



Research Paper

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Effect of mulching on weed control and tuber yield of medicinal coleus (*Coleus forskholli* Briq.)

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ABSTRACT : The effect of mulching with organic materials and black polythene sheet on weed population and tuber yield of *Coleus forskholli* was evaluated in a farmers field at Perundururai Block of Erode district. The experiment was carried out in a Randomized Block Design with four replications and six treatments with a plot size of 3 x 2 m. The results of the experiments showed that the weed density (number/m²) and weed biomass (g/m²) were lowest in the treatment T₅ (black polythene mulch). The weed control index and fresh tuber weight (20.10 mt ha⁻¹) were also the highest in the black polythene mulch treatment (T₅). Among the tuber characters studied, black polythene mulch (T₅) recorded highly significant values for number of tubers per plant (21.50), tuber length (20.20 cm), tuber girth (2.80 cm), tuber volume (238 cm³plant⁻¹), tuber fresh weight (361.76g plant⁻¹), tuber fresh weight per plot (12.30 kg plot⁻¹) and tuber fresh weight per hectare (20.10 mt), except forskolin content (0.56 %). It was concluded that mulching practices was very useful to control the weeds and it also enhanced the tuber characters and yield of *Coleus forskholli*.

KEY WORDS : Coleus, Mulching, Weed control, Tuber yield, Forskolin

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Among the various commercially important medicinal plants in India *Coleus forskholli* Briq assumes greater interest in the Indian drug industry. Its tuberous roots are a rich source of forskolin which is being developed as a drug for hypertension, glaucoma. Owing to the immense medicinal importance, the herb has a great demand in the domestic and international market. Mulching in general is beneficial for crop production as it conserves soil moisture, retains heat as well it suppresses weed growth. Organic mulches derived from plant material, will decompose in time and improve the soil. This results in increased aeration and adds water holding capacity of red loamy soil. In addition, organic mulches contain both major and minor elements essential for plant growth (Palaniappan, 2002). Black polythene mulches will reduce light penetration to the soil and weeds cannot generally survive under such mulch. The soil under plastic mulch remains loose, friable and well aerated. Roots have access to adequate oxygen, and microbial activity is enhanced. Information on the effect of mulching on Coleus to

improve the tuber yield is scanty. Therefore, considering the importance of different mulching materials, the present investigation was carried out to study the effect of different mulching materials on the weed growth and tuber yield of medicinal coleus.

RESEARCH METHODS

A field experiment was conducted in a Randomized Block Design with four replications in medicinal coleus (*Coleus forskholli* Briq.), in a farmers field at Perundururai Block of Erode District of Tamil Nadu. The treatments consisted of five different mulches (T₁ - Sugarcane trash mulch (10 cm thickness @ 12.5 t ha⁻¹), T₂ - Paddy straw mulch (10 cm thickness @ 15 t ha⁻¹, T₃ - Coirpith mulch (2 cm thickness @ 12.5 t ha⁻¹), T₄ - Sawdust mulch (4 cm thickness @ 15 t ha⁻¹), T₅ - Black polythene sheet (30 micron thickness). Regular package of practices as per crop production guide (2004) was followed. Five plants were selected at random from each plot to record the tuber characters. Weed control index was worked out per

square meter for each treatment. The fresh tuber weight was recorded per plant and per plot and then it was converted into tonnes per hectare. Observations on weed growth and tuber characters were recorded and subjected to statistical analysis as described by Panse and Sukhatme (1978).

RESEARCH FINDINGS AND DISCUSSION

The results obtained from the present investigation are summarized below :

Effect of mulching on weed control:

Effect of different mulching treatments (Table 1) significantly influenced the weed characters *viz.*, weed density, weed dry weight and weed control index at both 60 days after planting and 120 days after planting. Among the different mulches, black polythene mulch (T_5) recorded the lowest weed density (11.2 and 18.5 numbers/m²) and weed dry weight (6.22 and 8.04 g/m²), respectively at 60 and 120 days after planting. This may be due to the suppression of weeds by increasing the soil temperature resulting in killing the weed seeds in the early stages. The effectiveness of black polythene sheet as mulching material in restricting weed growth has been reported by Chirstopher Lourduraj *et al.* (1997) in brinjal and Agrawal *et al.* (2000) in banana cv. Dwarf Cavendish. Among the treatments, the least weed dry weight was observed in black polythene mulch which may be due to the fact that polythene sheet mulch acts as a barrier between sunlight and soil which further leads to a reduction in the weed growth under the mulches. The weed control index was highest in the treatment T_5 (76.28 and 71.18) at 60 and 120 days after planting, respectively. The increased weed control index in the best treatment may be due to the reduced weed population and weed dry weight. This strengthens the results of Chirstopher Lourduraj *et al.* (1997) in brinjal.

Effect of mulching on tuber characters and yield:

The results revealed that different types of mulching materials (Table 2) significantly influenced all the tuber characters *viz.*, number of tubers per plant, tuber length, tuber girth, tuber volume, tuber fresh weight per plant, tuber fresh weight per plot and tuber fresh weight per hectare over the control. Among the different mulching treatments, the treatment T_5 - black polythene mulch recorded higher values for the characters *viz.*, number of tubers per plant, tuber length, tuber girth, tuber volume, tuber fresh weight per plant, tuber fresh weight per plot and tuber fresh weight per hectare. The increase in the tuber characters was attributed to the sufficient soil moisture in the root zone and minimized evaporation loss due to mulching. The extended retention of moisture and availability of moisture also leads to higher uptake of nutrients for proper growth and development of tubers which resulted in higher fresh tuber yield as compared to the control. Similar findings have also been observed by Dean Ban *et al.* (2004),

Treatments	Weed density (number/m ²)		Weed dry weight (g/m ²)		Weed control index	
	60 DAP	120 DAP	60 DAP	120 DAP	60 DAP	120 DAP
T ₁ - Sugarcane trash mulch	24.50	42.30	13.61	18.48	47.50	31.85
T ₂ - Paddy straw mulch	28.70	58.40	15.94	22.40	38.64	17.21
T ₃ - Coir pith mulch	23.20	41.20	12.89	17.91	50.42	38.54
T ₄ - Saw dust mulch	26.50	48.40	14.72	21.04	43.35	22.43
T ₅ - Black polythene sheet	11.20	18.50	6.22	8.04	76.28	71.18
T ₆ - Control	46.80	62.40	26.00	27.13	-	-
S.E.+	1.00	0.70	0.46	1.05	1.70	2.96
C.D. (P=0.05)	2.14	1.50	0.98	2.21	3.63	6.32

Table 2 : Effect of mulching on tuber characters and forskolin content in medicinal coleus

Treatments	Number of tubers per plant	Tuber length (cm)	Tuber girth (cm)	Tuber volume (cc)	Fresh weight of tuber per plant (g)	Fresh weight of tuber per plot (kg)	Fresh weight of tuber (tha ⁻¹)	Forskolin (%)
T ₁ - Sugarcane trash mulch	17.60	18.20	2.42	218.00	315.32	10.72	17.52	0.54
T ₂ - Paddy straw mulch	15.60	17.80	2.21	206.00	294.35	10.01	16.35	0.56
T ₃ - Coir pith mulch	12.60	19.10	2.51	224.00	340.48	11.58	18.92	0.55
T ₄ - Saw dust mulch	14.50	18.30	2.42	220.00	334.40	11.37	18.58	0.54
T ₅ - Black polythene sheet	21.50	20.20	2.80	238.00	361.76	12.30	20.10	0.56
T ₆ - Control	10.50	15.90	1.60	192.00	220.34	7.49	12.24	0.53
S.E. _±	0.42	0.48	0.08	4.37	4.73	0.16	0.26	0.01
C.D. (P=0.05)	0.90	1.03	0.17	9.32	10.09	0.34	0.56	NS

NS=Non-significant

Ansary and Roy (2005) in watermelon, Al-Majali and Kasrawi (1995) in muskmelon, Hallidri (2001) in cucumber, Alemayehu-Ambaye and Joseph (2002) in melon, Sharma and Agarwal (2004) in tomato, Ali and Gaur (2007) in strawberry and Aruna *et al.* (2007) in tomato. However, the data on forskolin content revealed that there was not much influence of mulching on the recovery of forskolin in the tubers.

Plastic mulch reduces evaporation from the soil surface and soil moisture is maintained with greater uniformity. Due to the lack of light under the black plastic mulch, photosynthesis could not be done and weeds cannot grow. Therefore, the plants will have greater access to water and nutrients. In other words, if the mulch is used, less water is consumed and yield can be expected to be higher (Jolaini *et al.*, 2008). This lends support to the above findings.

It is concluded that the application of black polythene mulch is beneficial than other organic mulches in improving the tuber yield of medicinal coleus. Increase in tuber yield along with other advantages of mulching may further help the farmers to grow coleus on a large scale.

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