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## Effect of mulches on growth and yield parameters in gherkin (*Cucumis sativus* sub spp. *Anguria*)

**T Mounika, TSKK Kiran Patro, N Emmanuel, B Chennakesavulu, Dr. Salomi Suneetha and M Lakshmi Narayana Reddy**

**Abstract**

An experiment was conducted during *kharif*, 2016 at College of Horticulture, Venkataramannagudem, West Godavari District of Andhra Pradesh to study the effect of mulches on growth and yield parameters in gherkin. The experiment was laid out in a randomized block design (RBD) with different mulch applications (black plastic mulch, white plastic mulch, saw dust, coco peat and control). Among different mulch applications, white plastic mulch recorded significantly highest values for all plant growth parameters and yield contributing parameters.

**Keywords:** White plastic mulch, parameters, growth, yield

**Introduction**

Gherkin (*Cucumis sativus* sub spp. *Anguria*) (2n= 24), belongs to the family Cucurbitaceae. It is popularly known as "Pickling cucumber" or small cucumber among farmers. It is monoecious, annual, trailing or climbing vine, which branches freely with slender, rough hairy, angled stems and tendrils. The leaves are 3 to 5 angled, shallow lobed with acute sinuses and 7 to 15 cm in length and oval to oblong in shape and born on long slender stalks. They are light green and turn yellowish when fully matured with or without spiky surface covered with long sharp glistening hairs. Flower is yellow in colour. The flesh is greenish in colour with many seeds. Seeds are small, white, smooth, 3 to 5 mm long. The immature fruits are used for the preparation of pickles, eaten as a cooked vegetable and are used in curries (Purseglove, 1969) [7]. The seed oil is used as antipyretic. Fruits are good for people suffering with constipation, jaundice and indigestion. Gherkins pickled in brine are a favourite lunch substitute in west. Gherkin is commonly grown in USA, Australia and Sri Lanka and is being consumed in European countries. The market demand is on the increase in America and Australia. Traditionally Spain, Morocco, Turkey and Bulgaria are the leading producers at the global level.

The main objective of the grower is to produce maximum yield at the time when prices are high. This requires skillful decisions regarding selection of cultivars. Mulching is also a very important factor to influence the growth and yield (Barman *et al.*, 2005) [1].

Mulching is the practice of covering the soil around the plant to make conditions more favourable for growth, development and efficient crop production (Nagalakshmi *et al.*, 2002) [5]. Mulching also suppress weed infestation effectively. Furthermore it stimulates microbial activity in soil through increasing soil temperature, which improves agro physical properties of soil. Mulching used as a means of successful crop production mainly in place where irrigation facilities are scanty. The effect of this is to cut off the upward flow of underground moisture at a point below the actual surface and to prevent its rapid escape into the air during dry weather. It has a unique character of reducing the maximum soil temperature and increasing the minimum temperature (Solaiman *et al.*, 2008) [8]. Organic mulches such as leaf, straw, dried leaves and compost have been used for centuries. When compared to other mulches plastic mulches are completely impermeable to water and prevents direct evaporation of moisture from soil and thus limits the water losses and soil erosion over the surface. Polyethylene (PE) films as mulch material provide many positive advantages for the user such as increased yields, earlier maturing crops, higher quality produce, insect management and weed control (Lamont, 1993) [4].

Mulching before field planting conserves moisture, increases early and total yield. Mulch should be placed immediately over the fumigated soil. The soil must be moist while laying the mulch. The effect of mulching vary with the type of mulch material used.

Hence, standardization of mulching material for obtaining better growth and yield of gherkin is very important as this crop is a new introduction to this area. Therefore, the present investigation was carried out with this aim.

### Materials and Methods

The present experiment is conducted during *kharif*, 2016 at College farm, College of Horticulture, Venkataramannagudem, West Godavari District. The experiment was laid out in a randomized block design (RBD) with different combination of mulches (black plastic mulch, white plastic mulch, saw dust, coco peat and control). The experimental area of 448 m<sup>2</sup> was divided into beds of 5 m x 1.5 m size. Irrigation channels of 1 m size were provided between two beds. Soil cover treatment (black plastic mulch, white plastic mulch, saw dust, coco peat and no mulch) were randomly distributed according to randomized block arrangement. The black and white plastic mulch of 25 microns each were used to cover the respective plots before sowing of the seed by cutting into pieces of 5.0 x 1.5 m to cover the crop area. After laying the mulch sheet, small circular holes were made with scissors with a spacing of 45 x 75 cm distance. The sheet was spread on the bed and seeds were sown through the holes already made. Saw dust and coco peat mulch were applied at a thickness of 5 cm each on the bed and seeds were sown at a required spacing of 45 x 75 cm distance. Sowing of the seeds was taken at a depth of less than 1 cm on raised beds of height 15 cm. 3-4 seeds were sown in each pit during first week of July. Each bed consisted of 12 plants, of which five competitive plants were selected at random for recording the observations. The crop was raised as per the recommended package of practices. Data was statistically analyzed by the methods outlined by Panse and Sukhatme (1985)<sup>[6]</sup>.

### Results and Discussion

The analysis of variance (ANOVA) revealed significant differences among all treatment combinations in respect to growth parameters, yield parameters and quality parameters. White plastic mulch was found to be significantly superior

over black plastic mulch followed by saw dust coco peat and control<sup>6</sup>. It has exhibited less number of days for emergence (6.71), highest percentage of germination (78.72), longest main vine length (124.46 cm), more number of nodes per vine (32.38), shortest internodes (3.97 cm), more number of primary branches per vine (7.88), less number of days taken for first female flower opening (27.05), more number of days taken for first male flower opening (21.97) and node at which first flower appeared (5.16). The quantitative increase in growth parameters under plastic mulch might be due to higher relative growth, which was controlled by cell division and cell elongation. Increase in plant growth parameters due to application of plastic mulch might be due to the favorable soil moisture status and soil temperature which increases the turgidity of the cell with increase in available soil moisture leading to quicker cell division and enlargement. Plastic mulch reduced nutrient losses, weed control and improved hydrothermal regimes of soil, which ultimately helps in increasing growth parameters of the plant. The findings of present study are in close agreement with the findings of Khan *et al.*, (2015)<sup>[3]</sup> in sponge gourd.

In case of yield parameters also white plastic mulch showed significantly superiority over other mulch applications followed by black plastic mulch in terms of days to first harvest (36.53), number of fruits per vine (68.88), number of seeds per fruit (17.11), fruit length (5.70 cm), fruit diameter (2.86 cm), mean fruit weight (21.02 g), yield per vine (3.67 kg), yield per plot (66.14 kg/plot), yield per hectare (14.61 t/ha), days from fruit set to maturity (10.71) and fruit retention percentage (79.05) except for hundred seed weight which was found to be non-significant. These results are in close agreement with findings of and Khan *et al.*, (2015)<sup>[3]</sup> in sponge gourd. More number of fruits due to mulching could be due to its direct effect on suppressing weed flora and indirect effect on uptake of nutrients under the improved conditions of soil, particularly with respect to moisture availability and moderation of soil temperature. More over mulching with white plastic mulch also resulted in increased length of main vine which might probably responsible for the greater number of fruits.

### Conclusion

The study revealed that white plastic mulch can be used as mulch material on beds for getting higher yield in gherkin.

**Table 1:** Effect of mulches on growth parameters in gherkin

Mulch	Days to first seedling emergence	Percentage of germination (%)	Main vine length (cm)	Nodes per vine	Intermodal length (cm)	Primary branches per vine	Days taken for first female flower opening	Days taken for first male flower opening	Node at which first flower appeared
Black plastic mulch	8.30	77.50	123.13	31.98	4.13	7.52	27.22	21.91	5.37
White plastic mulch	6.71	78.72	124.46	32.38	3.97	7.88	27.05	21.97	5.16
Saw dust	9.31	73.22	120.68	30.00	4.34	6.70	28.08	21.06	5.54
Coco peat	8.75	75.94	122.73	31.21	4.32	7.33	28.00	21.12	5.51
Control	9.44	63.77	113.16	28.02	5.84	6.63	34.26	20.93	6.76
SE(m)	0.29	1.70	2.08	1.05	0.15	0.17	0.66	0.18	0.12
CD at 5%	0.84	4.96	6.06	3.07	0.44	0.51	1.93	0.54	0.37

**Table 2:** Effect of mulches on yield parameters in gherkin

Mulch	Days to first harvest	Number of fruits per vine	Number of seeds per fruit	Fruit length (cm)	Fruit diameter (cm)	Mean fruit weight (g)	Yield per vine (kg)	Yield per plot (kg/plot)	Yield per hectare (t/ha)	Days from fruit set to maturity	Fruit retention percentage (%)
Black plastic mulch	38.43	61.53	16.36	5.04	2.86	20.41	3.18	57.40	12.20	11.52	77.72
White plastic mulch	36.53	68.88	17.11	5.70	2.86	21.02	3.67	66.14	14.61	10.71	79.05
Saw dust	39.82	61.19	15.72	4.83	2.57	18.98	3.00	54.14	11.16	11.84	73.22
Coco peat	39.23	61.51	16.27	4.97	2.85	19.76	3.02	54.50	12.21	11.67	77.61
Control	48.88	60.22	15.57	4.81	2.55	18.71	2.52	45.38	10.04	13.26	63.77
SE(m)	1.22	1.45	0.35	0.14	0.09	0.47	0.12	2.20	0.82	0.39	2.24
CD at 5%	3.57	4.23	1.03	0.41	0.27	1.37	0.35	6.42	2.40	1.15	6.53

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