placed over the soil around the plants. Mulching was found to reduce evaporation losses of water from soil apart from other advantages like reduced weed problem, maintaining a thermal regime in the root zone, etc. (Bhella 1988). In the recent years, plastic mulches of different colours are coming up in place of organic.

Benefits of mulching

1. It keeps moisture in. A layer spread over bare soil allows the area to soak up more water. The outer layer dries faster than the soil below it, which reduces the rate of evaporation from the soil, plus it lets the soil to retain moisture for the plants.
2. It regulates soil temperature. In hot summer months, a layer helps keep the underlying soil cooler. In the fall when temperatures falls off, the layer around the plants keep roots warm.
3. It smothers weeds. Fewer weeds sprout because seeds are buried beneath the surface. And the weeds that sprout are weak and easy to pull.

4. It prevents disease and fruit rot. A layer keeps water from splashing on the soil, absorbing bacteria and fungi, and bouncing up onto the plants.
5. It improves the soil. Organic varieties can be turned into the soil at the end of the season.

During Rabi season, temperature and moisture play a vital role in vegetative growth and yield of green chilli, where mulch plays a vital role in order to maintain the temperature and moisture content (Patel et al. 2009). Hence, present study was carried out to study the effect of mulches on the growth and yield of green chilli.

MATERIALS AND METHODS

Experimental site: A study was conducted during Rabi season in 2014-15 in the field of Krishi Vignana Kendra Hirehally, Tumkur District, Karnataka State which lies between 13°0' N latitude and 77°0' E longitude at 845 m above MSL. The annual rainfall of the area is about 800 mm. The soil is comprised of red sandy loam with a pH of 6.93 and EC. 0.65 dS per meter. Tumkur is having mainly dry climate with temperature ranging from 18°C to 38°C. The district receives major rainfall from south-west monsoon from June to September and north-west monsoon in October and November, winter starts from December and continues up to February. Summer starts from March and ends up in May.

Planting material: Planting material used was green chilli,

Hybrid variety MHCP 317- Sierra of Mahyco Company. The polythene mulch (black) was laid after establishment of the crop. Black polythene mulch film of 25 micron thickness was cut into pieces of 6.50 m × 50 cm to cover 80 per cent of the area in the main field. Before laying the film, small circular holes were made with scissors as per the intra row spacing (45 cm) of the crop and the sheet was spread on the crop rows by carefully taking out the established plants through the holes made already. Then the sides of the polythene film were anchored with soil. The experiment was laid out with 4 replications of mulched and unmulched treatment.

Collection of Experimental Data

Sampling procedure: Primary and secondary branches were recorded at 15 days interval starting from the day of transplantation to 75 days after transplantation and at harvest. The data were collected at 15, 30, 45, 55 and 75 days after transplanting and at the time of harvesting from five plants randomly selected in each of the 4 replications of mulched and unmulched treatment. Green chillies were picked and recorded from five plants randomly selected in each of the 4 replications of mulched and unmulched treatment and total yield was reported as tons per ha.

Statistical analysis: The data collected for the study was tabulated, processed and analysed using simple statistical tools like frequency and percentage.

Table 1: Effect of mulches on primary and secondary branches.

Sr. No.	Days	Mulched		Unmulched	
		Primary branches	Secondary branches	Primary branches	Secondary branches
1	15	04	06	04	07
2	30	05	10	05	09
3	45	07	13	08	11
4	55	10	15	09	12
5	75	12	18	09	13
6	Harvest	14	23	10	17

Table 2: Economic improvement in green chilli cultivation through mulching.

Sl. No.	Particulars	Non mulch	Mulched
1	Material cost lakh per ha (seedlings, inputs)	0.70	0.70
2	Labour cost lakh per ha	0.40	0.25
3	Cost of mulching sheets lakh per ha	0.00	0.15
4	Total cost of cultivation in Rs. per ha	1.10	1.10
5	Yield (tones) per ha	12.50	20.20
7	Rate obtained per kg of green chilli in Rs	14.00	14.00
8	Total revenue in lakh per ha	1.75	2.82
10	Net profit in lakh per ha	0.65	1.72
11	Benefit cost ratio	1.59	2.56

a. Specific for the green chilli grown during Rabi 2014; b. Economics have been worked out for the district of Tumkur



Fig. 1: Mulched green chilli crop.

RESULTS AND DISCUSSION

All the growth parameters like primary and secondary branches were maximum with black polythene mulch, followed by unmulched. Table 1 indicates that there was no specific trend in increasing of branches up to 45 days after transplanting. The effect of mulches on plant height was significant after 55th day onwards. However, there was a significant difference in the number of primary and secondary branches recorded after the 55th day of transplanting, which was highest in the black polythene mulch treatment (14 & 23) and least in unmulched (10 & 17) plots (Figs. 1 and 2). Choudhary & Bhambri (2012) also reported that the growth

parameters were maximum with black polythene mulch in their experiment.

Green chilli yield: Use of black polythene mulch produced highest yield of green chilli i.e., 20.20 tons per ha. There was a significant increase in green chilli yield by 38% compared to no mulch treatment, where green chilli yield was low at 12.50 tonnes per ha.

Economics: It is implied from Table 2 that the average material cost including seedlings, fertilizers, pesticides, and others was 0.70 lakh. Black mulch sheet of 155 kg per ha costing Rs 200 per kg, total cost of black mulch sheet could be Rs 31000 per ha, which can be used for getting two crops/



Fig. 2: Unmulched green chilli crop.

season, therefore, per crop/season cost worked out to be Rs 15500 and labour cost was 0.25 lakh. The total cost of cultivation worked out was 1.10 lakh per ha and the unmulched material cost including seedlings, fertilizers, pesticides, and others incurred was 0.70 lakh per ha, and labour cost was 0.40 lakh which was 37 % more compared to mulched. Total cost of cultivation worked out was 1.10 lakh per ha.

CONCLUSION

It can be concluded that the black polythene mulching increased the yield of green chilli over unmulched. Which might be due to the favourable soil physical environment in

the root zone. Mulched plots reduced the labour costs and also pest incidence.

REFERENCES

- Anonymous, 2002, Chilli Research and Development in India. Status Report. Indian Inst. Spices Res., Calicut, pp. 1-4.
- Bhella, H.S. 1988. Tomato response to trickle irrigation and black polythene mulch. J. Am. Soc. Hort. Sci., 113: 543-546.
- Choudhary, V. K. and Bhambri, M. C. 2012. Agro-economic potential of capsicum with drip irrigation and mulching. SAARC J. Agri., 10(2): 51-60.
- Patel, D.B., Patel, R.H. and Patel, R. B. 2009. Effect of drip irrigation, mulch and nitrogen fertigation on yield and yield attributes of okra (*Abelmoschus esculentus*). Indian J. Agric. Sci., 79(1): 12-15.