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ASSESSMENT OF QUALITY PARAMETERS AND BIO-CHEMICAL PARAMETERS OF ROASTING TYPE BRINJAL HYBRIDS (*SOLANUM MELONGENA* L.)

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ABSTRACT

The present investigation entitled, "Assessment of Quality Parameter and Bio-chemical Parameters of Roasting type Brinjal Hybrids (*Solanum melongena* L.)" was carried out at AICRP on Vegetable Crops, Department of Horticulture, MPKV, Rahuri during *kharif* 2020. The experiment was laid out in the RBD with three replications. The experiment was comprised of seven hybrids and three checks. Among all the treatments dark purple colour of fruit was observed in hybrids RBH-1, RBH-2, RBH-7, check Phule Harit, Gallon and Bartok as commercial check. Purple colour observed in RBH-3. Light purple colour observed in RBH-4, RBH-5, RBH-6, green with white stripes at end observed in check Phule Harit. All treatments recorded oblong fruit shape. Treatment RBH-1 (T_1), RBH-2 (T_2), RBH-3- (T_3), RBH-7 (T_7), check Phule Harit, Gallon and Bartok as commercial check recorded less seed content, medium seed content recorded in RBH-4, RBH-6 recorded medium seed content. High seed content recorded in RBH-5. The treatment Gallon (T_9) recorded maximum TSS (6.41°Brix). Maximum moisture (92.37%) recorded in treatment RBH-2 (T_2). Maximum total sugars (4.14%), reducing sugars (2.90%) and non-reducing sugars (1.24%) recorded in Gallon (T_9). Maximum dry matter (12.30%) recorded in treatment RBH-5 (T_5).

Key words : Brinjal, Assessment, Quality, Bio-chemical, Roasting.

Introduction

The brinjal or eggplant (*Solanum melongena* L.) is a popular solanaceous crop in the subtropics and tropics. The crop owes its nativity to our country. The word brinjal is widespread in the Indian subcontinent and is derived from *Arabic* and *Sanskrit*. In Europe, it is also known as *aubergine* (French term). Odisha, Bihar, Karnataka, West Bengal, Andhra Pradesh, Maharashtra and Uttar Pradesh are among the states in India, where it is commercially grown. Kolhapur, Satara, Sangli, Pune, Ahmednagar, Nashik, Jalgaon, Nagpur, Chandrapur and Amravati are the major brinjal-growing districts in Maharashtra.

It is a perennial, but it's usually planted as a frost-sensitive, warm-season annual. It grows to be 0.4 to 1.5 meters tall and branching, with wide, broad leaves and a spiny stem. Fruits that are physiologically mature are brown or golden in colour. Spherical, oblong, ovoid, oval long and various intermediate shapes are among the shapes available. (Kumar *et al*., 2011).

The brinjal is a popular vegetable in India, Bangladesh, Pakistan, China and the Philippines, where it is grown extensively. Brinjal is India's most popular and widely farmed native vegetable crop (*Solanum melongena* L.). China, Turkey, Japan, Egypt, Italy, Indonesia, Iraq, Syria, Spain and the Philippines are all big brinjal producers, in addition to India. India is the world's second-largest producer with an area of 7.36 million hectares and a yield of 12777 metric tons.Brinjal occupies 8.14% of total vegetable land in India and accounts for 9% of total vegetable production. Odisha, Bihar, Karnataka, West Bengal, Andhra Pradesh, Maharashtra and Uttar Pradesh are among the states in India where it is widely distributed. West Bengal is the leading producer, with 3027.75 tonnes

produced and a 23.69% share of total output. Maharashtra, on the other hand, produced 429.91 tonnes, accounting for 3.36% of total production (Anonymous, 2020).

In India, as well as Maharashtra state, there is a lot of variation. As a result, it will be necessary to investigate the diversity and indigenous biodiversity found in this crop, which includes significant variation in plant type, stem colour, leaf size, leaf tip, midrib colour, thorniness, fruit size, fruit shape, fruit colour, fruit yield, fruit quality, cooking quality, pest and disease tolerance. Brinjal fruit has a lot of carbs (6.4%), proteins (1.3%), fats (0.3%), calcium (0.02%), phosphorus (0.02%), iron (0.0013%) and other minerals. In addition, per 100 g of fruit, it includes 34 mg carotene, 0.05 mg riboflavin, 0.05 mg thiamine, 0.5 mg niacin and 0.9 mg ascorbic acid (Jayalakshmi and Praneetha, 2018).

Brinjal is high in nutritional fibre and low in fat. It is primarily composed of water, with some proteins and carbohydrates, and is high in nutrients such as ascorbic acid, vitamin K, niacin, vitamin B_6, pantothenic acid and minerals such as calcium, magnesium, potassium and iron. Among other nutrients, it is high in total water soluble sugars, free reducing sugars and amide proteins. Brinjal's bitterness is attributed to the presence of glycoalkaloids.

For the majority of people both in cities and villages, it provides a source of money and work. The alkaloid found in the roots and leaves of brinjal is used to cure diabetes, asthma, cholera and bronchitis, among other ailments. The fruits are a great way to lower cholesterol. Diabetic people are thought to benefit from white brinjal. The percentage dry matter is a crucial characteristic for processing. Pest resistance is linked to phenol and the hairiness of leaves. The collection and evaluation of genotypes is a prerequisite for agricultural genetic improvement. (Rashmika *et al.*, 2016).

Materials and Methods

During the *kharif* season of 2020-21, the field experiment was undertaken at the AICRP on Vegetable Crops, Department of Horticulture, MPKV, Rahuri.). Seven brinjal hybrids and three checks were used in the experiment, which was carried out in a Randomized Block Design (RBD) with three replications. The treatments consisted of hybrids RBH-1, RBH-2, RBH-3, RBH-4, RBH-5, RBH-6, RBH-7 and checks Phule Harit, Gallon and Bartok.

The following observations were recorded during the crop growth period on five randomly selected competitive plans. Observations were recorded on quality parameters such as colour of fruits, shape of fruits, seed content. Bio-chemical parameters such as total soluble solids (°Brix), Moisture (%), sugars (%) and dry matter (%).

Qualitative parameters

1. Colour of fruits

Colour of harvested fruits was observed visually for their colour at different developmental stages.

2. Shape of fruits

The fruit shape of various hybrids (treatments) was observed and visually categorized as round, oblong, long and oval.

3. Seed content

The seed content of various hybrids was observed and visually categorized as less, medium, high.

Bio-chemical characters

1. Total soluble solid (°Brix)

The total soluble solid (TSS) of a fresh fruit sample was determined with the help of a hand refractometer. The values are expressed in °Brix.

2. Moisture (%)

100g of sample was taken and dried in a 60°C oven. The dried samples were then weighed, and this number was subtracted from the sample's fresh weight to get the moisture content. The percentages were used to express the values.

$$\text{Moisture } (\%) = \left[\frac{\text{Weight sample before drying (g)} - \text{Weight sample after drying (g)}}{\text{Weight sample before drying (g)}} \right] \times 100$$

3. Sugars (%)

The extract was used to calculate total and reducing sugars using the Phenol Sulphuric Acid method (Mecozzi, 2005) and the Nelson-Somogyi's method (Somogyi, 1966), respectively. By deducting the reducing sugar from the total sugars, the non-reducing sugars content was estimated. After that, the sugars content was expressed as a per cent.

$$\text{Total sugars } (\%) = \frac{\text{Sugars value from graph } (\mu g)}{\text{Aliquot sample used}} \times \frac{\text{Total vol. of extracts}}{\text{Wt. of sample (g)}} \times \frac{1}{1000}$$

$$\text{Reducing sugars } (\%) = \frac{\text{Sugar value from graph } (\mu g)}{\text{Aliquot sample used } (0.1 \text{ or } 0.2 \text{ ml})}$$

$$\frac{\text{Total volume of } alcohol - Free extracts}{\text{Wt. of sample } (100 \text{ mg})} \times \frac{1}{1000}$$

4. Dry matter (%)

After recording the weight of fresh fruits, they were oven dried at 50±1°C till they attained constant weight. Later the dehydrated fruits were weighed and percent dry matter in fruits was calculated.

$$\text{Dry matter } (\%) = \frac{\text{Dehydrated fruit weight } (g)}{\text{Fresh fruit weight } (g)} \times 10$$

The data was statistically analysed using the statistical procedures recommended by Panse and Sukhatme (1985). Wherever, the results were significant, the standard error (S.E.) of means was determined, and the critical difference (CD) between two means was calculated at a 5% level of significance. The data on individual plant characters was subjected to the analysis of variance approach, which is often used in randomised block design.

Results and Discussion

Quality parameter

The result of the present investigation for quality parameters are depicted in Table 1. There was wide variation in colour of fruits for different brinjal hybrids. Dark purple colour of fruit was observed in hybrids RBH-1, RBH-2, RBH-7, Gallon and Bartok as commercial check. Purple colour observed in RBH-3. Light purple colour observed in RBH-4, RBH-5, RBH-6, Green with white stripes at end observed in check Phule Harit. Above result sure in accordance with Mehta *et al*. (2004), Dash *et al*. (2019) and Haldavanekar *et al*. (2019). It was observed that all the hybrids and genotype having oblong type fruit shape. All hybrids RBH-1, RBH-2, RBH-3, RBH-4, RBH-5, RBH-6, RBH-7, check Phule Harit, Gallon and Bartok as commercial check having oblong shape. These results are in line with the result of Kadam *et al*. (2007), Haldavanekar *et al*. (2019).

The seed content of fruit was categorized as less, medium, high. Less seed content observed in RBH-1 (T_1), RBH-2 (T_2), RBH-3 (T_3) RBH-7 (T_7), check Phule Harit (T_8), Gallon (T_9) and Bartok (T_{10}) as commercial check. Medium seed content was noticed in, RBH-4 (T_4), and RBH-6 (T_6). High seed contain noticed in RBH-5 (T_5). The less seeds in the flesh were additionally the firmest and the most fibrous and fruits having the less seed or

Table 1 : Qualitative parameters of roasting type brinjal hybrids and genotype.

Treatment	Treatments	Colour of fruit	Shape of fruit	Seed content
T_1	**RBH-1**	Dark purple	Oblong	Less
T_2	**RBH-2**	Dark purple	Oblong	Less
T_3	**RBH-3**	Purple	Oblong	Less
T_4	**RBH-4**	Light purple	Oblong	Medium
T_5	**RBH-5**	Light purple	Oblong	High
T_6	**RBH-6**	Light purple	Oblong	Medium
T_7	**RBH-7**	Dark purple	Oblong	Less
T_8	**Phule Harit (c)***	Green with white stripes at end	Oblong	Less
T_9	**Gallon (cc) ****	Dark purple	Oblong	Less
T_{10}	**Bartok (cc) ****	Dark purple	Oblong	Less

Table 2 : Bio-chemical parameters of roasting type brinjal hybrids and genotype.

Treatment	Treatment details	TSS (°Brix)	Moisture (%)	Dry matter (%)
T_1	**RBH-1**	6.18	90.55 (72.10)	9.45 (17.90)
T_2	**RBH-2**	5.78	92.37 (73.98)	7.62 (16.02)
T_3	**RBH-3**	5.37	91.69 (73.25)	8.31 (16.75)
T_4	**RBH-4**	4.51	88.96 (70.63)	10.98 (19.34)
T_5	**RBH-5**	4.23	87.66 (69.46)	12.30 (20.53)
T_6	**RBH-6**	4.73	90.48 (72.05)	9.57 (18.01)
T_7	**RBH-7**	6.30	90.17 (71.75)	9.85 (18.28)
T_8	**Phule Harit (c) ***	6.13	90.84 (72.39)	9.61 (18.05)
T_9	**Gallon (cc) ****	6.41	89.94 (71.52)	9.47 (17.92)
T_{10}	**Bartok (cc)****	6.36	90.48 (72.04)	9.96 (18.40)
	S.E. (m) ±	0.24	0.58	0.28
	CD at 5%	0.71	1.72	0.84

Figures in parentheses indicate arc sin transformation.

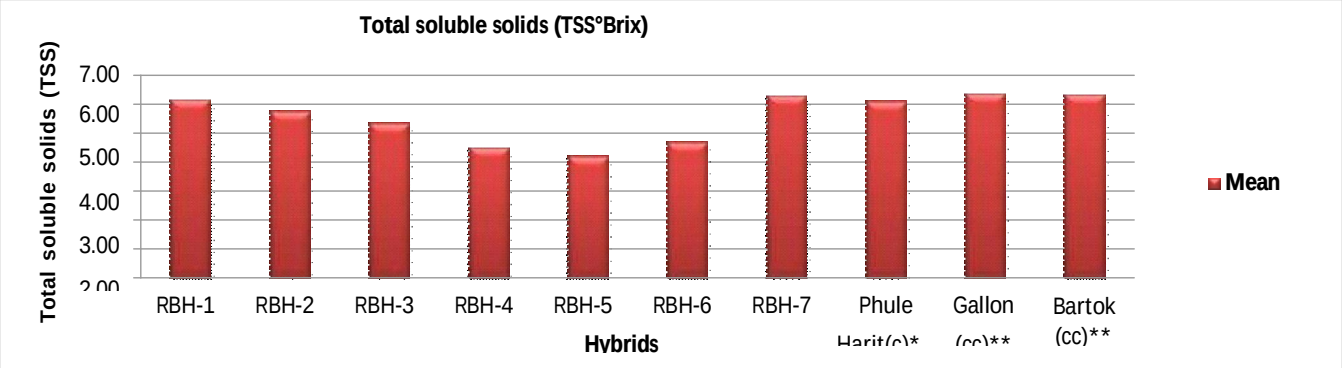

Fig. 1 : Total soluble solids of roasting type brinjal hybrids and genotype.

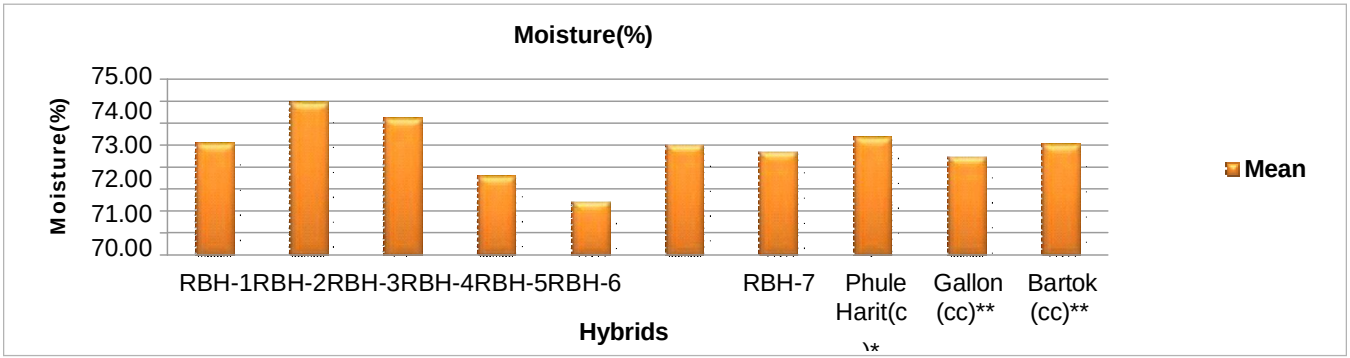

Fig. 2 : Moisture (%) of roasting type brinjal hybrids and genotype.

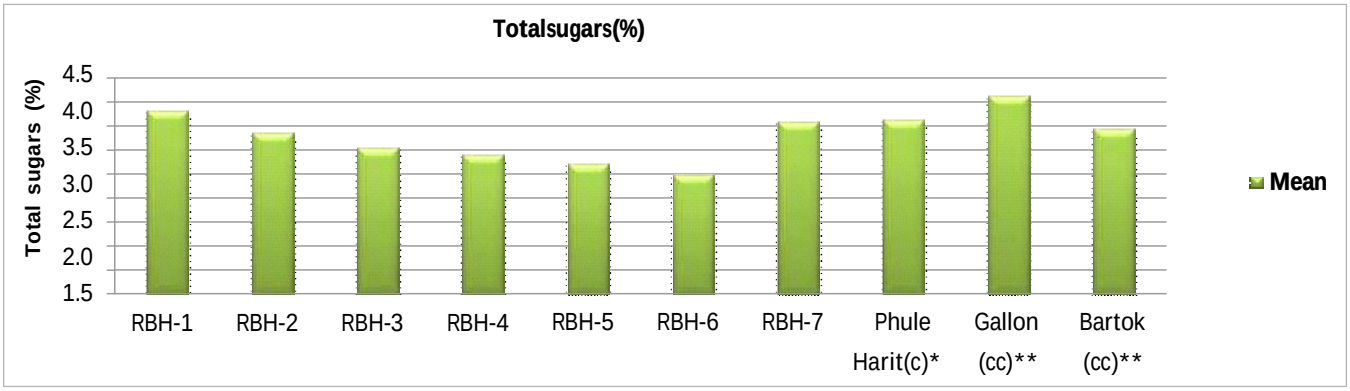

Fig. 3 : Total sugars roasting type of brinjal hybrids and genotype.

immature seed content high pulp is usually suitable for bharta preparation. Above result in accordance with Gayatri and Patil (2003) and Chaturvedi *et al.* (2016).

Bio-chemical parameters

The mean performance of bio-chemical parameters is presented in Table 2. The data on total soluble solids indicated that Gallon as commercial check (T_9) showed the maximum TSS of 6.41°Brix. There were five hybrids (Bartok as commercial check, RBH-7, RBH-1, checks Phule Harit and RBH-2) at par with it. Minimum TSS observed in RBH-5 (T_5) (4.23°Brix) and remaining 3 hybrids were at par with it. The results are in concordance with those of Gayatri and Patil (2003), Balaganoor (2008), Tripathy *et al*. (2017).

Among the hybrids, RBH-2 (92.37%) showed significantly higher moisture content which was at par with RBH-3 (T_3) (91.69%), check Phule Harit (T8) (90.84%) followed by RBH-1 (T_1) (90.55%), RBH-6 (T_6) (90.48%) and Bartok (T_{10}) (90.48%). These results are in line with the results of Gayatri and Patil (2003), Balaganoor (2008) and Kandoliya *et al.* (2020).

The result of the present investigation sugars are depicted in Table 3. The higher total sugars were exhibited by commercial check Gallon (4.14%) followed by RBH-1 (T_1) (3.84%), check Phule Harit (3.64%), RBH-7 (T_7) (3.61%). Lower total sugars noticed in RBH-6 (T_6) (2.49%). The higher reducing sugars was noticed in commercial check Gallon (T_9) (2.90%), which was at par with RBH-1 (T_1) (2.77%). Lower reducing sugars

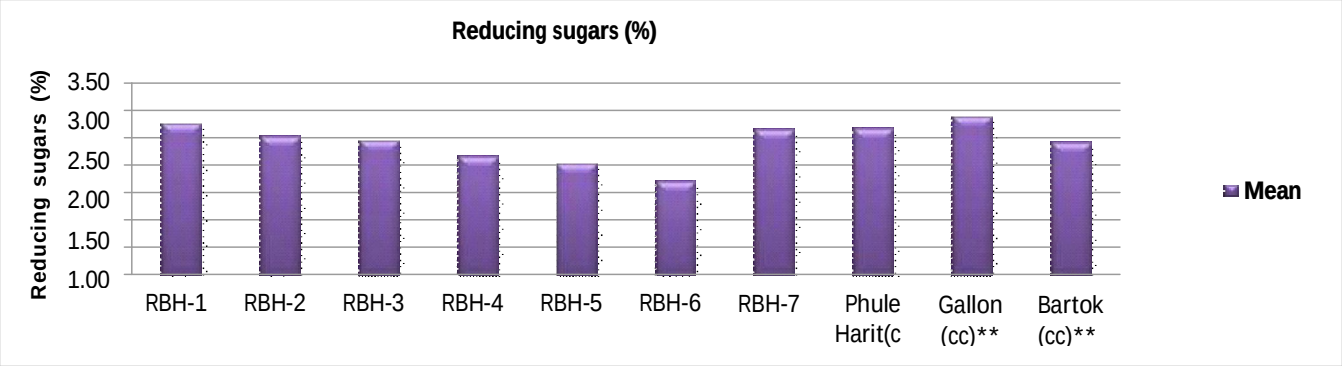

Fig. 4: Reducing sugars of roasting type brinjal hybrids and genotype.

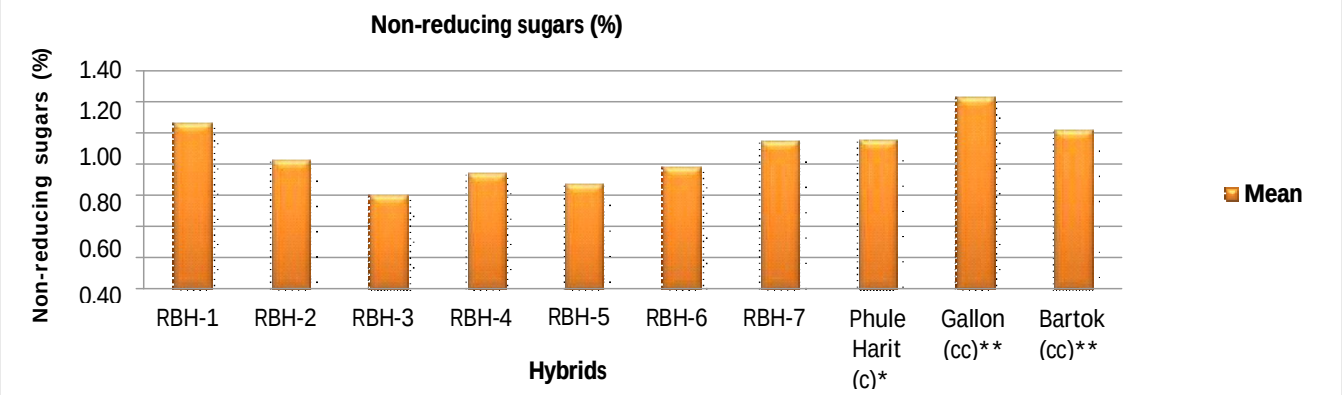

Fig. 5 : Non-reducing sugars (%) of roasting type brinjal hybrids and genotype.

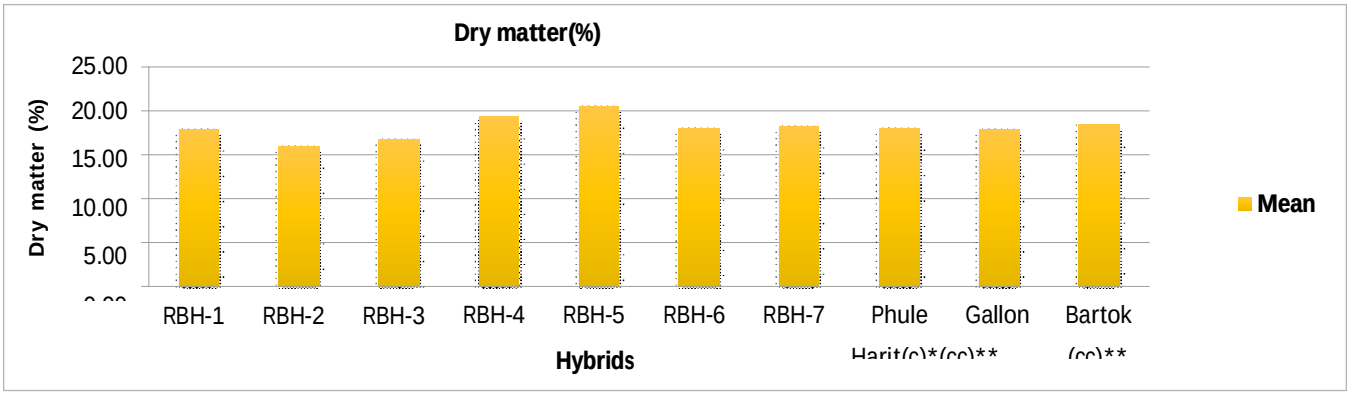

Fig. 6 : Dry matter (%) of roasting type brinjal hybrids and genotype.

Table 3 : Bio-chemical parameters of roasting type of brinjal hybrids and genotype.

Treatment	Treatment details	Total sugars (%)	Reducing sugars (%)	Non-reducing sugars (%)
T_1	**RBH-1**	3.84	2.77	1.07
T_2	**RBH-2**	3.36	2.53	0.83
T_3	**RBH-3**	3.06	2.45	0.61
T_4	**RBH-4**	2.91	2.16	0.75
T_5	**RBH-5**	2.73	2.05	0.68
T_6	**RBH-6**	2.49	1.70	0.79
T_7	**RBH-7**	3.61	2.65	0.96
T_8	**Phule Harit (c)***	3.64	2.68	0.96
T_9	**Gallon (cc)****	4.14	2.90	1.24
T_{10}	**Bartok (cc)****	3.45	2.42	1.03
	S.E.(m)±	0.06	0.04	0.060
	CD at 5%	0.19	0.13	0.18

noticed in RBH-6 (T_6) (1.70%). The maximum non-reducing sugar noticed in commercial check Gallon (T_9) (1.24%), which was at par with RBH-1 (T_1) (1.07%). Minimum non-reducing sugars exhibited by RBH-5 (T_5) (0.68). Above result in accordance with Awasthi and Dixit (1986), Gayatri and Patil (2003), Balaganoor (2008) and Kandoliya *et al.* (2020).

The hybrid RBH-5 (T_5) (12.30%) recorded the significantly higher dry matter content followed by RBH-4 (T_4) (10.98%), commercial check Bartok (T_{10}) (9.96%), RBH-7 (T_7) (9.85%), check Phule Harit (T_8) (9.61%), RBH-6 (T_6) (9.57%), RBH-1 (T_1) (9.45%), RBH-3 (T_3) (8.31%). Lowest dry matter content noticed in RBH-2 (T_2) (7.62%). Above result in accordance with Jaiswal *et al*. (1974), Bajaj *et al*. (1990) and Gayatri and Patil (2003).

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