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Studies on Bio-chemical Characteristics of Some Sapota Varieties in Gangetic Alluvial Zone of West Bengal, India

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ABSTRACT

The present study was undertaken, during 2017-2018, for the purpose of evaluation of six sapota varieties, namely, Cricket Ball, CO-1, CO-2, PKM-1, PKM-2 and PKM-3, with special reference to bio-chemical parameters of optimally matured fruits, at Gangetic Alluvial zone of West Bengal. The variations in gene configuration evolved significant differences with respect various bio-chemical attributes of sapota. Among the six genotypes of sapota studied in the present experiment, CO-3 proved to be the best with respect to TSS, total, reducing and non-reducing sugar, titratable acidity, ascorbic acid and total phenol contents of sapota fruit. CO-2 and PKM-3 also resulted in a preferred manner with respect to the contents of the same. So, the varieties namely, CO-3, CO-2 and PKM-3 may prove to be very much useful as parental materials, from fruit bio-chemical point of views, during future breeding programme related to improvement of quality of sapota.

Key words*: Ascorbic acid, Gangetic alluvial, Non-reducing sugar, Phenol, Reducing sugar, Sapota, Total sugar, TSS.*

Introduction

Sapota (*Manilkara achras* (Mill.) Fosberg) is one of the delicious fruits of humid tropical and subtropical regions, belonging to the family Sapotaceae. It is also known as sapodilla or chiku. It is a native of tropical America and has now spread to almost all tropical countries of the world. India is one of the leading producers of sapota with an area and production of 107.2 thousand ha and 1284.6 thousand metric tonnes respectively (Anon., 2017). The pulp is very sweet, soft, melting and crumbling sometimes with a sandy or granular structure and contains about 1-5 hard black glossy seeds. In perennial crops like sapota, guava etc., the important way to develop a new high yielding variety with specific desirable characteristics is selection of superior genotypes based on the existing phenotypic forms and use them directly or in future breeding programmes. Since, sapota is an open pollinated crop, a great deal of variability was shown up in the population. Therefore, the high genetic variability in Indian sapota cultivars might have originated through seedling segregation, inter crossing among cultivars or because of a large number of cultivars or genotypes were introduced (Suhasini *et al*., 2013). Despite its wide cultivation throughout the world, the genetic diversity of the crop has not been studied, so evalu-

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ation and characterization is an important aspect for documentation of the performance of the different genotypes of sapota, which is particularly lacking in West Bengal condition, which subsequently will help to introduce, select, and improve existing sapota varieties. Keeping a close view towards the above mentioned facts the present research experiment entitled as "Studies on bio chemical Characteristics of Some Sapota Varieties in Gangetic Alluvial Zone of West Bengal" was conducted with the following objectives -

To study the bio-chemical characteristics of the fruits different Sapota varieties in Gangetic alluvial or new alluvial zone of west Bengal.

Materials and Methods

The experimental site lies at A.I.C.R.P. on Fruits Research station of Mondouri in the field of R.K.V.Y. Ad-hoc Project on 'Survey, collection, conservation and maintenance of under-utilized fruits' in the plains of New Alluvial zone of West Bengal with an elevation of 9.75 m above mean sea level. It is located at 23.5^0N latitude and 80^0E longitude during 2017-18. The soil type of the experimental field was clay loam having sufficient depth, moderately fertile with soil pH of 6.7. Six numbers of varieties of sapota *viz*, Cricket Ball, CO-2, CO-3, PKM-1. PKM-2 and PKM-3 were evaluated with respect to various fruit bio-chemical parameters. The experiment was laid out in a randomized block design with four replications.

Results and Discussion

The observation based on the bio-chemical parameters of various sapota varieties under the present investigation had been documented in Table 1. The genetic differences on the TSS were found to be significant among the different varieties of sapota under the present study. The highest TSS was observed in CO-3 genotypes, with a measured value of 22.65^0 Brix, very closely and insignificantly followed by CO-2 (22.33^0 Brix). In contrast to this the lowest value for this parameter was recorded in PKM-1 (21.64^0 Brix), which differed significantly from those obtained from CO-3 and CO-2. As per the findings of the current study, CO-3 also showed the highest contents with respect to all types of sugar, where the values of total, reducing and non reducing sugar contents had been determined as 15.26, 7.55 and 7.32, respectively. The second highest results for the same parameters were documented from CO-2, where these values were obtained as 15.14, 7.48 and 7.28%, respectively. Data collected on titratable acidity showed significant difference due to the effect of different genotypes. The highest acidity was found in CO-3 genotypes of 0.197%, which was very closely followed by CO-2 and PKM-3, both contained an acidity figure of 0.194%. In contrary the lowest titratable acidity was visualized from variety PKM-1, with a measure of 0.125%. Various genotypes of sapota exhibited remarkable variation over the ascorbic acid content of mature ripe sapota fruit, which ranged between 9.06 to 10.17 mg/100g and the lowest and highest values for the same were found in case of PKM-1 and CO-3, respectively. Relatively preferred result with respect to ascorbic acid content of the fruit of sapota also had been documented from CO-2 and PKM-3, where these values were obtained as 10.07 and 9.78 mg/100g, respectively. Tabular representation of data with respect to total phenol content showed significant difference due to the effect of different genotypes.

Table 1. Bio-chemical parameters of the fruits of various sapota genotypes

Varieties	TSS (°Brix)	Total Sugar (%)	Reducing sugar (%)	Non-reducing sugar(%)	Titratable Acidity (%)	Ascorbic acid (mg/100g)	Total phenol (mg/100g)
Cricket Ball	21.28	14.45	7.11	6.97	0.191	9.28	0.373
CO-2	22.33	15.14	7.48	7.28	0.194	10.07	0.408
CO-3	22.65	15.26	7.55	7.32	0.197	10.16	0.415
PKM-1	20.64	14.26	7.06	6.84	0.125	9.06	0.357
PKM-2	21.76	14.52	7.15	7.00	0.193	9.54	0.384
PKM-3	21.93	14.75	7.15	7.22	0.194	9.78	0.395
S.Em.(±)	0.017	0.014	0.012	0.015	0.001	0.013	0.001
C. D. at 0.05	**0.050**	**0.043**	**0.035**	**0.045**	**0.003**	**0.040**	**0.004**

The highest total phenol content was found in CO-3 genotypes of 0.415 mg/100g and the lowest was found in PKM-1 genotypes (0.357 mg/100g). Considerably higher values for total phenol content were also registered as 0.408 and 0.395 mg/100g from varieties CO-2 and PKM-3, respectively. The overall variation with respect to different fruit bio-chemical attributes of sapota might be attributed to the variable genetic configuration among different varieties of sapota and the interaction of genetic and environmental factors that influenced the gene expression. The result of this experiment revealed close agreement with the findings of Saraswathy *et al.* (2010); Radha (2014); Harshavardhan (2015) and Govindraj (2015).

Conclusion

As a pertaining fact of the present study it could be stated here that variations in gene configuration evolved significant differences with respect various bio-chemical attributes of sopota. Among the six genotypes of sapota studied in the present experiment, CO-3 proved to the best with respect to TSS, total, reducing and non reducing sugar, titratable acidity, ascorbic acid and total phenol content of sapota fruit. CO-2 and PKM-3 also resulted in a preferred manner with respect to the contents of the same. So, the varieties namely, CO-3, CO-2 and PKM-3 may prove to be very much useful as breeding materials, from fruit bio-chemical point of views, during future breeding programme related to improvement of quality of sapota fruit.

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