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Influence of different mulches on yield and economics of chilli *(Capsicum annuum)* cv. Kashi Anmol.

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Abstract : A field experiment entitled " Influence of different mulches on yield and economics of Chilli *(Capsicum annuum L.)*cv. Kashi Anmol" was concluded at the experimental field of Department of Horticulture, Udai Pratap (Autonomous) College, Varanasi (U.P.) during Rabi season of 2024 – 2025. Experiment was laid out in a Randomized Block Design (RBD) with seven treatments replicated three times organic and inorganic mulch with control i.e, Red plastic mulch (50 µ), Paddy straw mulch (5 cm), Compost (5 cm), Black plastic mulch (50 µ), Wheat straw mulch (5 cm), Silver plastic mulch (50 µ), No mulch (Control).Significantly, differences were yield attributed viz. Number of fruit per plant, weight of one fruit (g), fruit length (cm), fruit diameter (cm), fruit yield per plant (kg), fruit yield per plot (kg), and green chilli yield (q/ha.) increased under black plastic mulch and the apply of Black plastic mulch showed significant effect on economics cost in chilli cv. Kashi Anmol. It is revealed that the use of Black plastic mulch, considerably significantly increased yield and economics of chilli.

(Index terms : Chilli, Mulches, Black plastic, yield and economics)

Introduction

Chilli (*Capsicum annuumL.)* commonly known as hot pepper, belonging to the Solanaceae family and is cultivated as an annual crop world wide. It is a species of the genus *Capsicum* and is indigenous to Southern North America. It is an important spice as well as vegetable crop, where both ripe and unripe fruits are used for culinary, salad and processing purposes. Its extract is used in pharmaceutical industry for colorings the drugs. Imperative worldwide is one of the foremost assorted spice crops. It is commercially important for its red color due to the chemical constituent capsaicin. Hence, chili serves diverse purposes as a spice, condiment, culinary supplement, medicine and vegetable ***(Kumar et al., 2019)*** Known by various names like bell pepper, hot pepper and red pepper, it plays a pivotal role as a primary ingredient in many different cuisines globally, owing to its pungency, color, flavor and taste. It is an excellent source of Vitamin-A and C. Being richest source of Vitamin-C, it is sometimes referred as capsule of Vitamin-C ***(Durustet al. 1997).***It is believed to possess immune-boosting properties and offer relief from conditions such as arthritis, headache and dermatological conditions ***(Bharati et al., 2023).***

Spreading different covering materials on the soil's surface to reduce moisture loss and weed growth and increase crop output is known as mulching (Kader et al, 2019).Mulches are an efficient way to reduce nitrogen loss and soil erosion (Van Derwerken and Wilcox-Lee 1988).Additionally, it lowers crop disease and insect incidences.

Inorganic mulch and organic mulch are the two types of mulch materials that are utilized. For organic mulch, we use dried leaves, grass clippings, straw from various crops, and other materials. When it comes to inorganic mulch, we use various kinds of polyethylene film as the mulch material. Mulches such as polyethylene film, plastic mulch, synthetic mulch, etc., are typically utilized for perennial crops (Rani et al., 2020). By preserving soil moisture, adjusting root-zone temperatures, and modifying the amount and quality of light reflected back to the plants, mulches also modify the microenvironment that affects plant growth and development ***(Crizinszkyet al. 1995)***. Hence, with these views more work need to be done in this area and the the research was undertaken with the objective of "Influence of different mulches on yield and economics of chilli (Capsicum annuum) cv. Kashi Anmol".

RESEARCH METHODOLOGY

The experiment was conducted during November 2024 to February 2025 at Udai Pratap Autonomous College, Varanasi Uttar Pradesh. The soil of the experimental plot was sandy loam in texture having ph 6.87, rich in P (Phosphorus), medium in K (Potassium) and poor in Organic matter, N (nitrogen), and Zn (Zinc) content. The treatment of the experiment comprised six mulch material viz. Paddy straw (5 cm thick), Wheat straw (5 cm thick), Compost (5 cm thick), Black plastic (50 µ thick), Red plastic (50 µ thick), Silver plastic (50 µ thick) with control (no mulch). The research trial was conducted in a Randomized block Design with three replication and the treatment were 7. The unit plot size 2.66 × 1.4 m = 3.72 m2 prepared. The seedlings were transplanted on the November 8th, 2024 maintaining a spacing 60cm × 45cm. Crop was fertilized with FYM 20 t/ha, Urea 260.86 kg/ha, SSP (Single supper phosphate) 375 kg/ha, and MOP (muriate of potash) 100 kg/ha. Total amount of FYM, SSP, MOP and ½ Urea were applied during final land preparation. The rest of Urea was Hence, an attempt has been made to estimate the ex-post economic impact of the chili variety Kashi Anmol. applied in two equal installments at 30 and 60 days after transplanting. Irrigation was done after application of fertilizer. Other intercultural operations and plant protection measures were taken as needed. Data was collected on growth and yield characters. Recorded data were analyzed statistically.

Results and Discussion

Influence on yield and economics in chili like number of fruit per plant, fruit length (cm), fruit diameter (cm), one fruit weight (g), yield green chilli yield (q/ha) and economics cost.

Yield attributes

The data presented in table 1 revealed the The maximum no. of fruit per plant (289) was recorded under black plastic mulch and minimum no. of fruit per plant (260) under control (no mulch)..The maximum fruit length (7.4 cm) was recorded under black plastic mulch and minimum fruit length (5.4 cm) under control (no mulch). The maximum fruit diameter (0.97 cm) was recorded under black plastic mulch and minimum fruit diameter (0.69 cm) under control (no mulch).. The maximum one fruit weghit (2.67 g) and minimum (2.61 g) *under control.* The maximum yield (285.55 q/ha) was recorded under black plastic mulch and minimum yield (251.11 q/ha) under control (no mulch).

The difference in chilli yield in the present study appear the black plastic mulch enhancing the photosynthesis and yield factor though higher soil temperature, moisture conservation, increased microorganism growth, reduce the weed infestation,and other reasons which may help in increasing the yield. The results are in conformity with the finding of *Lamont (1993), Ghosal et al. (2000), Ibarra-Jiménez et al. (2011), Ahmad et al. (2010), Kashi et al. (2011), Ibarra-Jiménez et al. (2013), Kumar et al. (2017).*

Table 1. Influence different of mulches on yield of chilli cv. Kashi Anmol

Mulch	Number of fruit per plant	Fruit length (cm)	Fruit diameter (cm)	One fruit weight (g)	Yield (q/ha)
Red plastic	278	6.6	0.84	2.64	271.48
Paddy straw	273	6.2	0.79	2.63	265.55
Compost	281	6.9	0.88	2.65	275.55
Black plastic	289	7.4	0.97	2.67	285.55
Wheat straw	269	5.8	0.74	2.62	260.74
Silver plastic	286	7.1	0.92	2.66	281.48
Control	260	5.4	0.69	2.61	251.11
SEm+_	**3.82**	**0.05**	**0.01**	**0.03**	**4.78**
CD	**11.77**	**0.17**	**0.04**	**0.10**	**14.73**

Fig. 1. Influence of different mulches on Number of fruit per plant and yield in chilli cv. Kashi Anmol

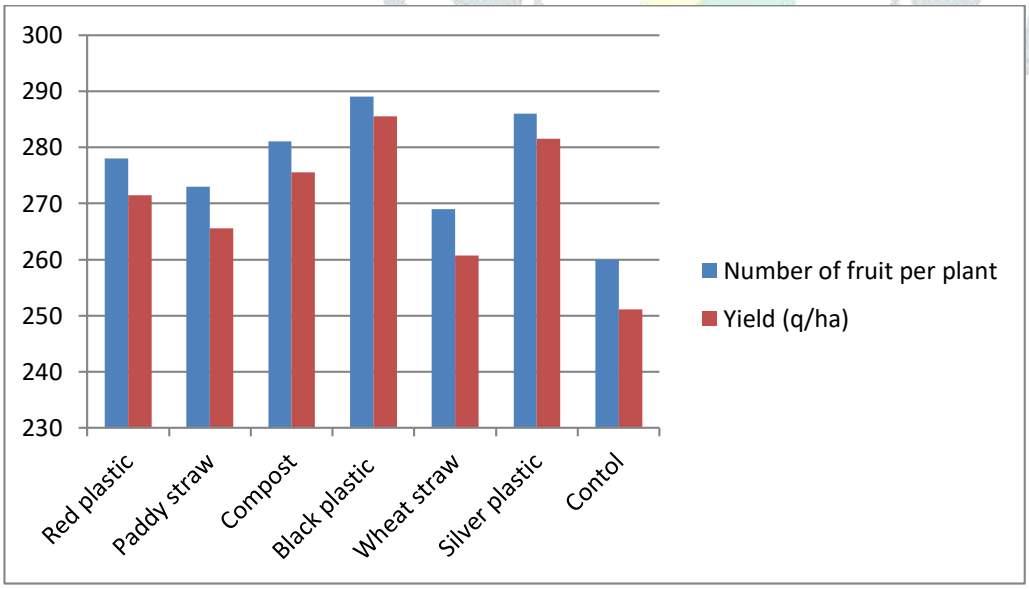

Fig. 2. Influence of different mulches on fruit length (cm), fruit diameter (cm), one fruit weight (g) in chilli cv. Kashi Anmol.

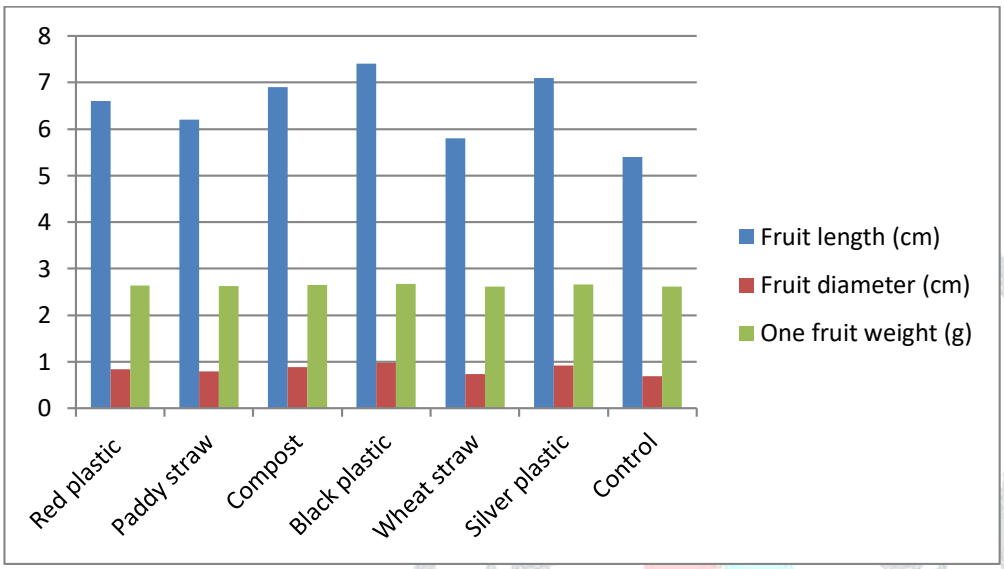

Table. 2. Economic of different mulching practices on benefit: cost ratio in chilli

Treatments	Cost of cultivation (Rs/ha)	Yield (q/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	B:C ratio
T1 (Red plastic mulch)	182988	271.48	542960	359972	1.96
T2 (Paddy straw mulch)	181388	265.55	531100	349712	1.92
T3 (Compost)	181488	275.55	551100	369612	2.03
T4 (Black plastic mulch)	182488	285.55	571100	388612	2.12
T5 (Wheat straw mulch)	181488	260.74	521480	339992	1.87
T6 (Silver plastic mulch)	182988	281.48	562960	379972	2.07
T7 No mulch (Control)	175488	251.11	502220	326732	1.80

Avg. sale price of green chilli @ Rs20/kg

Economics

The economics of cultivation present in table 2 showed the among the treatments, application of 50 micron black plastic mulch resulted in higher gross returns od (Rs 571100) net returns(Rs 388612) and benefit : cost ratio (2.12) as compared to no mulch (control).The economics of the various treatments is usually a deciding factor for its adaptation by the farmers for commercial green chilli production. It is therefore, of wide interest to calculate the effects of various treatments and the basis of yield and to work out the most remunerative combination of these factors to be applied in yield of chilli.

Conclusion : The studies have demonstrated the benefits of black plastic mulch on yield and economics of chilli. Mulching (black plastic mulch) resulted in 13.71% increase in fruit yield as compared to control (no mulch).

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