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Preparation of Antioxidant Rich Herbal Mint Flavored Beverages using Grapes Juice

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ABSTRACT: ***The present study entitled "Preparation of Antioxidant Rich Herbal Beverages Using Grapes Juice" was under taken to analyze the nutritional composition of grape and celery to be used for beverage preparation, using a variety of fruit bases like mint, also to chemically determine the nutritional constituents of the prepared beverages. Three different beverages were prepared using three different fruit base The five treatments that were applied in each product were T_0 (fruit juice-100%), T_1 (grapes juice 93%, celery juice 5% and mint extract 2%), T_2 (grapes juice 86%, celery juice 10% and mint extract 4%), T_3 (grape juice 79%, celery juice 15% and mint extract 6%) and T_4 (grapes juice 72%, celery juice 20% and mint extract 8%), T_5 (grapes juice 65%,celery 25% and mint extract 10%). The beverages prepared were organoleptically evaluated with regard to color, consistency, taste and flavor and overall acceptability using the 9 point Hedonic Scale. The nutritional compositions of the beverages were chemically determined with reference vitamin-C, total carbohydrate, carotene, iron and calcium using standard chemical procedures. The pH and viscosity was analyzed using standard AOAC (2005) procedures. The results were statistically analyzed using two way Analysis of Variance technique.***

Total carbohydrate content ranged from 9.98g to 49.90g/100ml, the carotene ranged from 2µg to 244.4µg, the highest being in grape and celery with mint. The iron content ranged from 1mg to 293.3mg/100ml highest being in grapes and celery with mint, the vitamin-C was between 6mg and 28.55mg, the highest being in grapes and celery with mint. The calcium content ranged from 1mg to 26.35mg/100ml, the highest being in grape and celery with mint. The pH ranged between 1.12 and 3.37. The viscosity ranged between 56 and 60.12 centipoises. Carotene, iron, calcium and vitamin C contents increased in the treated samples of all the four beverages as compared to control. Energy and Total carbohydrate content is decreased in the treated samples of all the four beverages as compared to the respective controls. Addition of herbal extracts not only increased the nutritional contents but also added variety in the choice of beverages.

INTRODUCTION

One of the best ways to keep our immune system strong is to include fruits and vegetables which are rich in nutrients called antioxidants that are good for our immune system. Our bodies are battlegrounds against infection and diseases. Normal body functions such as breathing or physical activity and other lifestyle habits such as smoking produce substances called free radicals that attack healthy cells. A glass of Fruit Grapes juice keeps your brain active, alert and healthy. Grape Juice is believed to increase the blood flow

in the brain. We all are aware of the negative effects of solar Radiation. Grapes juice helps to protect your body against the harmful rays of sun.

The leaf blades with petioles are commonly used in salads, while the seeds are used to reduce the lipid level in the blood, helping to avoid cardiovascular diseases (**Shehata and Soltan, 2012**) Celery can prevent cardiovascular diseases, jaundice, liver diseases, urinary tract obstruction, gout, and rheumatic disorders. Research on rats shows that ethanol extracts of celery leaves increases spermatogenesis and also improves their fertility. Celery reduces glucose, blood lipids, and blood pressure, which can strengthen the heart. Experimental studies show that celery has antifungal and anti-inflammatory properties.Mint some of its constituents is known for antimicrobial and antioxidant properties. Mint is one of the most widely consumed single ingredients in herbal teas, and the essential oil of mint is used in traditional medicine **(*Lv et al.*, 2012).**Mint has significant antimicrobial and 1105 antiviral activities, strong antioxidant and antitumor actions, and exhibits some antiallergenic potential **(Skalicka-Woźniak and Walasek, 2014.**

Along with the regular diet, supplementation with a healthy beverage can be a welcome change- Vitamins, fibers and minerals provided by grape fruit will ensure good health and immunity from diseases. Problems such as obesity, diabetes, heart diseases and other life style can be prevented by having a healthy beverage made out of grape fruit, celery extract, and mint Vitamin C, along with other antioxidants, neutralizes damaging free radicals that destroy healthy cells. The vitamin C we get from grape juice protects our bodies from the harmful effects of free radicals that cause early aging, and aids in the absorption of essential minerals like calcium. Drinking fruit juices regularly is thought to decrease levels of low-density lipoprotein, or LDL, cholesterol. This beverage suitable for all age group people. The main objectives of this research were to prepare grapes juice based antioxidant rich herbal flavored (celery, mint) beverages, to assess the organoleptic attributes of prepared flavored beverages, to find out the physic-chemical properties and nutritional composition of the developed., to determine the antioxidant content in the prepared beverages

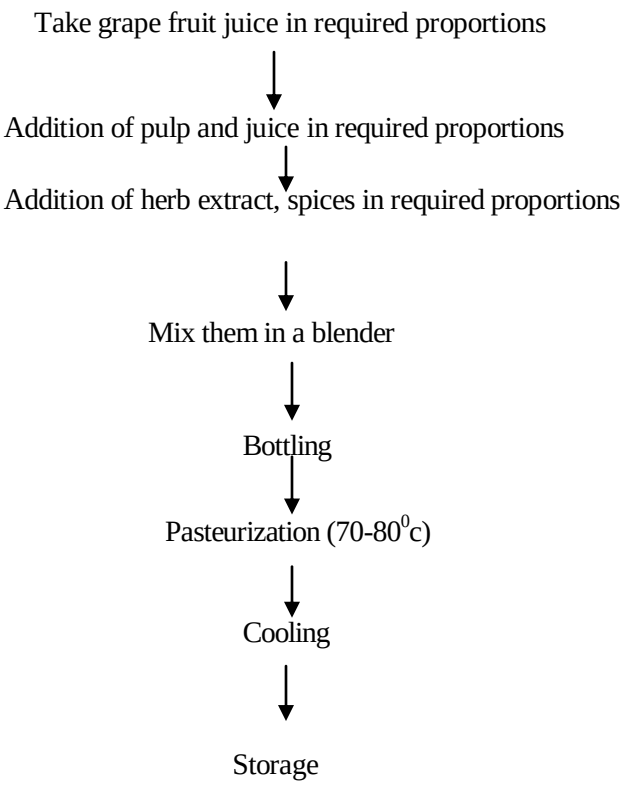
MATERIALS AND METHODS

The present investigation entitled **"Preparation of Antioxidant Rich Herbal Flavored Grapes juice Based Beverages"** was conducted in the Nutrition Research Laboratory, Department of **Food Nutrition** and Public Health Ethelind **Collage of Home Science, Sam Higginbottom Agriculture University Allahabad, U.P.**The basic recipe served as control (T0) five value added treatments i.e. incorporated with celery extract at 5 ml, 10 ml, 15 ml, 20 ml, and 25 ml were referred to as T1, T2, T3, T4 and T5 Mint,. Control and treatments for each preparation were replicated 5 times respectively.

Treatment	Grapes juice (ml)	Celery juice (ml)	Mint (ml)	Replication
T_0	100	-	-	5
T_1	93	5	2	5
T_2	86	10	4	5
T_3	79	15	6	5
T_4	72	20	8	5
T_5	65	25	10	5

Fig: Flowchart for preparation of celery pulp.

- **Preparation of the beverage:-**



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Treatments	Color	Consistency	Flavor	Taste	Overall acceptability
T_0	7.00	7.12	7.48	8.08	7.42
T_1	6.35	6.85	7.00	6.62	6.70
T_2	7.13	7.26	7.55	7.40	7.35
T_3	7.68	7.92	8.17	7.82	7.89
T_4	8.28	8.52	8.82	8.92	8.63
T_5	5.04	4.96	5.12	5.16	4
F%	Significant	Significant	Significant	Significant	Significant
C.D.	0.24	0.42	0.37	0.47	0.35

The result illustrated in the above table 8.1 pertains to the average sensory scores of different parameters in treated samples of the prepared beverage. This clearly indicates that the treatment $T_4$of the beverage has the highest score in terms of color (8.28), consistency (8.52), flavor (8.82) & taste (8.92) and the overall acceptability (8.63). This is followed by T1, T_2 and T_3 respectively. T_4 was found to be the acceptable by the panel of judges In the ANOVA table, the calculated replication value of F (3.231) and treatment value (185.369) was higher than the table value of F (2.87) and (2.71) at 5% degree of freedom level of probability. Therefore there are significant differences regarding the color of the prepared beverages.

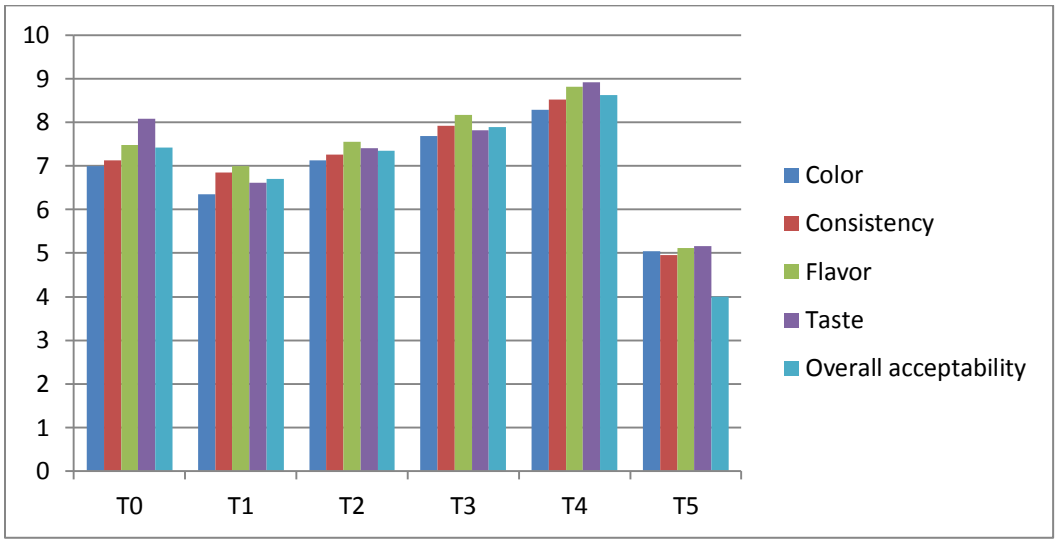
The consistence of the orange based celery beverage with mint clearly indicates that the treatment T_4 has the highest score followed by T_2, T_0, T_3 and T_5, T1 respectively.

In the ANOVA table, the calculated value of F (3.231) and treatment (185.369) was higher than the table value of F (2.87) and (2.71) at 5% degree of freedom level of probability. Therefore there are significant differences in the consistency of the prepared beverages. The addition of celery juice and mint extract brought about a difference in the consistency of the beverage.

Treatment T_4 has the highest score in terms of taste and flavor and was highly acceptable by the panel of judges. This was followed by T_2, T_3, T_0 and T_5, T1 respectively. The calculated value of F (6.7732) was

higher than the F table value (2.71) in the ANOVA table. Therefore there is significant difference regarding the taste and flavor of the prepared beverages at different treatment compositions.

Again the treatment T_1 has the highest score regarding the overall acceptability of the product. It was found to be the most acceptable by the panel members followed by T_0, T_2, T_3 and T_4. The calculated value of F (6.58) was higher than the calculated value of F (3.26) at 5% degree of freedom level of probability. Hence there are significant differences in the overall acceptability of the beverage due to addition of different amounts of the celery juice. It has increased on addition of celery juice.



7 NUTRITIONAL COMPOSITIONS OF THE PRODUCTS

Average percentage of nutrients in control and treated sample of "Grape juice Based Beverages with mint":-

Treatment / Nutrients	T_0	T_1	T_2	T_3	T_4	T_5
Energy(kcl)	67	64.17	61.34	58.51	55.68	52.85
Total carbohydrate (g)	12.3	11.73	11.16	10.59	49.40	45.00

Vitamin C (mg)	**6**	**10.07**	**14.14**	**18.21**	**22.28**	**28.15**
Carotene(µg)	**2**	**60.26**	**118.52**	**176.78**	**235.04**	**244.4**
Iron (mg)	**1**	**1.48**	**1.94**	**2.446**	**2.92**	**2.93**
Calcium(mg)	**1**	**6.43**	**11.86**	**23.57**	**22.72**	**26.35**

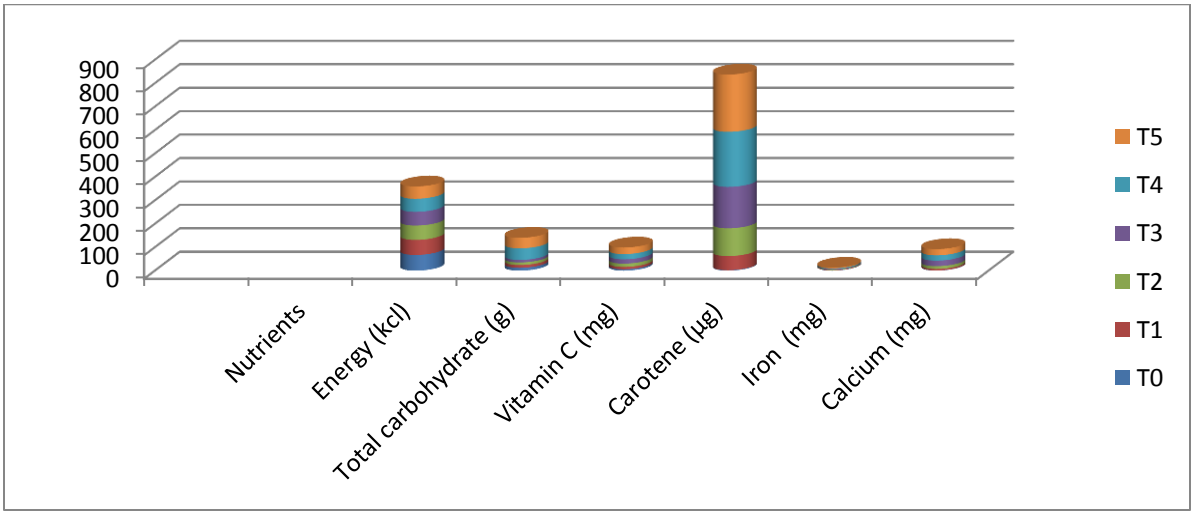
The above table shows the nutritional composition of the beverage containing only Grape juice (100ml) as the control T_0. It has an appreciable amount of energy and carbohydrate. The vitamin-C content is good, but carotene, iron and calcium amounts are not up to the mark. In the treated samples, where celery juice and mint extract has been incorporated. 20ml celery juice has been added to all the treated samples and mint extract as T_1 (5ml), T_2 (10ml), T_3 (15ml) and T_4 (20ml) T_5 (25). The vitamin-C content has almost remained constant but the amount of carotene, calcium and iron have spiked to a great extent. The iron, calcium and carotene content of T_5 is the highest, that is, 2.7mg, 26.35mg and 244.4µg respectively followed by T_3, T_2 and T_1. This has been noted to be the lowest for T_0 being 0.7mg, 5mg and 15µm respectively. Only the control T_0 has 20gm of sugar which causes its calories content and carbohydrate to go high, that is, 67 kcal and 21.7 gm respectively. This amount has been considerably lowered in the treated samples of the product, that is, 52.85 kcal and 2.28g for T_1, 64.17 kcal and 2.34 gm for T_2, The above table shows the nutritional composition of the beverage containing only grape juice (100ml) control T_0 It has an appreciable amount of energy and carbohydrate. The energy content is good (67kcl), but carotene (1µg) and iron (1mg) amounts are not up to the mark. It has a fair amount of calcium (1mg). In the treated samples, where celery juice and lemon extract has been incorporated along, the carbohydrate and energy amounts have been reduced considerably. 25ml celery juice has been added to all the treated samples and mint extract as T_1 (5ml), T_2 (10ml), T_3 (15ml) and T_4 (20ml), T_5 (25).The vitamin-C content has reduced slightly in the treated samples only slightly due to the gradual reduction in the amount of lemon juice and addition of celery juice. The content of iron and calcium has increased gradually as 1. & 1mg in T_1, 1.17mg & 3.83mg in T_2, 1.44& 6.66mg in T_3 and 9.49 mg & 1.52 mg in T_5 respectively. The carotene content in the control is only about 2 µg, whereas it is as high as 27.86µg, 53.72µg, 73.58µg and 105.44µg , 131.3µg in T_1, T_2, T_3 and T_4,T_5respectively. Therefore we can see that treatment T_5 has the highest amount of carotene, iron and calcium but lowest amount of vitamin-C which however is still as

high as 27.55 mg. This amount is the highest in control (6mg) but it is very low in carotene, iron and calcium as compared to the treated samples.

CONCLUSION

From the result summarized it is concluded that herb mint can be successfully incorporated in grape fruit beverages. The sensory scores of the prepared beverages T4 were highly accepted in terms of taste, consistency, color, flavor and overall acceptability in all beverages. The Nutritional composition and physico-chemical characterizes of in all beverages Treatment T_4 was highly significant. Antioxidants content were increased as the incorporation level was increased. The amount of iron, carotene, calcium and vitamin-C was greatly improved in the treated samples of the products.

Average percentage of nutrients in control and treated sample of "Grape juice Based Beverages with mint":-



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