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Studies on preparation of gummy candy using pineapple juice and carrot juice

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Abstract

In recent years, the consumers food habit has been focused on processed foods rich in nutritional and functional properties. The consumer's trend has shifted to foods with more natural, dietary fibers, natural colorants, minerals, vitamins, low calories, low cholesterol, and low fat and free of synthetic additives. The present investigation was made with an attempt to develop gummy candy using pineapple juice and carrot juice. This value added nutrient rich gummy candy with functional properties will impart endless nutrient benefits to consumer with high beta-carotene.

Keywords: Gummy candy, pineapple juice, carrot juice, agar-agar and sugar

Introduction

Gummy candy is a unique candy composed of agar-agar or gelatin, sweeteners, flavorings, and colorings. Because of its nature it can be molded into literally thousands of shapes, making it one of the most versatile confection products ever. First developed in Germany in the early 1900s, by a man named Hans Riegel. He began the Haribo company, which made the first gummy bears in the 1920s.

Candy is also a source of empty calories, because it provides little or no nutritional value beyond food energy. At the start of the 20th century, when under nutrition was a serious problem, especially among poor and working-class people, and when nutrition science was a new field, the high calorie content was promoted as a virtue. Researchers suggested that candy, especially candy with milk and nuts, was a low-cost alternative to normal meals (Labau, 2012) [4]. In this study, agar-agar is added to make the candy more gummy and more appetizing to the consumers at all ages, gummy candies are made with a base of agar-agar and are often flavoured with fruit juices or extracts. Agar-agar gives them a distinctive chewy texture that ranges from soft to very firm, depending on the amount of agar-agar used. Agar-agar is a thickening agent similar to gelatin, but it's made from seaweed and is totally flavourless. (Pobar, 2015) [9]

Pineapple (*Ananas comosus*) is a non-climateric fruit. It is rich in vitamin C, magnesium, calcium, potassium, iron and the protein digesting enzyme, bromelin. The flesh is light yellow and very juicy when ripe. Queen variety fruits are of the weight 0.9-1.3 kg in general. The flesh is deep golden-yellow less juicy than Kew crisp textured with a pleasant aroma and flavor.

Health benefits of pineapple

Prevents free radical damage Pineapple are a rich source of antioxidants. They fight against free radicals in the body, preventing cell damage. These antioxidants help protect you from diseases like heart diseases, arthritis, various cancers etc.

Strong bones Rich amount of manganese present in pineapples helps in strengthening bones and connective tissues. A cup of pineapple juice gives roughly 73% of the required manganese for a day.

Healthy gums Eating pineapple benefits in strengthening your gums, keeping your teeth healthy and strong.

Thwarts off cold pineapples are abundant in vitamin C and bromelain, which fights against microbial infections. Eating pineapples with the prescribed medicines can help cure cold and cough effectively

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Carrot (*Daucus carota* L.) belongs to the family *Apiaceae*. It is related to clearly, celeriac coriander, fennel, parsnip and parsley, which are all member of this family. Carrot are particularly rich in carotene (pro-vitamin A). They are consumed either fresh, as a salad crop, or cooked. Large quantities are also processed, either alone or in mixtures with other vegetables, by canning, freezing or dehydration.

Health benefits of carrot

Improves visions carrots being “good for the eyes”. Carrots are rich in beta-carotene, which is converted into vitamin A in the liver. Vitamin A transformed in the retina, to rhodopsin, a purple pigment necessary for night vision.

Promotes healthier skin Vitamin A and antioxidants protects skin from sun damage.

Helps prevent infection Carrots are known by herbalists to prevent infection. They can be used on cuts-shredded raw boiled and mashed.

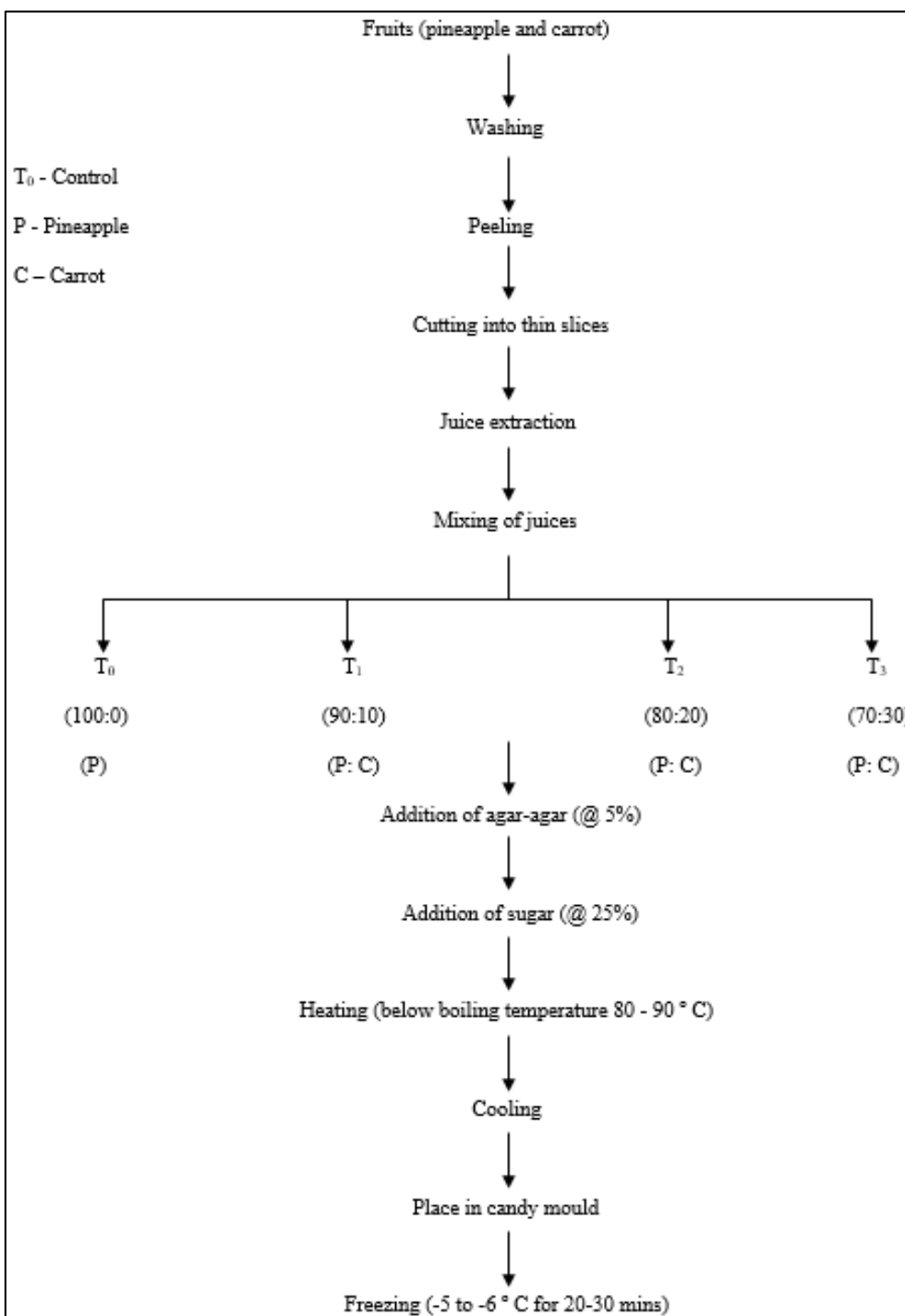
Prevents heart diseases studies show that diets high in carotenoids are associated with a lower risk of heart disease. Carrot has not only beta-carotene but also alpha-carotene and lutein. The regular consumption of carrot also reduces cholesterol levels because the soluble fibers in carrots bind with bile acids.

Materials and Methods

Treatment Combination (ratio)

Treatment	Pineapple	Carrot	Sugar	Agar-agar
T ₀	100	0	25	5
T ₁	90	10	25	5
T ₂	80	20	25	5
T ₃	70	30	25	5

Flow Chart



Results and Discussion

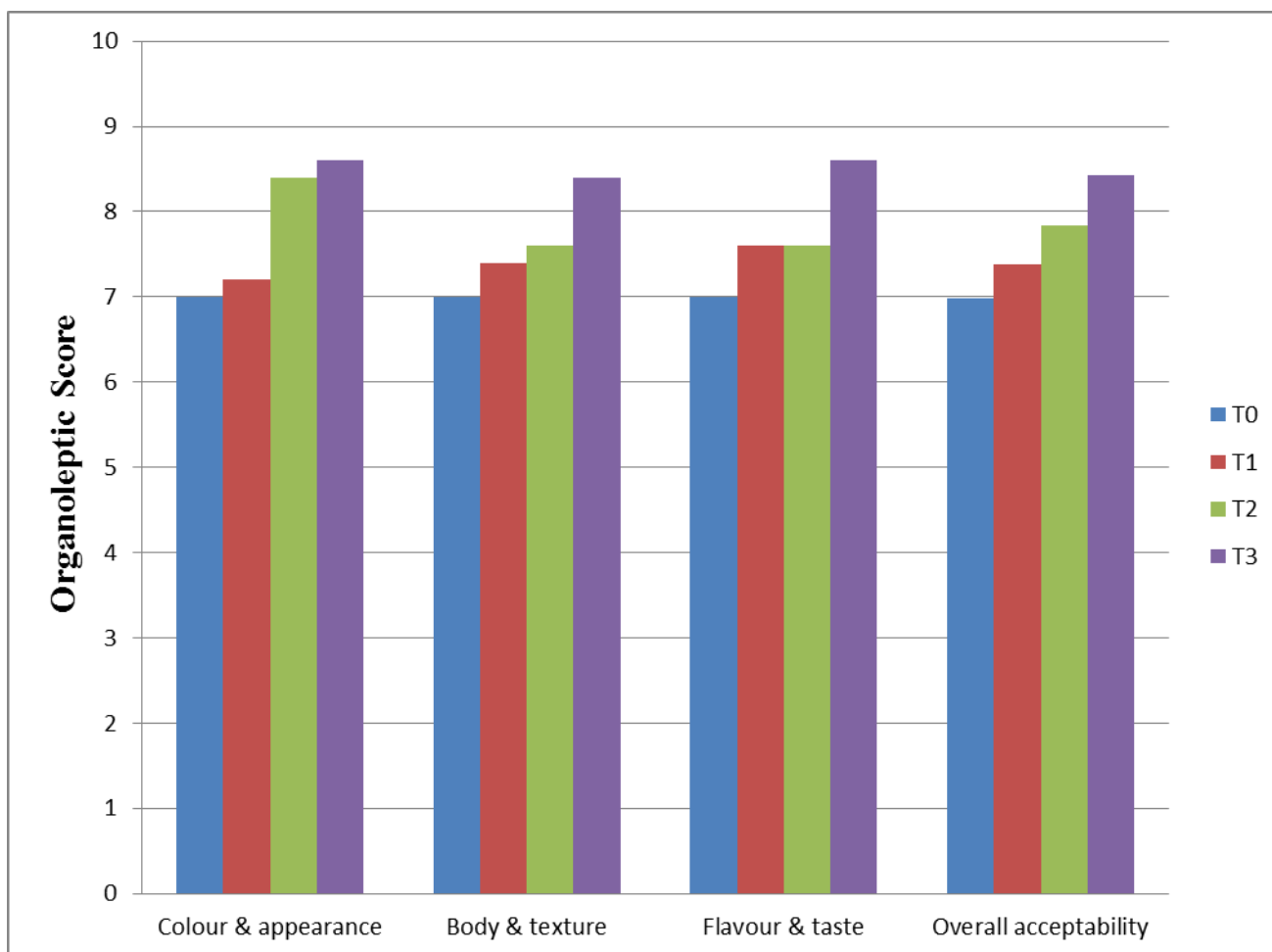
The different parameters of control and experimental samples of gummy candy which has been found are discussed below:

Parameter	T ₀	T ₁	T ₂	T ₃
Physico-chemical analysis				
β-carotene	0.22	0.51	0.57	0.63
Acidity	0.21	0.19	0.19	0.18
Ascorbic acid (mg)	14.86	13.58	11.98	10.78
Ash %	0.46	0.47	0.47	0.48
Moisture%	24.68	24.66	24.62	24.58
Reducing sugar	6.82	6.83	6.84	6.87
Organoleptic scores (9 point hedonic scale)				
Colour & Appearance	7.00	7.20	8.40	8.60
Body & Texture	7.00	7.40	7.60	8.40
Flavour & taste	7.00	7.60	7.60	8.60
Overall acceptability	6.99	7.38	7.84	8.42
Microbiological analysis				
SPC ($\times 10^3$) (cfu/g)	11.90	11.30	10.40	10.10
Coli Form (per/g)	Nil	Nil	Nil	Nil
Cost of ingredients				
Gummy candy (in rupees/kg)	26	25.9	25.8	25.7

Effect of addition of Pineapple Juice, Carrot juice, Agar-agar and Sugar on Organoleptic score of gummy candy samples.

The gummy candy samples were subjected to organoleptic evaluation before a panel of trained judges using a 9 point hedonic scale. The samples were evaluated for colour & appearance, body & texture, flavor and taste and overall

acceptability. The organoleptic scores are presented graphically in Fig 1. From the figure, it can be observed that treatment T₃ scored significantly higher values for colour & appearance, body & texture, flavour & taste and overall acceptability as compared to other treatments including control. Therefore gummy candy samples of T₃ treatment was taken as the optimized product.



Effect of addition of Pineapple juice, Carrot juice, Agar-agar and Sugar on Physico-chemical and microbiological quality of gummy candy samples.

The beta-carotene ($\mu\text{g}/100\text{g}$) content of gummy candy samples of different treatments increased significantly ($P < 0.05$). The beta-carotene of T_0 , T_1 , T_2 and T_3 was found to be 0.22, 0.51, 0.57 and 0.63 respectively. The acidity percentage of gummy candy samples of different treatments decreased significantly ($P < 0.05$). The acidity percent of T_0 , T_1 , T_2 and T_3 was found to be 0.21%, 0.19%, 0.19% and 0.18% respectively. The ascorbic acid ($\text{mg}/100$) of gummy candy samples of different treatments viz., T_0 , T_1 , T_2 and T_3 was found to be 14.86%, 13.58%, 11.98% and 10.78% respectively. There was significant difference among the treatments ($P < 0.05$). The ash percentage of gummy candy samples of different treatments viz., T_0 , T_1 , T_2 and T_3 was found to be 0.46%, 0.47%, 0.47% and 0.48% respectively. There was significant difference among the treatments ($P < 0.05$). The moisture percentage for gummy candy samples of treatments T_0 , T_1 , T_2 and T_3 was found to be 24.68%, 24.66%, 24.62% and 24.58% respectively. There was significant difference among the treatments ($P < 0.05$). The reducing sugar percentage of gummy candy samples T_0 , T_1 , T_2 and T_3 of treatments was found to be 6.82%, 6.83%, 6.84% and 6.87% respectively. There was significant difference among the treatments ($P < 0.05$).

Standard plate count of gummy candy samples of different treatments viz., T_0 , T_1 , T_2 and T_3 was found to be 11.90 cfu/g, 11.30 cfu/g, 11.40 cfu/g and 11.10 cfu/g respectively. There was significant difference among the SPC. The coli form counts of different samples were found to be absent.

Conclusion

It may be concluded that the gummy candy can be successfully prepared by using pineapple juice and carrot juice with addition of agar-agar and sugar.

It is found that the experimental gummy candy in treatment T_3 was best in organoleptic characteristics and received highest score in organoleptic evaluation (colour & appearance, body & texture, flavour & taste and overall acceptability). The cost of preparation of gummy candy was highest in T_0 was found to be Rs 26 per kg

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