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To study about biochemical changes (TSS, titrable acidity and TSS/ acid ratio) of dragon fruit nectar during storage

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Abstract
The current investigatory work entitled "study about biochemical changes (TSS, titrable acidity and TSS/ acid ratio) prepared Product (nectar) during storage. " was executed at Pomology Laboratory, Department of Pomology, Pt K.L.S. CHRS, Pendri, Rajnandgaon, IGKV, Raipur, Chhattisgarh during year 2019-2020. The analysis of chemical variation of nectar of dragon fruit at fortnight meantime for course of 45 days preservation by implementing CRD with 3 replication inside lab condition. Each replication comprised of 7 treatments for nectar. The nectar comprise of 20 percent pulp and 0.3 percent acidity and recipe is varied by different concentration of TSS. The nectar prepared from treatment T_7 containing 20 percent pulp,0.3 percent acidity and 22 percent TSS shows highest value of TSS, TSS Acid ratio, while peak acidity value observed was of treatment T_1 (20 percent pulp+16 percent TSS + 0.3 percent acidity).

Keywords: Dragon fruit (*Hylocereus costaricensis*), TSS, titratable acidity, TSS/acid ratio, nectar, replication, treatment, biochemical

1. Introduction
Dragon fruit (*Hylocereus* spp.) is a sweltering climate bearer climbing cactus. The genus *Hylocereus* belongs to Cactaceae family, which is a dicotyledonous flowering plant family, under Caryophyllales order. In Latin America it is also known belle of the night and condrella plant. It contains antioxidant such as flavanoids, phenolic acid and betacyanin and naturally fat free and high fibre. These is a low acid food and Its pH values ranges between 4.4 and 5.1 out of which malic acid forms major portion. (Nomura *et al*., 2005) [2]. Biochemical estimation of fruit showed that the 100 gm fruit has moisture content of about 83-88%, titratable acidity between 0.20 to 0.30 mg lactic acid equivalents, total soluble solids (TSS) between 8-12°Brix.
Dragon fruit can be consumed fresh. Its flowers can be consumed directly or macerated in tea. Rarely utilized in flavouring other drinks. The pulpy and luscious flesh can also be jumbled with milk or sugar, utlizied in marmalades, jellies, ices and soft drinks. It can also be transformed into juice, jam, RTS, nectar, squash, red wine, etc. Beside it can be useful to develop factory products such as preserve, ice cream, syrup, yogurt, candy, pastry, spread and ketch up. (Anonymous, 2006) [1]. Rarely pulp jumbled in pizzas. Processed products can be made from fresh pulp or frozen pulp. The red and pink pulp of dragon fruit can be used as a food dying agent and as a raw material for the food dying factories (Wybraniec and Mizrahi, 2002) [4]. The flower buds are utilized to make soups or jumbled in salads, and could also be consumed as a vegetable. The peels can be parched to separate pectin and antioxidants. The utilization of red pitaya as a raw material makes the food attractive and eye catching and also add up to nutritional composition of its processed products.
This fruit is new to Chhattisgarh and is cultivated in some parts of Raigarh district (Kotra, Kharsia) Raipur, Rajnandgaon and Durg district. And there are rare work done in dragon fruit in India especially in processing. As hot climate and low rainfall is suitable for its cultivation so its area and production will increase in Chhattisgarh in future so there is need to standardize the recipe for preparation of useful products from it such as jam, jelly and beverages.

2. Materials and Method
The recent research on Study about biochemical changes (TSS, titrable acidity and TSS/ acid ratio) prepared Product (nectar) during storage was conducted during 2019-20 in the laboratory of Department of fruit science, Pt K.L.S College of Horticulture and Research Station Rajnandgaon (C.G).

It is located at 21.10°N latitude, and 81.03°E longitude and at an altitude of 307 m MSL under Chhattisgarh plains. It has tropical and dry spell throughout the year, However the temperature observed is 10 °C during winter and in summer reaches the 48 °C. This place bears hot windy climate during summer and precipitation annually of 1250 mm out of which approximately 85% is precipitated from third week of June to mid of September and remaining precipitate in month of October to February. May month has maximum temperature while December month has minimum temperature. The basic material used in this present research are firm, well developed and uniform ripened dragon fruit of *Hylocerus costaricensis* species which were obtained from farm of Chawda Bagh, Nandanvan Road, Raipur. And chemical and solution needed for analysis were provided by Fruit Science Processing laboratory, Pt. K.L.S College of Horticulture and Research Station Rajnandgaon C.G and Soil Science laboratory, S.K.S College of Agriculture and Research Station, Rajnandgaon C.G. Equipment and instruments required for analysis of product are provided by Soil Science laboratory, S.K.S College of Agriculture and Research Station, Rajnandgaon C.G.

The bottles of nectar beverage was stored under favourable environment for further analysis and observation upto 45 days and analysis conduted at 15 days interval. The Dragon fruit pulp/product was evenly crushed with a mortar and pestle. A drop of crushed pulp was laid on the prism of Hand refractometer and TSS was recorded as °Bx. Titrable acidity of nectar is estimated by procedure described by Rangana (1997) [5]. For estimation of total acid content 10 ml sample of RTS titrated against the standard solution of N/10 NaOH using phenolphthalein as indicator. The end point judged by light pink colour. The acidity expressed in percentage (%). By dividing total soluble solid of pulp to acid of fruit pulp, T.S.S / Acid ratio of different samples of product are obtained separately

3. Result and Discussion

The dragon fruit nectar shows following biochemical variation during storage. The Total Soluble Solid value of nectar a at its intial preparation time peak TSS value observed was 21.94 with the treatment T_7 (20 percent pulp 22 percent TSS + 0.3 percent acidity)). After 15 days storage of dragon fruit Nectar peak Total Soluble Solid value observed was 21.97 with the treatment T_7 (20 percent pulp 22 percent TSS + 0.3 percent acidity). After 30 days storage of dragon fruit Nectar peak Total Soluble Solid value observed was 22.21 with the treatment T_7 (20 percent pulp 22 percent TSS + 0.3 percent acidity). After 45 days storage of dragon fruit Nectar peak Total Soluble Solid value observed was 22.39 with the treatment T_7 (20 percent pulp 22 percent TSS + 0.3 percent acidity). The rise in TSS might be due to fact that dragon fruit juice has high TSS initially and room temperature accelerated the biochemical changes of conversion of complex sugar into simple sugar.

At the time of preparation peak acidity value observed was 0.37 with the treatment T_1 (20 percent pulp 16 percent TSS + 0.3 percent acidity). After 15 days storage of dragon fruit Nectar peak acidity value observed was 0.38 with the treatment T_1 (20 percent pulp16 percent TSS + 0.3 percent acidity). After 30 days storage of dragon fruit Nectar peak acidity was 0.47 with the treatment T_1 (20 percent pulp16 percent TSS + 0.3 percent acidity). After 45 days storage of dragon fruit Nectar peak acidity value observed was 0.50 with the treatment T1 (20 percent pulp 16 percent TSS + 0.3 percent acidity) At the time of preparation peak TSS acid ratio value observed was 78.35 with the treatment T_7 (20 percent pulp 22 percent TSS + 0.3 percent acidity). After 15 days storage of dragon fruit Nectar peak TSS acid ratio value observed was 75.75 with the treatment T_7 (20 percent pulp 22 percent TSS + 0.3 percent acidity). After 30 days storage of dragon fruit Nectar peak TSS acid ratio value observed was 69.40 with the treatment T_7 (20 percent pulp 22 percent TSS + 0.3 percent acidity). After 45 days storage of dragon fruit Nectar peak TSS acid ratio value observed was 65.84 with the treatment T_7 (20 percent pulp 22 percent TSS + 0.3 percent acidity)

4. Conclusion

The TSS shows growing pattern with passage of course of storage for 45 days. The TSS value of Nectar was peak for treatment T_7 comprising of 20% pulp, 0.3% acidity, 22% TSS. while the TSS value of Nectar was least for treatment T1 comprising of 20% pulp, 0.3% acidity, 16% TSS. The acidity shows growing pattern with passage of course of storage for 45 days. The acidity value of Nectar was peak for treatment T1 comprising of 20% pulp, 0.3% acidity, 16% TSS. while the acidity value of Nectar was least for treatment T_7 comprising of 20% pulp, 0.3% acidity, 22% TSS. The TSS acid ratio shows diminishing pattern with passage of course of storage for 45 days. The TSS acid ratio value of Nectar was peak for treatment T_7 comprising of 20 percent pulp, 0.3 percent acidity, 22 percent TSS. while the TSS acid ratio value of Nectar was least for treatment T1 comprising of 20 percent pulp, 0.3 percent acidity, 16 percent TSS.

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