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RESEARCH ARTICLE

TO ASSESS THE SENSORY PROPERTIES OF FOOD PRODUCT DEVELOPED FROM THE CASHEWNUTS AND ORANGE JUICE

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ABSTRACT

Cashewnuts are known to have minerals and vitamins richness and orange juice adds to the nutritional content of the product. The present study was done to prepare a food product in different ratios of 50:50, 60:40, 80:20. The cashewnuts were varied so that the final product could be obtained. Twenty experts (Nutritionists) were selected to carry out the sensory evaluation of the samples prepared. The best sample in terms of color, texture, flavor and overall acceptability was chosen. Sample A was rated best with 80:20 ratios.

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INTRODUCTION

Orange is a tropical to semitropical, evergreen, small flowering tree. Oranges have two general categories sweet and bitter; with the former being the type most commonly consumed type. Oranges can be kept at room temperature for a week or so. Store freshly squeezed orange juice inside the refrigerator for later use. Orange juice is refreshing drink for whole day and this fruit is used in preparation of deserts, jams and jellies. Orange zest one of the type of orange is used in the preparation of some major popular dishes and considered to be as a flavoring agents in some dishes. It contains some vitamins, minerals, nutrients for normal growth and development and overall considered to wellbeing. There are certain flavonoids that are found in orange (ie.citrus fruit) like hesperidin, naringin, naringenin. One of these flavonoids like naringenin has bio active effect on human health as antioxidant, free radicals scavengers, anti-inflammatory and immune system modulator. Oranges also contain very good amount vitamin –A and other flavonoid antioxidants such as alpha and beta carotenes, zeaxanthin and lutein. Vitamin –A is also required for maintaining healthy mucus membranes, skin and

also essential for healthy vision. These flavonoids help human body to protect from lung and oral cavity cancers. It is also a very good source of vitamin –B complex such as thiamine, pyridoxine, folates. these vitamins are essential for human body. Orange fruit also contain very good amounts of minerals like potassium and calcium. The prior one that is potassium is important component of cell and body fluids that helps and control heart rate and blood pressure while the latter one calcium is essential for the bones and help to reduce the risk of rheumatoid arthritis. Oranges also contain some insoluble and soluble dietary fibre that helps in cutting down cancer risk, chronic disease like arthritis, obesity and coronary heart diseases. Orange in whole contain 85 calories and has no fat, cholesterol or sodium that is why in many cases it can be considered to be as vitamin C content. The famous line said by “Laura Flores”, a san Diego-based nutritionist that oranges are the sources of vitamin C content. Orange juices contain nutrients but they do not contain fibre. There is a pith that is found between the peel and the flesh are considered to be rich in fibre. There is a publication in 2010 journal nutrition research found that drinking orange juice for 60 days decreases the low density lipoprotein in people with high cholesterol. Another case study in 2012 state that people who consume 4069 mg of potassium each day had a 49% lower risk of death from heart disease in comparison to those who consume only 1000mg of potassium per day. Cashew was introduced from Brazil to

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Srilanka by the Portuguese in the 16th century and latter spread as dry crop. The cashew tree is native to Brazil's amazon rain forest. It is spread by the Portuguese explorers in large commercial scale in Brazil, Vietnam, India. Cashew nut is actually a true fruit bears a numerous edible, and considered to be as accessory fruits called "cashew apples". It is actually firm attached to bottom of cashew apple that appears to like a clapper in the bell. It is also called a Drupe that featured the outer shell that enclose a kernel and is commercially known. Cashew contains low fat when compare to other nuts. It lower the risk of blood pressure with the help of magnesium present in them. It keeps us away from heart diseases and keep our heart in a healthy state. Cashew is full of copper content that helps for the good appearance of hair. Calcium and Magnesium are the main component of cashew nut which is important for bone health. Daily intake of cashew nut can reduce the risk of developing gallstones upto 25% and also minimize the effect of High BP, headache etc. It also help in growth and development of nucleic acid synthesis and digestion. Calcium contains very good amount of magnesium which is essential for bone so it gives healthy teeth as well as strong gums to hold them. It is also enriched in vitamins like Riboflavin, Pantothenic and Thiamine and Niacin etc. The copper and iron in cashew together help the body form a utilize RBC. They are also good for the eyes. Cashew have the ability to filter sun's UV rays and protect us from Macular degeneration.

According to Harvard Research two servings of nuts a day is helpful in fighting against Cardiovascular diseases and cancer. Cashew replace animal fats and proteins in a excellent way to manage your weight and reduce the build-up of fats and cholesterol in the heart. They are high in calories. 100 gm of nuts provide 553calories. They are packed with soluble dietary fibre, vitamins, minerals and numerous health promoting phytochemicals that help and protect form diseases. Cashew (*Anacardium occidentale* L.); a tropical nut tree crop, is a source of food, income, industrial raw materials and foreign exchange for many countries of Africa, Asia and Latin America. There are many importance's makes it a topmost tree crop for intensive research. Researchers are into end to use potentials of cashew promoted the development of various innovative products from its apple and nuts. They have the potential to improve shell life. Cashew kernels are roasted, fried, spiced, or honey coated and sold in different packages and sizes as snacks. Oil has been mechanically extracted from the cashew kernel which has higher stability at 80 degrees centigrade compared with other commercial oils like palm oil, groundnut oil, corn oil, or cocoa butter. The cashew kernel oil is promising for food and industrial uses. There has been development of improved technique for processing cashew apples into wine, jam, and non-alcoholic beverage of a high nutritional value with vitamin C content of 170-180 mg/100 ml juice. Developed cashew meal from the kernel including bread, candy, cake, biscuits coated with chocolate is found to have good and acceptable organoleptic properties. Cashew nut shells have been incorporated in fertilizer composition, ruminant feeds and hydraulic paints. In view of the food, industrial and medicinal uses to which cashew tree and its products can be put (Table 6), it appears to be one of the most intensively utilised plant in the world. It offers continual opportunity for investment, as well as great potential for economic development (Olife *et al.*, 2013). Local juice extractor or processors that make or somehow produce cashew

apple juice are acceptable for use on a cottage industry scale and has been fabricated and are found to be economically variable. (Akinwale *et al.* 2001; Oduwale *et al.* 2001) over those years there have been intensified efforts to boost cashew research for improve production. As remarked in Adewale *et al.* (2013), the less health risk from consumption of cashew is one of the attracting reason for increasing consumption and demand. Citrus sinuses (L. Osbeck) or sweet orange originated from south East Asia, but it is consumed all over the world as an excellent source of vitamin C, a powerful natural antioxidant. Considering its health benefits, there is need for public awareness on its important on the importance of orange specially in the rural areas as the fruit relatively cheap and common almost all year around (Katzer *et al.*, 1999). This paper reviews the importance of oranges to human health, the impact of diseases on its production and control measure that should be adopted to realize its maximum benefits in the promotions of human health. The ripe root is classified a hesperidium, which is a type of berry with multiple seed and it is fleshy. The endocarp and the carpels in which the juice containing vesicles are found and which form a synthetic biology point of view should be considered as the liquid release by the cytoplasm and by the vacuoles in the vesicles, internal cells. The genetic origin of orange is not clear yet but although it is believed to be derived from the interspecific hybridization of some primitive citrus species there can be some common listed (Xu *et al.* 2013). Oranges are used to make sorbets, marmalade and beverages. The human diet contains important micronutrients ie. Vitamin C and E, carotenoids and flavonoids essential for maintenance of human health. Multiple dietary sources of these compounds are preset virtually in all plants materials (Di Majo *et al.*, 2005). Increased in fruits and vegetables consumption protect against degenerative pathology such as cancer andtherosclerosis(Keys 1995) . Studies indicate that flavonoids are excellent radical scavengers of the hydroxyl radical (Cillard and Cillard 1988, Darmon *et al.* 1990), due to their ability to inhibit the hydroxyl radicle and donate hydrogen atom (Di Majo *et al.*, 2005; Tripoli *et al.* 2007). A single orange is set to have about 170 polynutrients and over 60 flavinoids with anti tumour and anti-inflammatory. Considering its health benefits there is need for public enlightenment on the importance of oranges as fruit is relatively chief and common almost all year around.

MATERIALS AND METHODS

Procurement of Raw Materials

Oranges were purchased online from Big Basket Store. The raw materials were physically examined to ensure that they were disease free and stored in a cool temperature. Cashew nut and sugar were purchased from departmental store in Amity University Manesar, Haryana, India. Sugar and cashew were milled in a grinder to obtain sugar and cashew in powdered form. All the ingredients are carried to Nutrition Lab of Dietetics And Applied Nutrition, Amity University Haryana. Standardization of Food Product

The recipe of katli was standardized using the following:

- Orange Juice
- Cashew nut
- Sugar

And proceed further for the development of food.

Development of Food Product

Using the above standardized recipe, Katli was developed by powdered sugar and orange juice in three ratios, i.e., 80:20, 60:40, 50:50.

The method used in making Katli are as follows

First of all peel the oranges and then after peeling put it into juicer grinder to obtain fresh juice of oranges were collected in a bowl. Powdered cashew nuts were roasted in a frying pan over a gas fuel and then kept for few minutes so that there temperature comes to room temperature. After this sugar syrup is made by adding 120ml of water, 80gm of sugar and 100ml of orange juice. Boil it for 5-7 minutes. Later add the roasted cashew powder in it. Stir them well for 5 minutes and then collect them in a plate. Give them desired shape and refrigerate for two hours. For sample A we will take 80gm of sugar, 40ml of orange juice. For sample B we will take 60gm of sugar and 80ml of orange juice. For sample C we will take 50gm of sugar and 50ml of orange juice.

Sensory evaluation of Product

Then sensory evaluation of three samples is were being done at a point hedonic scale. For each variation 20 hedonic tastes were conducted by 20 different panelists of Dietetics and applied Nutrition. Hedonic tastes were done on the basis of

- Taste
- Colour
- Texture
- Firmness
- Stickiness
- Acceptability

Each individual gave its rating on the basis of his likes or dislikes. After conducting the sensory evaluation, statistical analysis were done.

Table 1. The Sensory scores of the different samples with various attributes

Attributes	A(80:20)	B(60:40)	C(50:50)
Taste	9.15 ± 0.74 ^{^(1)}	8.7 ± 1.26 ^{^(2)}	8.7 ± 0.97 ^{^(3)}
Colour	9.3 ± 0.92 ^{^(1)}	8.9 ± 1.25 ^{^(2)}	8.85 ± 0.93 ^{^(3)}
Texture	9.4 ± 0.94 ^{^(1)}	9.1 ± 0.96 ^{^(2)}	8.85 ± 1.08 ^{^(3)}
Firmness	9.25 ± 0.91 ^{^(1)}	8.95 ± 1.35 ^{^(2)}	8.9 ± 0.91 ^{^(3)}
Stickiness	9.4 ± 0.75 ^{^(1)}	9.15 ± 0.93 ^{^(2)}	9 ± 0.97 ^{^(3)}
Acceptability	9.6 ± 0.59 ^{^(1)}	9.15 ± 0.87 ^{^(2)}	9 ± 0.97 ^{^(3)}

Table 2. Chemical composition of accepted Katli having 80% of sugar and 20% of orange juice

Nutrition value	Moisture	Protein	Fats	Carbohydrates	Energy	Calcium
Ingredients						
Cashew nuts	11.8	42.4	93.8	44.6	1192	
Orange	105.12	0.84	0.24	13.08	57.6	31.2

ICMR – NIN – Nutritive value of Indian Foods, 1989

This was done on the basis of mean and standard deviation of all attributes. In statistical analysis we jot down all the points given by the individuals in different attributes.

RESULTS AND DISCUSSION

After the sensory evaluation the product were statically analyzed using the mean and standard deviation. The mean

and standard deviation of product is as follows: It is clearly seen that sample containing 80 % of sugar and 20% of orange juice is rated best followed by sample containing 60% of sugar and 40% of orange juice which is followed by sample 50% of sugar and 50% of orange juice is least rated. All these results are calculated on the basis of standard deviation and mean of the samples. Sample A was found to be significant on the other attributes like taste, texture and firmness. The Katli prepared from 50% of sugar and 50% orange juice were more sour in taste and their taste wasn't too good. Moreover their taste was not much appealing. The storage capacity of these Katli's was also calculated and it was observed that these katli's can stay in the refrigerator for upto 7 days without adding any preservatives. The result thus indicates that panelist accepted the Katli prepared from 80% sugar and 20% of oranges. According to above information, we got to know that following samples have following attributes.

Sample A:

Taste:- The sample had mean 9.15 ± 0.74 scores depicting the taste factor. It was felt by the experts that in both the ingredients i.e. orange juice and cashew nuts, cashew nuts was more tasted.

Colour: The sample had mean 9.3 ± 0.92 scores in this aspect and it's colour was quite similar to white as cashew content was highest in it. As colour factor is very important because the food is at first seen by the eyes so the Sample A had an soothing whitish color.

Texture:- The sample had mean 9.4 ± 0.94 scores in texture and it was observed as soft and had a smooth top so it resembles the texture required for katli.

Firmness:- The sample had mean 9.25 ± 0.91 scores depicting the firmness factor and firmness.

Overall:- Overall this sample was most accepted by panelists as it was rated best in all the attributes and had 9.6 ± 0.59 mean scores.

Sample B:

Taste:- The sample had mean scores 8.7 ± 1.26, it was also felt to have taste of both the ingredients equally.

Colour:- The sample had mean score 8.9 ± 1.25 and it possessed dark colour which was less tempting than sample A and more suited to the texture of this sample.

Texture:- This sample had mean score 9.1 ± 0.96

Firmness:- This sample was rated best in this aspect among all and it had 9.05 ± 0.92 mean scores and its firmness was similar to that required by the cookies i.e. neither too hard nor too soft and chewy also.

Overall:- Overall this sample was accepted by the panellists upto much of the extent as all the ideal factors required for cookies was not met and had 9.15 ± 0.87 mean scores.

Sample C:

Taste:- The sample had 8.35 ± 0.79 mean scores in taste and it was observed after tasting that this sample had a bitter after taste so it did not satisfy the taste buds as compared to other samples.

Colour:- This sample had 8.25 ± 0.82 mean scores depicting the taste factor and it was light red along with black finish. Vision stimulates taste thus the colour was not so eye relishing.

Texture:- The sample had 8.55 ± 0.92 mean scores in texture. It was found to have high flakiness and lack of puffiness thus the sample was not considered. It was thin, coarse and rough in texture.

Firmness:- The sample had 8.45 ± 0.80 mean scores in firmness. Hard foods are not easily accepted and the sample was quite hard to break thus not accepted.

Crispiness:- The sample had 8.5 ± 0.80 mean scores in this aspect. The high crispiness made this sample hard to chew.

Overall:- Overall this sample was accepted by only some of the panellists and it had 8.25 ± 0.82 mean scores. Due to this sample lacking in all the considered aspects this sample was ranked on the third place.

Chemical Composition (Raw materials)

Conclusion

After the evaluation of chemical composition, minerals and energy of sample A, i.e., 80% of sugar and 20% of orange juice. It has been concluded that sample A is rich in energy and calcium. It is also revealed that there is no difference in cooking time with change in amount of sugar and orange juice. The result of this study are good indicators of the possibilities of better utilization of orange and cashew through developing variety of new food products.

Around one katli can meet the requirement of energy and calcium. Though these katli are calcium and magnesium rich which is important for bone health.

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