Response of nutrients and mulches on qualitative Attributes of Strawberry (*Fragaria* × *ananassa* Duch.) cv. Chandler

Abstract

A field experiment was conducted at the Horticulture Research Farm-1, of the Department of Horticulture, School of Agricultural Sciences and technology, Babasaheb Bhimrao Ambedkar University (A Central University), Vidya- Vihar, Rae Bareli Road, Lucknow to evaluate the significance of mulching and nutrients the performances of Strawberry (*Fragaria* x *ananassa*) with respect to the qualitative character's parameters during 2019-20.The experiment was laid out in RBD having three replications. The result revealed significantly highest Tss (11.28)^{0}Brix, Total Sugar (8.89%), Reducing Sugar (6.85%), Non Reducing Sugar (2.39%), Acidity (0.63%) and Ascorbic Acid (41.90 mg/100g) in treatment T_9 (Black polythene FYM 100%) followed by the treatment T_{10} (Black polythene vermi-compost 100%). However, treatment T_1 (control) showed poor performance with respect to all qualitative parameters. Hence, the result lead to the conclusion that adoption of Black polythene with FYM 100% in Strawberry enhances all qualitative attributing parameters and black polythene with vermin-compost 100%showed second-best result.

Keyword: Strawberry, nutrients, mulches, growth and yield

Introduction

The Strawberry is a most important man made horticultural fruit crop. The modern cultivated octaploid Strawberry (*Fragaria X ananassa* Duch.) originated in France. It belongs to the family Rosaceae. It is one of the delicious and nutritious among soft fruit with wider adoptability. This crop is chiefly grown in the temperate world. However, it can be grown under sub-tropical climate and even at high altitude of tropical climate. Strawberry can be grown wide range of soil from heavy clays to light sand and gravels. However, strawberry plant grows well in sandy loam soil with pH of 5.5- 6.5(Anon1956). The strawberry fruit contains 0.5% total sugar and 0.90%to 1.85%acidity the prominent mailic acid and citric acid. As reported by Watt and Merrill (1959) 100 g of natural strawberry fruit contains protein 0.7g, fat 0.5 g, carbohydrate 8.4 g, Vitamin A

60 IU., thiamine 0.03 mg riboflavin.07 mg, niacin 0.60mg, vitamin C 59.0mg, calcium 21.0mg, phosphorous 21.0 mg, iron1.0 g, potassium 164 mg and sodium 1.0 mg. It is found that 10 to70gm catechin, 10 mg epicatechin, 10 mg caffeic acid, 10 to 15 mg P-coumaric acid, 10 to 35 mg 4- hydroxybenzoic acid, 5 mg protecatechuic acid and 10 to 40 mg gallic acid per kg of fresh fruit. Ethyl Easters are the major volatile compounds responsible for the flavour of fruits. Ethyl butanoate and ethyl hexanoate are the main easters identified in ripe fruits and asparagine, glutamine and alanine are the most prominent free amirto acid [Perez et al., (1992)]. Green and ripe, red achenes and leaf tissue of strawberry contain ellagic acid –an antimutagenic and anticarcinogenic plant phenol. Couture et al. (1988) found that ripe fruit contains slightly more lipid than unripe fruit and it contains more eleic acid and less linoleic acid. . The fruit of strawberry is a complete fruit with 98% edible portion. The first plant of the cultivated strawberry Fragaria x ananassa has originated in France and the two American diploids F. chiloensis and F. virginianaare considered in progenitors. The cultivated strawberry F. ananassa is grown all over the world but its progenitors are the Native to the new world. F. chiloensis is found to occur in Chile and along the coast from California to the Aleutian island while F. virginianais located in Canada and United States of America. Natural population of F. ananassa is restricted to the coastal California, Oregan and Washington (Sologalov, 1987). The most broadly distributed natural species is the diploid F. vasca which is found in North and South America, Europe, Asia and Hawai (Heike, 1997). The modern cultivated strawberry is of recent origin in Europe between 1714 and 1759).

MATERIALS AND METHODS

The experiment was conducted at Horticulture Research Farm –I of Department of Horticulture, School of Agricultural Sciences and Technology, Babasaheb Bhimrao Ambedkar University, Lucknow, India, during the academic year of 2019-20it is geographically situated in the subtropical tract of Central U.P. at $80^0$55’ East longitude and $26^0$56’ North latitude. The Horticulture Research Farm is situated at 10 Km away from the Lucknow Railway Station towards South-East in Lucknow Rae Bareli Road, Vidya-Vihar, near South City, Lucknow. This region received an average annual rainfall of 650-750 mm which is distributed over a period of more than 100 days with peak period during July-August. It is also receiving scattered show during winter months. In general, the temperature ranges from 3.5^0C to 45^0C. The coldest month

is January while, the maximum temperature is observed during May and June. The relative humidity (RH) is 50-77% in different season of the year. Lucknow is characterized by sub-tropical climate with hot, dry summer and cold winter. The soil of experimental farm was saline with soil pH less than 8.2, Electrical conductivity more than 4.0 and sodium exchangeable percentage less than 15.0.

Experimental Material:- The runners of Chandler variety of strawberry were brought from the Central Institute of Temperate Horticulture, Kashmir (J&K) in the month of October, 2019. The runners were kept for two days in shade for hardening before transplanting in well-prepared beds under open field condition plots which were distributed randomly in three replications. Standard cultural practices were followed during the period of the experiment for maintaining the runners.
List 1 : **The details of treatments used in the experiments are given below.**

T_1	White Polythene
T_2	White Polythene + FYM 100%
T_3	White Polythene + vermi-compost 100%
T_4	White Polythene + NPK 100%
T_5	White polythene FYM 50%+ Vermi-compost 50%
T_6	White Polythene FYM 50% + NPK 50%
T_7	White polythene Vermi-compost 50% + NPK 50%
T_8	Black Polythene
T_9	Black polythene + FYM 100%
T1o	Black Polythene + Vermi-compost 100%
T_{11}	Black polythene +NPK 100%
T_{12}	Black Polythene FYM 50%+ Vermi-compost 50%
T_{13}	Black Polythene FYM 50%+ Vermi-compost 50%
T14	Black Polythene Vermi-compost 50%+ NPK 50%

Observation recorded: Qualitative parameters like Total soluble solids were estimated at ambient temperature by digital hand refractometer (ATAGO Pocket 3810, PAL-1). Titrable acidity was calculated by titrating the fruit pulp extract with 0.1N NaOH using the phenolphthalein indicator. Acidity, Ascorbic acid, total sugar, reducing sugar, and non-reducing sugar content in fruit samples were estimated by the method described by Panse and

Sukhatme (1989).

Statistical analysis: The analysis of variance (ANOVA) for randomised block design (RBD) was performed using the OPSTAT (http://14.139.232.166/opstat) programme, according to the criteria provided by Gomez and Gomez (1984). Fisher and Yates' table was used for comparing 'F' values and computing critical difference (CD) at a 5% level of significance.

Results and Discussion

Response of different nutrients and mulches on quality attributes of strawberry

The Total soluble solids (T.S.S.) content of strawberry fruits were recorded with the help of Erma Hand Refractometer. The total soluble solid of various treatment combination has been represented in table, which was varied from (7.5%) to (11.28)^{0}Brix. The total soluble solids contents of fruits were increased significantly with different effect of FYM, NPK, Vermicompost, and Mulched with black and white polythene in comparison to control plants. The maximum total soluble solids (11.28) were recorded in the treatment nine fruits treated with black polythene with FYM 100% followed by treatment Ten (10.18) treated with black polythene vermi-compost 100%. These results are in conformity with the finding of Patil *et al.* (2004) in strawberry. The minimum acidity was observed with controlled treatment one (0.31%), whereas, the maximum acidity was recorded treatment nine (0.63%) followed by treatment ten (0.58). These results are in agreement with those obtained by Rajbir *et al*. (2008). In case of ascorbic acid the maximum data clearly showed that the treatment T9 (41.90 mg/100g) followed by the treatment T10 (40.20 mg/100g). Minimum value was found in the treatment T1 (control) (27.06 mg/100g). Significantly higher ascorbic acid content in fruits was also recorded in Black polythene FYM 100% in comparison to white polythene Patil *et al*. (2004).

The total sugar, reducing and non reducing sugar was observe maximum in treatment T9 (8.89%), (6.85%) and (2.39%) which is followed by T10 (8.54%), (6.78%) and (1.76%) respectively. However minimum non-reducing, reducing and total sugar was recorded (1.15%),(5%) and (6.15%) respectively. Among all the treatments the maximum amount of qualitative parameters were estimated when treatment treated with FYM 100% and mulched of black polythene and followed by treatment ten which black polythene and vermi-compost

100%.

Table 1: response of different nutrients and mulches on qualitative attributes of strawberry

Treatments	TSS	Acidity	Ascorbic Acid	Reducing sugar	Non-reducing sugar	Total sugars
T1	7.5	0.31	27.06	5.00	1.14	6.14
T2	8.8	0.57	30.13	4.15	1.16	5.31
T3	8.65	0.55	31.73	3.42	1.14	4.56
T4	8.3	0.57	30.60	2.25	1.27	3.52
T5	8.45	0.50	32.36	3.2	1.15	4.49
T6	8.42	0.41	33.93	4.38	1.36	5.74
T7	8.49	0.39	30.16	3.56	1.36	4.96
T8	7.7	0.38	29.50	5.15	1.20	6.35
T9	11.28	0.63	41.9	6.85	2.39	8.89
T10	10.18	0.58	40.2	6.78	1.76	8.54
T11	9.2	0.547	36.72	5.9	1.8	7.30
T12	9.69	0.383	35.50	5.1	1.5	6.60
T13	9.45	0.52	34.23	4.5	1.26	5.76
T14	9.6	0.53	32.53	2.2	1.05	3.25
C.D.	1.06	0.04	3.92	0.53	0.22	0.68
S.E(m)	0.36	0.01	1.34	0.18	0.07	0.23
S.E(d)	0.51	0.02	1.90	0.25	0.11	0.33

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