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Quality of Baby Corn (*Zea mays* L.) as influenced by different weed management practices under the temperate conditions of Kashmir valley

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ABSTRACT
A field experiment entitled "Quality of Baby Corn (Zea mays L.) as influenced by different weed management practices under the temperate conditions of Kashmir valley" was conducted at Mountain Livestock Research Institute (MLRI), Manasbal, (SKUAST-K) during kharif2014. The experiment comprising of 11 treatments [Farmers practice (W_1); Earthing up and weeding at 30 and 45 DAS (W_2); Atrazine @ 1.5 kg a.iha^{-1}pre-emergence at 1 DAS (W_3); atrazine @ 1.5 kg a.iha^{-1} early post-emergence at 10 DAS (W_4); straw mulch (paddy straw) at 1DAS (W_5); straw mulch (brown sarson) at 1DAS (W_6); polyethylene mulch (black) at 1DAS (W_7); polyethylene mulch (white) at 1DAS (W_8); saw mulch at 1DAS (W_9); weedy check (W_{10}) and weed free (W_{11})] was laid out in a randomized complete block design with three replications. Quality parameters viz. nitrogen content, protein content, vitamin C and total sugars in baby corn were not significantly influenced by different weed management practices but were recorded highest in weed free treatment.
***Key words**: Quality, sugars, moisture, protein, nitrogen, atrazine, baby corn*

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INTRODUCTION

In India, maize (Zea mays L.) is grown on an area of 9.43 mha, with production and productivity of 24.35 mt and 2583 kg/ha, respectively (GOI, 2014). Maize has been classified in different types according to its use and/or starch content viz., Flour corn (*Zea mays* var. Amylacea) Popcorn (*Zea mays* var. Everta) Dent corn (*Zea mays* var. Indentata) Flint corn (*Zea mays* var. Indurata) Sweet corn (*Zea mays* var. Saccharata) Waxy corn (*Zea mays* var. Ceratina) Pod corn (*Zea mays* var. Tunicate) and Baby corn (*Zea mays* L.) [2].
Baby corn (*Zea mays* L.) refers to the whole, entirely edible cobs of immature corn harvested just before fertilization at 2-3 cm long silk emergence stage [2]. Baby corn is a delicious and nutritive vegetable and it is consumed as a natural food. It is very tasty, sweet and easy to consume because of its tenderness and sweetness with good nutritive value. Due to changing food preferences in Indian life style, the urban population is switching over to new food items; the 'Baby corn' is a new addition to Indian foods. Being a short duration crop, it easily fits in an intensive cropping system and in addition to baby cob it provides delicious green fodder to cattle [3].Keeping in view the above facts, the present studywas undertaken.

MATERIAL AND METHODS

The experiment was conducted at Mountain Livestock Research Institute (MLRI) Manasbal, SKUAST-Kashmir during *Kharif* 2014. The site is situated between 34.15^{o}N and 74.40^{o}E at an altitude of 1650 meters above mean sea level. Climatically the experimental site falls in temperate zone of north western Himalaya characterized by hot summers and very cold winters. The average annual precipitation is 944.6 mm (average of past 30 years) most of which is received from December to April in the form of snow and rains. It is evident from the data that mean maximum and minimum temperatures were 28.14^{o}C and 12.88^{o}C, respectively and the total precipitation amounted to 389.50 mm during crop growth period of 2014. The total number of sunshine hours recorded during the crop growth period was 144.36 hours and the mean maximum and minimum relative humidity were 79.30% and 53.00%, respectively during the

crop growth period. The soil was clay loam in texture, high in organic carbon, low in available nitrogen, medium in available phosphorus and high in available potassium with neutral pH.

The experiment consisting of eleven treatments was laid out in a randomized complete block design with three replications and eleven treatments: Farmers practice (W_1), Earthing up and weeding at 30 DAS and 45 DAS (W_2), Atrazine @ 1.5 kg *a.i*ha^{-1} Pre-emergence at 1 DAS (W_3), Atrazine @ 1.5 kg *a.i*ha^{-1} Early Post-emergence at 10 DAS (W_4), Straw mulch (paddy straw) at 1DAS (W_5), Straw mulch (brown sarson) at 1DAS (W_6), Polyethylene mulch (black) at 1DAS (W_7), Polyethylene mulch (white) at 1DAS (W_8), Saw mulch at 1DAS (W_9), Weedy check (W_{10}) and Weed free (W_{11}). The variety HM-4 was used for the experiment. The gross plot size was 6 m × 3 m and net plot size was 5.40 m × 1.50 m.

Young cob samples of 50 g each collected from picked lot of each plot and 1 kg fodder sample collected from harvest lot of each plot were sun dried and then oven dried at 60-65^{o}C for 36-48 hours to a constant weight. The dry weight of samples was recorded in grams. The samples were grounded and subsequently used for chemical analysis. Nitrogen content of ground cob samples and dry fodder samples was estimated by modified Kjeldahl's method [4]. Protein content in cob and fodder was determined by multiplying respective nitrogen content with a factor 6.25. Vitamin C was estimated by using 2,6dichlorophenol indophenol as dye. Dye factor was first calculated by titrating 5 ml standard ascorbic acid plus 5 ml (3%) metaphosphoric acid against 2,6, dichlorophenol indophenol till pink colour appeared and volume used noted.

$$\text{Dye factor} = \frac{0.5}{\text{Titre value}}$$

The vitamin C of the sample was estimated by taking 10 ml of sample, volume made upto 100 ml with 3% metaphosphoric acid and filtered. Then aliquot of 10 ml was taken in titration flask and titrated against dye 2, 6 dichlorophenol indophenol till light pink colour appeared (which should persist for 15 seconds). Samples preserved by KMS (potassium metabisulphite) were analyzed after eliminating the interface of sulphur dioxide by using formal dehyde condensation procedure. Vitamin C was calculated using equation as :

$$\text{Ascorbic acid (mg/100 g)} = \frac{\text{Titre value} \times \text{Dye factor} \times \text{vol. made up}}{\text{ml of filtrate taken for estimation} \times \text{wt. of sample}} \times 100$$

To obtain the total amount of sugar, we need to determine the quantity of total solids. The total of represent sample were determined by drying the baby corn samples in a vacuum oven at 70 ^{o}C. The moisture content recorded by drying was subtracted from 100. The value obtained includes water soluble and insoluble matter i.e. total solids. The hand refractometer of range (0-32) ^{o}Brix (Erma make Japan) was used to determine total soluble solids of fresh baby corn samples. The values were corrected at 20^{o}C. Total and reducing sugars were estimated by the Lane and Eynon method.

$$\text{Total sugars (\%)} = \frac{\text{Fehling's factor} \times \text{volume made up}}{\text{Titre value} \times \text{volume of sample}} \times 100$$

RESULTS

A perusal of data showed that weed management practices did not affect nitrogen content of baby corn and the plant significantly. The results showed that weed management practices did not affect the protein content of baby corn and the plant significantly. Highest protein content of cob and green fodder (12.73 and 7.06) was recorded by weed free treatment followed by earthing up and weeding at 30 DAS and 45 DAS (12.52 and 6.85) whereas, lowest protein content of cob and green fodder (7.30 and 3.64) was recorded by weedy check. Different weed management practices showed non-significant effect on vitamin C content of fresh baby corn. However, higher vitamin C content was recorded in weed free treatment (10.70 mg/100g) followed by earthing up and weeding at 30 DAS and 45 DAS (10.68) whereas; lowest vitamin C content (10.36 mg/100g) was recorded by weedy check. Weed management practices had not affected the moisture content of baby corn and the plant significantly. Highest moisture content (91.26%) was recorded by black polyethylene mulch followed by white polyethylene mulch (90.10%), whereas, lowest moisture content (88.16%) was recorded by weedy check. Total sugars content of fresh baby corn yield was not influenced by different weed management practices (Table 1).

DISCUSSION

The results of the present experiment revealed that quality parameters viz. nitrogen content, protein content, moisture content, vitamin C and total sugars in baby corn were not significantly influenced by different weed management practices. This might be due to the genetic character of baby corn. However,

these parameters were recorded highest in weed free treatment except moisture content that was recorded highest under black polyethylene mulch. This might be due to the reduced crop-weed competition in weed free treatment (Table 16), which helped the crop to grow better and absorb and assimilate more nitrogen in grains and synthesize more starch [1].

Table 1:Effect of weed management practices on nitrogen content (%) and protein content (%)of cob and green fodder, moisture content (%) of cob, ascorbic acid (%), TSS (%) and Total sugars (%) of baby corn (*Zea mays* L.)

Quality parameters / Treatments	N content of cob (%)	N content of green fodder (%)	Protein content of cob (%)	Protein content of green fodder (%)	Moisture content of baby corn (%)	Ascorbic acid (%)	Total soluble sugar (%)	Total sugars (%)
Farmers practice	1.74	0.75	10.89	4.68	89.07	10.49	9.75	9.67
Earthing up and weeding	2.00	1.09	12.52	6.85	89.76	10.68	10.43	10.27
Atrazine @ 1.5 kg a.i ha^{-1} PE	1.53	0.66	9.56	4.14	88.18	10.44	9.67	9.58
Atrazine @1.5 kg a.i ha^{-1} Early PoE	1.41	0.72	8.85	4.53	88.17	10.44	9.64	9.54
Paddy straw mulch	1.79	0.80	11.20	5.01	89.57	10.58	10.30	9.99
Brown sarson mulch	1.81	0.83	11.31	5.22	89.67	10.62	10.40	10.11
Black polyethylene mulch	1.88	1.04	11.76	6.53	91.26	10.55	9.94	9.72
White polyethylene mulch	1.85	0.90	11.58	5.66	90.10	10.54	9.87	9.63
Saw mulch	1.76	0.76	10.76	4.75	89.27	10.50	9.77	9.77
Weedy check	1.17	0.58	7.30	3.64	88.16	10.36	9.62	9.38
Weed free	2.03	1.13	12.73	7.06	89.89	10.70	10.52	10.38
SEm±	0.31	0.23	0.19	0.14	0.14	0.27	0.30	0.34
C.D (p≤0.05)	NS	NS	0.57	0.43	0.41	NS	NS	NS

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