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Physical and nutritional analysis of apple juice samples

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ABSTRACT

Canned Apple juice and Fresh Apple juice samples were analyzed for its physical and chemical parameters. Fresh juice and canned juice were found to be free from caffeine and alcohol. Fresh juice has greater amount of total solids, ash, pH, Nitrogen, protein, reducing sugar, Vit. C, calcium, potassium and phosphorous. © 2009 Trade Science Inc. - INDIA

KEYWORDS

Canned;
Fresh;
Apple juice;
Nutrition;
Balanced diet;
Proximate composition.

INTRODUCTION

Food products are analyzed for a variety of reasons, e.g., compliance with legal and labeling requirements, assessment of product quality, determination of nutritive value, detection of adulteration, research and development. The chemical analysis of food enables us to know the composition of such materials. These investigations will help to grow the belief that a proper diet must consist of a correct amount of protein, fat, carbohydrate, water, and ash. One of the most important reasons for analyzing canned foods from both the consumers and the manufacturers stand point is to ensure that they are safe. Fruit juice is the product obtained by pressure from fruits. The water content of fruits varies from 60%-90%. The major part of the edible portion of fresh fruits consists of water^[3]. Fruits are poor sources of protein and oil. The fruits with reasonable amount of carbohydrates may contain varying amount of dextrose, fructose, sucrose and starch. The other constituents of fruits includes cellulose, mineral salts, coloring matters, and volatile oil. The principle acids present in fruits are citric, tartaric, and malic acid.

It also contains vitamin A, vitamin C, calcium, po-

tassium, sodium, Iron, and fibers. Fruit sugars such as those found in apple products serve as an immediate source of energy.

The pH of fruits varies from 2.5-4.5. Apple is the pomaceous fruit of the apple tree, species *Malus domestica* in the rose family *Rosaceae*. It is one of the most widely cultivated tree fruits. Apple is considered to be the most nutrition fruit.

The phytonutrients in apples inhibited the growth of colon cancer and liver cancer cells in vitro. While the beneficial phytonutrients were most strongly concentrated in the apple skin, the apple flesh also contained significant levels of phytonutrients.

MATERIAL AND METHODS

The chemicals used for analysis were of A.R. Grade and were from S.D. fine chemicals. They were used without further purification. All the experimental vessels and storage containers were Pyrex glass. The fruits were purchased from local market identified whether they were ripe. They were then frozen in plastic bags in a household freezer (-20°C) and kept until analysis. Canned fruit juice samples (five different brand) were

purchased from different areas of Aurangabad city (Maharashtra)

Each sample was analysed for Organoleptic test, specific gravity, pH, total solid, ash, reducing sugar, Ascorbic acid, Nitrogen, protein and some minerals such as Ca, P, K, Na, as described in the literature^[1,4]. The canned fruit juice was also analysed for preservatives such as benzoic acid, sulphure dioxide, sacchrin as artificial sweetening agent. It was also analysed for alcohol and caffeine content.

RESULTS AND DISCUSSION

The good quality sample of fruits were purchased from local market. They were washed with water dried by wipen with dry cloth and used to prepare fresh Juice. The juice was immediately analysed and the five aliquots of samples were analysed and the average results were represented in TABLE 1. The average of five replicate analysis of canned Jiuce is also reprinted in TABLE 1. In the present study we campared the parameters of canned juice and fresh juice.

The specific gravity of fresh apple juice is found to be high (1.044) compaired to canned apple juice(1.026).The pH value of canned juice is less(3.8)which might be due to additives or preservatives. The total solid present in fresh juice is observed to be high (12.12%). Ash value of fresh juice is more (0.26%) than canned juice (0.23%).The nitrogen content of fresh juice is found more (0.032gm) than canned juice (0.016gm).protein content is less in canned juice (0.10gm)than fresh juice (0.20gm).

A difference between reducing sugar of fresh apple juice (11.9gm/100ml) and canned juice is observed (5.62gm/100ml).This may be due to the presence of glucose, dextrose, and redusing sugar present naturally in fresh juice.In canned juice there is artificial sweetner added to enhance the sweet taste of juice.T Yarilac et al.^[5] studied sugar content of apricot varieties and reported that it vary from variety to variety,i.e sugar content depends on ecological conditions.This value (11.9gm/100ml)is closed to those reported for ole-aster^[6]. The fresh apple juice is very rich sources of vit.C, but canned juice contain very high amount of ascorbic acid(38.5 mg/100ml) as compaired to fresh juice (5.5 mg/100ml).It may be due to the addition of ascorbic

TABLE 1: Proximate composition of apple juice per 100 ml sample

Test	Parameters	Average value for canned juice	Average value for fresh juice
Organoleptic test	Colour	Light yellow	Light red
	Odour	Fruity	Fruity
	Taste	Sweet	Sweet
	Insect fragments and other matters	Not found	Not found
Proximate test	Sp.gravity	1.026	1.044
	pH	3.8	4.0
	Total solids %	7.09	12.12
	ash %	0.23	0.26
	Nitrogen gm	0.0160	0.032
	protein gm	0.10	0.20
	Reducing sugar gm	5.62	11.9
Vitamins minerals	Vitaminc mg	38.5	5.5
	calcium mg	8.0	11.0
	phosphorous mg	7.0	11.0
	potassium mg	100	110
	sodium mg	4.0	2.0
Preservatives and artificial sweetening agent	Benzoic acid (ppm)	320	
	Sulphur dioxide (ppm)	250	
	Saccharin(ppm)	280	
Others	Alcohol gm	bdl	bdl
	Caffeine gm	bdl	bdl

BDL = Below detection limit

acid for preservation. Scurvy is the diffeciency disease of vitC. Calcium and sodium in both canned and fresh apple juice is approximately same. potassium (110 mg/100ml) and phosphorous (11.0 mg/100ml)is found to be little high in fresh juice than canned juice(100 mg/100ml)and (7.0 mg /100ml) respectively.

The appreciable amount of such metals are also reported by Ahmet Kazankava and et al⁷ in fruit pistachio.The metals like calcuim,sodium,potassium and anion phosphate are essential for healthy bones. Calcium helps to keep check on the blood pressure.We observed that benzoic acid (320 ppm) and sulphur dioxide(280ppm) is present in canned juice which is under the permitted limit. Saccharin (280ppm) is detected as artificial sweetening agent which is also within permitted limit.Alcohol and caffeine in both fresh and canned apple juice found to be below detection limit. Though the quality of fresh apple juice is high ,it is

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unpasteurised and therefore it may likely get attacked by bacteria. The fruit juice may get contaminated with *Bacillus cereus*, *Bacillus subtilis*, *Bacillus polymyrea*, *Chryseomonas luteola*, *Tatumella ptyseos*, *Streptococcus lactis* and *Candida sp*^[8]. The quality of fresh fruits and vegetables is defined as^[9]; hygiene and quarantine factors (parasites, larvae, pupae, natural toxicants, contaminants, spray residues, heavy metals etc) Cosmetic appearance (size, weight, volume, dimensions, shape, regularity, surface texture, smoothness, waxiness, gloss, colour, uniformity, intensity, spectral, physical defects, splits, cuts, dents, bruises), texture (firmness, fibrousness, toughness) and flavour factors (sweetness, sourness, astringency, bitterness, aroma, off-flavours, off-odours) and nutritional (dietary fibres, cancer inhibitors, carbohydrates, proteins, lipids, vitamins, minerals). The analysis of above result indicate that compared to canned juice, fresh fruit juice has more pH, total solid, percent ash, nitrogen, protein, reducing sugar, vitamin C, calcium, phosphorous, potassium. Only amount of sodium and ascorbic acid is less. It is observed that in order to preserve food sodium salts are also used, this might be one of cause for more sodium in canned juice. We have not analysed fresh juice for preservative and sweetening agents. In both type of juice alcohol and caffeine was below detection limit. It is advisable to take always fresh apple juice instead of canned juice but it may get spoiled or contaminated with bacteria with time.

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