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Sensory evaluation of some selected fruit juices

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Abstract

The consumption of fruit juices has increased in recent years driven mainly by higher people awareness about the importance of choosing healthy foods to reduce the risk of developing diseases and improving quality of life. People are become more concerned about their nutrition and fruit juice in their day to day life. The fruit juices are sources of vitamins, minerals, organic acids and fibre whose effect on human health. Here, in this study the experiment was performed on these fruits; Sapota, Kiwi, Plum, Canary melon which are rarely used in daily life by common people. The aims of the study were to prepare the juices of selected fruits and explain the benefits of the selected fruits and sensory evaluation of prepared juices. The teaching and not teaching staffs of Mahila Maha Vidyalaya (BHU) were taken as the panel member (n=10) and their responses of sensory evolution was taken on 7 points Hedonic scale (like extremely to dislike extremely). The result of the study shows that expert sensory evaluation was not in favor of Kiwi, Plum, and Canary melon juice because, in case of these fruits, the F-values were not found significant. Whereas in case of Sapota juice F-value was found significant. It means that sensory evaluation of experts was in favor sapota juice only. Here it can be concluded that sapota juice is more favorable juice than remaining three juices.

Keywords: Sensory evaluation, human health, healthy foods

Introduction

Fruits are the great bounty of nature and their importance in the human diet is well known. They are major sources of Vitamin 'A' and 'C' and several minerals like calcium, phosphorus, and iron. Fruits and its juices constitute one of the most important foods for man. Their regular consumption maintains health and makes up for the losses in the human diet. Costescu *et al.*, (2006) ^[1] recommended the consumption of juices with pulp from foods and medicinal points of view. Fruits being a seasonal crop by nature have prompted many scientists to embark on researches on how to process fruit juices and preserve them for use during the off-season. The health giving properties of fruits have been recognized long before the discovery of vitamins and minerals in the daily human diet and therefore termed as 'protective food'.

Fruits are very necessary and important for our health. It must be included in daily diet. Mostly fruits are seasonal but there are also some varieties which can be easily available throughout all seasons. Many fruit varieties are liked by everyone. While some liked by certain people up to the limited extent. Besides this, there are also some fruit varieties which are not liked by anyone. The reasons behind this disliking may be their less use in daily life or they are not easily available to every person. Kiwi, sapota, plum and canary melon are examples of such fruits which are not commonly used. These fruits are used for special occasions and ceremonies. These fruits are also used in hotel and restaurants for preparing different recipes. Some people do not like these fruits because either they do not like their taste and flavor or they are costly or they are not aware about their nutritive values. It has also been found that some of the people even do not know how to use it.

Here, in this study the experiment was performed on these fruits; Kiwi, Sapota, Plum, Canary melon which are rarely used in daily life by common people. These fruits are easily available in the market, and in their seasons they may be found in bulk amount but due to lack of their knowledge to the people, they are rarely used and thus they waste in huge amount.

To perform this experiment, first of all, the investigator has selected the fruits, like Kiwi, Sapota, Plum, Canary melon. After the selection of fruits, juices were prepared in different ways.

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While preparing the juices, the investigator also mixed some other fruit juices and observed its acceptability in it. For knowing the appropriate quantity of the other fruit juices which were mixed to the main fruit juices, and which were responsible for the change in color, flavor, taste and other characteristics of the juices, sensory evaluation of the juice was tested.

Find out the extent of liking and the base of liking or disliking by different people we perform the sensory evaluation of the juices, with the help of this sensory evaluation investigator has concluded the people likes or dislikes. There was some fact also found that some people like their colour, taste or flavor and some people dislike this. The aim of the selection of this topic for study is to make aware the people about the importance of such type of fruits and their juices.

Importance of fruits juice

- Fruits juice is popularly consumed for the various health benefits associated with them.
- In recent years, consumption of the fruit juices has increased in due to the wide- spread awareness of people that juice are a natural and healthy source of vitamins, minerals and other nutrients.
- Regular consumption of certain juices reduces the risk of various cancers and even shows their progression.
- Fruits juices have also been linked to reduced levels of blood pressure and delay in onset of Alzheimer's.
- Fruit juice helps both adults and children to meet the daily recommended intake nutrients and calories.

Objectives

1. Preparing the juices of selected fruits and explain the benefits of the selected fruits.
2. Sensory evaluation of prepared juice.

Sensory Evaluation

Sensory evaluation involves the measurement and evaluation of sensory properties of foods and other materials by using the sensory organs. The sense organs present the stimulus of colour, taste, aroma, hearing, and touch. The brain areas which are involved are called somatic sensory area. Sensory tests are conducted to meet some purposes such as:

1. Selection of qualified judges and study human perception of food attributes;
2. Correlate sensory evaluation with chemical and physical measurement;
3. Study processing effects, maintain quality, evaluate raw material selection, establish stability or reduce costs;
4. Evaluate quality;
5. Determine consumer reaction.

Sensory evaluation is considered as an important analytical method in the context of the development of food processing industry. Measurement of sensory properties of food has become more or less the basis for predicting the acceptance of a product by the consumers. It is the purpose of sensory evaluation to ensure that the consumers get the consistent, non-defective and enjoyable foods.

Selection of fruits

The four rarely used fruits which are selected in this experiment are as follows:

1. Sapota (Botanical Name – Manilikaraachras Fosberg)

Benefits of sapota

Antioxidant vitamins: Sapota comprises of sufficient antioxidant vitamins such as Vitamin A and Vitamin C. Vitamin A helps to ensure proper vision and it is vital for maintaining healthy skin and mucus membranes. High intake of natural sources of vitamin A, like sapota, is believed to offer protection from the oral cavity and lung cancer. Similarly, vitamin C assists the body to develop a resistance against pathogens and destroy free radicals.

Tannins: Sapota contains the polyphenol compound tannin, which has been shown to have powerful antibacterial, anti-parasitic and antiviral effects. Actually, tannins have several beneficial applications medicinally where they act like remedies for hemorrhoids and diarrhea.

Fibre: Fibre is a key part of a good nutrition as it benefits the body in several ways. Sapota has lots of dietary fibre that assist to alleviate constipation episodes.

Highly nutritious: Fresh sapota fruits are great sources of several nutrients and minerals like copper, iron, pantothenic acid, and niacin. These nutrients are important for ideal health because they are involved in several metabolic body processes as enzyme cofactors.

Anti-inflammatory properties: Tannins found in sapota fruit have anti-inflammatory properties and assist to eliminate health conditions like IBS and erosive gastritis. The high fibre amounts present in sapota may cause stomach problems like gas, especially when consumed in high amounts.

Health and strengthen bones: Sapota has the rich is calcium, phosphorus, and iron content. Well, these all nutrition can help us to increase and strengthen bones quality.

The rich in protein content: Sapota fruit contains the rich in protein content. Protein functions in our bodies are very many, even many of the growth process of the human body is affected by the protein contained in our body.

2. Kiwi (Botanical Name - Actinidiachinensis)

Benefits of kiwi fruits

Nutrition powerhouse of fruit: Kiwifruit consistently rank of the top of fruit in nutrition density models, which tell us exactly how nutritious food are, that means you get more vitamins and minerals per gram, and per calorie of kiwifruit than most other fruit.

Rich in vitamin C: The fruit is an excellent source of antioxidant Vitamin C. Consumption of foods rich in Vitamin C helps the body develop resistance against infectious agents and scavenge harmful free radicals. Kiwi fruit is especially high in other vitamins compared to other fruit.

Vitamin E: It's quite unusual for a low fat food, let alone fruit to be a good source of Vitamin E, which is well known for its heart health and antioxidant properties. However, kiwifruit is a great low-fat, natural source of Vitamin E.

Folic acid: Kiwifruit is a natural source of folic acid which is needed to prevent cardiovascular disease, help brain and cognitive development and prevent neural defects in babies, both before and during pregnancy.

Kiwifruit can help improve the function of our immune system: Kiwifruit helps us to the word of the effects of stress, inflammation, and attack from bacteria and viruses. Kiwi fruit to be high effective at beneficially modulating the immune system.

Kiwifruit helps improves repair of damaged DNA: Eating just two kiwifruits a day has been proven to reduce the amount the oxidative damage to our cells and improve the repair of damaged DNA caused oxidative stress.

Reduce risk of cardiovascular diseases: Eating just 2-3 kiwifruit a day has been shown to reduce blood platelet aggregation. Platelet aggregation is a known risk factor for cardiovascular disease.

Kiwifruit help to relieve constipation: It is widely recognized as a natural digestive aid due to its unique combination of fibre and other components.

3. Plum (Botanical Name - Prunus domestica)

Benefits of plum

Antioxidant protection: It neutralizes disease-causing oxygen radicals in the body. The nutrients present in plums can destroy these oxygen radicals, therefore preventing them from causing any envisaged harm. The particular nutrients present in plums can neutralize the superoxide anion radicals, which can damage fats and neurons in the brains.

Improved iron absorption: This fruit has high vitamin C content. It enhances the body's ability to absorb bio available iron form the foods that we consume. In addition to this, Vitamin C also helps improve the body's natural ability to fight disease and infection.

Controlling cholesterol: The high amount of Vitamin C in the fruit can prevent oxidized cholesterol from building up in arteries and hardening them, therefore plum can be effective in preventing disease like hardened arteries or atherosclerosis.

Prevent macular degeneration: Macular degeneration is an age-related condition that affects the eyes. As the delicate tissues of the eyes degenerate due to old age, a person may have compromised sight, or may eventually even become blind. Research has shown that those who consume about three servings of plums regularly are able to prevent macular degeneration.

Plums are rich in nutrients: Plums are also a rich source of Vitamin A. They contain readily available beta carotene, which has its own health benefits and are also rich in potassium and dietary fibre.

4. Canary melon (Botanical Name - Cucumis melo)

Benefits of canary melon

Low in calories and fat: Canary melon has a low amount of calories and fat.

Contains healthy fibre: One serving of canary melon provides 5gm of fibre. The amount of this nutrient present in canary fibre accounts for 13.1 to 20 percent of the fibre our body requires each day. This fibre plays a variety of roles in our bodily function, many of them involving digestion and bowel health.

Boosts eye health: Eat a serving of canary melon to consume 50 percent of the Vitamin A we require each day. The vitamin A available in canary melon helps keep eyes healthy and functioning at optimal level.

Improves healing time: A great time to incorporate canary melon into our diet is right before any type of surgery or after we cut ourselves. The vitamin C, 50 percent of the recommended daily intake in this melon help our skin heal quicker, in part because it encourages our body to produce collagen. Vitamin C also helps repair all the tissue in our body, making it healthy food to speed the healing process.

Methodology

- Selection of fruit
- Selection of materials and preparing the fruits juice
- Statistical Analysis of data

Selection of fruit

Investigator has selected such fruits like sapota, kiwi, plum, and canary melon in the experiment for this study. Investigator prepared the juice of these fruits and made sensory evaluation by panelist and to know acceptability of them.

Selection of materials and preparing the juice of the fruit

Material required

- Reference Fruits- Sapota, Plum, Canary Melon, Kiwi
- Accessory fruits – Orange, watermelon, Apple, Grapes
- Knife and peeler & Chopping board
- Plate, bowl, glass, spoon
- Mixer grinder – Juicer
- Steiner

Method for preparing the juice of the fruit

- Take the fresh fruits to be the experiment (Sapota, Plum, canary melon, Kiwi) and also accessory fruits (Apple, orange, watermelon, grapes) and washed it with clean water.
- Peeled and cut these washed fruits and put them in separate bowls.
- Prepared juice each fruits with the help of juicer and collected them in separate bowls.
- Categorized these fruit juice into four samples which sample A, Sample B, Sample C and Sample D respectively.
- Sensory evaluation of these fruit juice was performed on the hedonic test.

Preparation of samples

Sample A- Reference fruit Juice 100%

Sample B – Reference juice 50% + Accessory fruits juice 50%

Sample C- Reference fruit juice 75% + Accessory fruit juice 25%

Sample D – Accessory fruit juice 100%

Selection of area and panel members

The teaching and not teaching staffs of Mahila Maha Vidyalaya (BHU) were taken as the panel member. The total number of panel member was 10.

Preparation of score card

For the purpose of evaluation of the acceptability of different

samples, a scorecard was prepared which was contained with necessary instruction.

Rating

All the members of the panel were invited and provided score card, containing all the grades and terms related to the test. The panel members tested each sample with an interval of few minutes and graded them on 7 points Hedonic scale (like extremely to dislike extremely).

Statistical analysis of data

Investigator prepared fruit juice sample and present it to the panelist for sensory evaluation, which was tested on the basis of Hedonic Scale. Which data get for knowing the acceptability of people, the investigator used the ANOVA test

(analysis of Variance) for statistical analysis. If the calculated value was found greater than tabulated value then hypothesis rejected and the product is significant.

Result

In order to test the acceptability of the selected fruits, ANOVA test was conducted for each juice separately. The significant value of F-ratio shows the acceptability and significant of the juice. If calculated F-ratio is found equal or greater than tabulated value then it means the product is significant. Here significant of the product show that subject have expressed their sensory evolution in favor of particular products.

Sapota

Table 1: Analysis of variance of responses for Sapota

Source of Variation	df	Variance	Mean Variance	F- ratio	Table Value (0.05)
Between formulations	3	17.4	5.8	4.8	2.86
Replicate error	36	44	1.2		

Table no 1 shows that the calculated value of F-ratio is 4.8 and tabulated value is 2.86 at 0.05 level of significance. When calculated value is greater than tabulated value then the product is significant. In this product, the calculated value is

greater than tabulated value. Its Mean product is significant.

Kiwi juice

Table 2: Analysis of variance of responses for Kiwi juice

Source of Variation	df	Variance	Mean Variance	F- ratio	Table Value (0.05)
Between formulations	3	16.48	5.49	1.33	2.86
Replicate error	36	148.5	4.125		

Table no 2 shows that the calculated value of F-ratio is 1.33 and tabulated value is 2.86 at 0.05 level of significance. When calculated value is greater than tabulated value then the product is significant. But in this product, the calculated value

is less than tabulated value. Its Mean product is not significant.

Plum juice

Table 3: Analysis of variance of responses for Plum juice

Source of Variation	df	Variance	Mean Variance	F- ratio	Table Value (0.05)
Between formulations	3	5.7	1.9	1.4	2.86
Replicate error	36	48.2	1.3		

Table no 3 shows that the calculated value of F-ratio is 1.4 and tabulated value is 2.86 at 0.05 level of significance. When calculated value is greater than tabulated value then the product is significant. But in this product, the calculated value

is less than tabulated value. Its Mean product is not significant.

Canary melon

Table 4: Analysis of variance of responses for Canary melon

Source of Variation	df	Variance	Mean Variance	F- ratio	Table Value (0.05)
Between formulations	3	4.075	1.35	0.73	2.86
Replicate error	36	66.9	1.85		

Table no 4 shows that the calculated value of F-ratio is 0.73 and tabulated value is 2.86 at 0.05 level of significance. When calculated value is greater than tabulated value then the product is significant. But in this product, the calculated value is less than tabulated value. Its Mean product is not significant.

Conclusion

Fruits are very important for ensuring good nutrition in human daily diets and building their healthy life. Here in this study sensory evaluation of all four fruit juices provide empirical evidence regarding their acceptability to use them day to day life. In this study, investigator prepared different

types of fruit juice and present it to the panelist for sensory evaluation on the 7 points Hedonic scale (like extremely to dislike extremely). Analysis of the data shows that some fruits sample is significant and some are not. F-value regarding every fruit juice provides the basis for favoring the certain fruit. The result of the study shows that expert sensory evaluation was not in favor of Kiwi, Plum, and Canary melon juice because, in case of these fruits, the F values were not found significant. Whereas in case of Sapota juice F-value was found significant. It means that sensory evaluation of experts was in favor sapota juice only. Here it can be concluded that sapota juice is more favorable juice than remaining three juices.

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