EVALUATION OF DIFFERENT JUICE VARIETIES OF GRAPE(*Vitis* sp.) FOR QUALITATIVE CHARACTERISTICS

Abstract

The present investigation was conducted at College of Horticulture, Rajendranagar, during the year 2022. The experiment was laid out in completely randomized design. The research experiment was conducted to evaluate qualitative parameters of different juice varieties of grape. The results revealed that maximum TSS (21.05 ^{0}B) and brix/acid ratio (42.96) were recorded in T_1 – H-516. Maximum pH was recorded in T_6 – Manjari Medika (4.03) and highest titrable acidity was recorded in T_5 – Gulabi X Bangalore Purple (0.71 %). Reducing sugars were highest in T_1 – H-516 (17.24 %), whereas total sugars were maximum in T_4 – Concord (28.56 %).

Introduction

Grape is one of the important fruit crops that belongs to the family Vitaceae. The family contains about 1000 species belonging to 17 genera that are typically shrubs or woody lianas which climb by means of their tendrils (Keller, 2015). Grape is a refreshing fruit, rich in sugars, acids, minerals, vitamins and tannins. Major constituents of fruits are carbohydrates (15 %), minerals (0.2-0.6 %), organic acids (0.3-1.5 %), nitrogenous compounds (0.03-0.7 %), iron (0.003-0.017 %/100 g), calcium (0.004-0.025 %), potassium (0.15-0.25 %), vitamin A (1-80 microgram), vitamin B complex (391-636 mg/100 g), and vitamin C (1-1.25mg/100 mg) (Winkler, 1965). As fresh fruit, grapes are very delicate and extremely perishable and have a very high rate of loss during harvest and distribution. Therefore, grapes are processed into different products like wine, raisins, juice, crush, jelly, canned grapes etc to reduce waste and improve the marketability and profit from grape cultivation. (Chandrasekar Venkitasamy*et al.,* 2019). Grape juice contains 81 to 86 percent of water, in which nutrient elements, sugar and natural acids are present in readily available forms. Hence grape juice assimilates in body fluid immediately after consumption, and act as an excellent health drink with instant source of energy

(Gurak *et al.,* 2010). The present study aims at evaluating the different juice varieties of grape for their qualitative parameters.

Material And Methods

The experiment was conducted at College of Horticulture, Rajendranagar, during the year 2022. Eight grape varieties (T_1 – H-516, T_2 – Arka Shyam, T_3 – Black Cornechen, T_4 – Concord, T_5 – Gulabi X Bangalore Purple, T_6 – Manjari Medika,T_7 – Pusa Navrang, T8 – Bangalore Blue) were collected from grape vines planted at Grape Research Station, Rajendranagar.

Total soluble solids (TSS) (^{0}Brix)

The TSS of grape juice was measured with the help of digital refractometer (HI 96801, Hanna, Romania). Data was expressed as degree Brix (^{0}B).

pH

The pH was determined using pH meter. pH meter was calibrated with the help of standard buffer solutions (pH 4.0 and 7.0). The juice sample was taken in 100 ml beaker and electrode was kept in the sample and read on pH meter.

Titrable acidity (%)

Titrable acidity in juice of different varieties of grape was estimated by adoptingthe procedure suggested by Lunkes and Hashizume (2014).

$$\text{Acidity (\%)} = \frac{\text{TV X Normality of alkali X Eqwt of acid X Vol made (ml) X 100}}{\text{Volume of aliquot (ml) X Weight of sample (g) X 1000}}$$

Brix/Acid ratio

Brix-acid ratio was calculated by dividing the TSS value by the acid value.

$$\text{Brix/Acid ratio} = \frac{\text{TSS value}}{\text{Acid value}}$$

Reducing sugars (%)

The reducing sugars were analysed by Lane and Eynon method suggested by Ranganna (1986).

$$\text{Reducing sugars (\%)} = \frac{\text{Factor X Volume made up X 100}}{\text{Titre value X Weight or volume of sample}}$$

Total sugars (%)

Total sugars in juice of different varieties were estimated by adopting the Lane and Eynon method suggested by Ranganna (1986).

$$\text{Total sugars (\%)} = \frac{\text{Factor X Volume made up X 100}}{\text{Titre value X Weight or volume of sample}}$$

Results and Discussion

Trials were conducted to evaluate different juice varieties of grape for qualitative parameters. The data recorded were statistically analysed and the results obtained are presented in the Table 1.

Total soluble solids (^{0}Brix)

The evaluation of TSS content established significant differences between different grape juice varieties. Among the different grape juice varieties, total soluble solids were significantly highest in T_1 – H-516 (21.05 ^{0}Brix) which was statistically on par with T_4 – Concord (20.87 ^{0}Brix), whereas significantly lowest total soluble solids were observed in T_5 – Gulabi X Bangalore Purple (17.47 ^{0}Brix). The variation in TSS may be attributed to changes in site, locality, topography and environment (Soni *et al.*, 2019). The variation in TSS of grape grown under same environment could be because of experimental conditions (Vijaya *et al.*, 2018). The results from current investigation are in accordance with the findings reported by Mehan *et al.* (2006), Patil *et al.* (2008), Gill *et al.* (2009), Ratnacharyulu (2010) and Vijaya *et al.* (2018) in different varieties of grape.

pH

pH was found significant in all treatments. Of all the varieties evaluated, T_6 – Manjari Medika had significantly highest pH (4.03), followed by T_1 – H-516 (4.00), while T_5 – Gulabi X Bangalore Purple recorded significantly lowest pH (3.22). The variation in pH of berry juice depends on genotypes, cultivars and environmental condition (Eshghi *et al.,* 2014). Karibasappa*et al.* (2008), Ratnacharyulu (2010), Sahoo *et al.* (2018) and Akram *et al.* (2020) reported similar findings in different grape varieties.

Titrable acidity (%)

Significantly maximum titrable acidity was obtained in T_5 – Gulabi X Bangalore Purple (0.71 %) which was statistically on par with T_3 – Black Cornechen (0.68 %), whereas the minimum titrable acidity was obtained in T_6 – Manjari Medika (0.48 %). The difference in acidity among different varieties might be due to varietal difference and other factors like storage conditions (Akram *et al.*, 2020). The reduction in acidity at the time of harvest is also due to dilution effect caused by increased fruit size (Khan *et al.,* 2011). Similar observations in different varieties of grape were reported by Ghosh *et al.* (2006), Kumar and Rajan (2008), Patil *et al.* (2008), Gill *et al.* (2009) and Soni *et al.* (2019).

Brix/Acid ratio

Among the different grape juice varieties, T_1 – H-516 recorded significantly highest brix/acid ratio (42.96) which was statistically on par with T_6 – Manjari Medika (41.52), while T_5 – Gulabi X Bangalore Purple recorded the lowest brix/acid ratio (24.61). The brix/acid ratio varies in different varieties of grape because amount of TSS/TA ratio is governed by genetical constitution, phenotypical factors and also the day and night temperature generally favours the accumulation of solutes (Sahoo *et al.,* 2018). Mehan *et al.* (2006), Ghosh *et al.* (2006) and Gill *et al.* (2009) reported similar findings in various grape varieties.

Reducing sugars (%)

All the varieties exhibited significant differences in the reducing sugars with significantly highest being T_1 – H-516 (17.24 %) which was followed by T_4 –

Concord (16.39 %), whereas T_7 – Pusa Navrang recorded significantly lowest reducing sugars (10.86 %).The difference in reducing sugars among the grape varieties might be because of the fact that the sugars in grapes are greatly influenced by varietal difference and environmental condition (Yinshan*et al.*, 2017; Akram *et al.,* 2020). The results of present investigation are supported by findings of Ratnacharyulu (2010) and Bahksh*et al.* (2022) in different grape varieties.

Total sugars (%)

Total sugars were found significant in all treatments. Of all the varieties evaluated, significantly highest total sugars were recorded in T_4 – Concord (28.56 %) which was followed by T_1 – H-516 (25.60 %), while lowest total sugars were recorded in T_2 – Arka Shyam (14.21 %).The variation in the total sugars might be due to genetic makeup of the variety and environmental condition (Shiraishi *et al.*, 2010; Khan *et al.*, 2011). Similar findings were reported by Ghosh *et al.* (2006), Ratnacharyulu (2010) and Akram *et al.* (2020) in different grape varieties.

Conclusion

The results from the present investigation revealed that TSS was recorded maximum in T_1 – H-516 (21.05 ^{0}B) which was statistically on par with T_4 – Concord (20.87 ^{0}B). T_6 – Manjari Medika recorded maximum pH (4.03) followed by T_1 – H-516 (4.00). The maximum titrable acidity was found in T_5 – Gulabi X Bangalore Purple (0.71 %) which was statistically on par with T_3 – Black Cornechen (0.68 %). Highest brix/acid ratio was recorded in T_1 – H-516 (42.96) which was statistically on par with T_6 – Manjari Medika (41.52). T_1 – H-516 recorded maximum reducing sugars (17.24 %) followed by T_4 – Concord (16.39 %), whereas maximum total sugars were recorded in T_4 – Concord (28.56 %) followed by T_1– H-516 (25.60 %).

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Table 1 :Evaluation of different juice varieties of grape for qualitative parameters

Treatments	Total soluble solids (^{0}Brix)	pH	Titrable acidity (%)	Brix/Acid ratio	Reducing sugars (%)	Total sugars (%)
T_1 : H - 516	21.05	4.00	0.49	42.96	17.24	25.60
T_2 : Arka Shyam	18.57	3.44	0.54	34.38	12.82	14.21
T_3 : Black		3.38				

Cornechen	19.13		0.68	28.13	11.36	15.16
T_4 : Concord	20.87	3.64	0.56	37.27	16.39	28.56
T_5 : Gulabi X Bangalore Purple	17.47	3.22	0.71	24.61	13.51	19.18
T_6 : Manjari Medika	19.93	4.03	0.48	41.52	14.49	22.53
T_7 : Pusa Navrang	18.84	3.99	0.51	36.94	10.86	16.34
T_8 : Bangalore Blue	20.67	3.34	0.58	35.64	12.65	15.92
SEm±	0.09	0.01	0.01	0.60	0.26	0.29
CD at 5%	0.26	0.02	0.03	1.79	0.78	0.86
CV	0.76	0.27	2.74	2.94	3.28	2.52