

## Nutrient Content, Phytonutrient Composition and Antioxidant Activity of Sapota Pulp Powder



### Home Science

**KEYWORDS :** Sapota pulp, Nutrient composition, Phytochemical, Antioxidant

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### ABSTRACT

*Sapota is one of the prominent fruits and belongs to family sapotaceae. India is the largest producer of sapota. In this present study, the proximate composition, and phytochemicals were analysed and antioxidant activity was determined for sapota pulp powder. Sapota fruit were collected from the KVK form, KVK Gandhigram. Sapota pulp was dried in a cabinet drier for a period of 12 hours at 75 °C. The dried sapota pulp were powdered and used for the analysis. Results indicate that nutrient composition, phytochemical and antioxidant activity of sapota pulp powder was promising. It is also a good source of antioxidants. These antioxidants are important in all of our diets, especially in infant diets. Thus sapota fruit can be used as a potent therapeutic agent.*

### INTRODUCTION

Fruits are identified as rich sources of antioxidants and copiously used to overcome oxidative stress. The fact behind the health-beneficial property of fruits is the large number of nutraceutical phytochemicals that they contain, viz., polyphenols, carotenoids, sterols, saponins, terpenes and vitamins. Phytochemical components like phenolics, ascorbic acid and carotenoids may have direct influence over the radical-scavenging potential [1].

Antioxidants that help in lowering incidence of degenerative diseases such as cancer, arthritis, arteriosclerosis, heart disease, brain dysfunction and acceleration of the ageing process. Antioxidants are substances which when present at low concentration are able to prevent or delay oxidative damage of lipids, proteins and nucleic acids by reactive oxygen species. These reactive oxygen species mainly are reactive free radicals such as superoxide, hydroxyl, peroxy, alkoxy and non- radicals such as hydrogen peroxide, hypochlorous. [2].

Sapota fruit is rich in carbohydrates and provides good amount of proteins and minerals like calcium, phosphorus and iron. The fruits are tonic, enrich blood, increase muscular strength, cooling, sedative to the heart and relieve vomiting. Sapota fruit as moisture 73.7 per cent, carbohydrate 21.4 per cent, fibre 2.6 per cent, fat 1.1 per cent, protein 0.7 per cent, mineral 0.5 per cent, vitamin C 6 mg, thiamine 0.02 mg, riboflavin 0.03 mg, niacin 0.02 mg and mineral content calcium 28 mg, phosphorus 27 mg and iron 2 mg [3].

Sapota is also a good source of antioxidants. These antioxidants are important in all of our diets, especially in infant diets. The amount of free radicals that are produced during metabolism can be countered very effectively by some vitamins and particularly by antioxidants. [4]

### MATERIALS AND METHODS

#### Collection and preparation of sapota pulp powder

Sapota Fruit were collected from the KVK form, KVK Gandhigram. Sapota were thoroughly washed with tap water to remove peel. Then the fruit is cut into pieces and removed the fruit seed carefully without damaging the surface of the pulp. Sapota pulp was dried in a cabinet drier for a period of 12 hours. The dried sapota pulp were powdered and stored in air tight container for further study. The sapota pulp powder was analyzed for proximate nutrients, phytochemical and antioxidant activity.

#### Analysis of proximate composition

The nutrient namely carbohydrate [5], fat and moisture [6] and total ash and crude fibre, iron, phosphorus, zinc, sodium, potassium, calcium, vitamin-A, -carotene and vitamin c [7] and sugar content.

#### EVALUATION OF PHYTOCHEMICALS AND ANTIOXIDANT ACTIVITY Ethanol extracts

Extracts of the sapota pulp powder was taken using ethanol. Two gram of the sample was ground and blended with 25ml of ethanol water [4:1] at room temperature (40 degree Celsius) using a shaker for 6 hours at 150rpm. The mixture was filtered through whattman filter paper No. 4 and 5. The filtrate was kept in freezing condition. The extract was used for analysis of phytonutrient and antioxidant activity.

#### Aqueous extract

Two gram of the sapota pulp powder was ground and blended with 25ml of aqueous water [4:1] at room temperature (40 degree Celsius) kept in a shaker for 6 hours at 150rpm. The mixture was filtered through whattman filter paper No. 4 and 5. The filtrate was kept in freezing condition. Aqueous extract was used for analysis of phytonutrient and evaluation of antioxidant activity because the sample used are food consumed by the people and not a pharmaceutical agent hence to understand the activity in aqueous extract the study was undertaken.

#### Total poly phenolic content

The Total Poly Phenolic (TPC) content was determined using the Folin-Ciocalteu reagent [8]. A 0.3ml of extract made up to 1ml with distilled water was mixed with 2.25ml of Folin-Ciocalteu reagent diluted (1:10) in distilled water and allowed to stand at room temperature for 25 minutes; 2.25ml of sodium carbonate (60g/l) solution was added to the mixture. After 90 minutes at 28 °C, the absorbance was measured at 725nm using spectrophotometer (UV Spectrophotometer, Evolution 201). The Total Phenolic Content (TPC) was calculated and expressed as Gallic acid equivalents based on the Gallic acid (100µg/ml) standard curve.

#### Tannin

The tannin content was determined as described by Boham and Abyazan, (1974) [9] 0.5g of powdered sample was added to 75ml of distilled water and the mixer was heated gently for 30 minutes. The solution was centrifuged at 2000 rpm for 20 minutes and the supernatant was collected. 1ml of extracted sample was transferred to 100ml volumetric flask containing 75ml water.

5ml of Folin-denis reagent and 10ml of sodium carbonate solution was mixed and diluted to 100ml with water. After mixing the solution was shaken well absorbance was read at 700nm after 30minutes.

**DPPH radical scavenging activity**

The radical scavenging activity of the extracts was determined using DPPH [10]. Ethanol extract (0.1ml) was added to 3ml of a 0.001M DPPH in methanol. The absorbance of the solution was determined using spectrophotometer (UV Spectrophotometer, Evolution 201) at 517 nm after 30 minutes, and the percent inhibition of activity was calculated as:

$$\text{Radical scavenging activity} = [(A_o - A_e) / A_o] \times 100$$

Ao = absorbance without extract; Ae = absorbance with extract)

**Statistical analysis**

Each measurement was carried out in triplicates. All the data are expressed as mean ± standard deviation.

**RESULTS AND DISCUSSION**

**Proximate analysis**

The proximate nutrient composition of sapota pulp powder was analysed and the results are presented in Table 1.

The moisture content of sapota pulp powder was analyzed and it was found that moisture was 6.87±0.70. These moisture levels are close to the moisture content of pine apple powder that ranged 4.0-5.8% [11].

The proximate nutrient content of sapota pulp powder was estimated and it was found to have 32.36±0.71 g of carbohydrate, 8.3±0.84 g of protein and 3.4±0.07 g of fat respectively.

On estimation, it is found that sapota pulp powder had 5.47±0.37 mg of iron, 164.33±3.46 mg of phosphorus, 89.33±0.7 mg of potassium, 8.3±0.78 mg of calcium 13.56±0.5 mg of sodium. Sapota is considered as energy producing fruit and having high nutritive value. It contains higher percentage of vitamin C. Sapota fruit is rich in carbohydrates and provides good amount of proteins and minerals like calcium, phosphorus and iron. The fruits are tonic, enrich blood, increase muscular strength, cooling, sedative to the heart and relieve vomiting [12].

The vitamins namely vitamin C and -carotene were analyzed and found to be 55±0.92mg and 83±0.37µg respectively. Vitamin C content in sapota pulp was found to be very low compared to the other fruits. It was further reduced in powder prepared from sapota pulp because most of the ascorbic acid present in the pulp was destroyed during prolonged heating at high temperature [13].

The sugar content namely total sugar, reducing sugar and non reducing sugar were estimated and found to be 38.37±0.6, 0.6±0.07 and 38.12±2.02 percent respectively.

**Table 1:** Proximate nutrient composition of sapota pulp powder

Proximate nutrient /100g	Sapota pulp powder
Moisture (g)	6.87±0.70
Ash (g)	0.86±0.17
Carbohydrate (g)	32.36±0.71
Fat (g)	3.4±0.07
Protein (g)	8.3±0.84
Iron (mg)	5.47±0.37

Phosphorus (mg)	164.33±3.46
Calcium (mg)	8.3±0.78
Potassium (mg)	89.33±0.7
Sodium (mg)	13.56±0.5
Vitamin-C (mg)	56±0.92
-Carotene (IU)	9.83±0.37
Fibre	8.74±0.17
Total sugar %	38.37±0.6
Reducing sugar %	0.6±0.07
Non reducing sugar %	38.12±2.02

**PHYTOCHEMICAL COMPOSITION**

**Tannin and Total Polyphenolic Content (TPC) content**

The result of the quantitative phytonutrients analysis of sapota pulp powder is presented in Table 2.

As shown in Table -2 the Tannin and Total Polyphenol Content (TPC) of the sapota pulp powder was 37.69±0.61 µg and 51.49±1.34mg respectively. Phenolics have biological properties such as anti-oxidant, anti-apoptosis, anti-aging, anti-carcinogen, anti-inflammation, anti-atherosclerosis, cardiovascular protection, improvement of the endothelial function, as well as inhibition of angiogenesis and cell proliferation activity [14].

**Antioxidant activity of sapota pulp powder**

DPPH assay was used as a rapid method to detect from the samples for their antioxidant activity of ethanol and aqueous extract. The results indicate a positive DPPH radical scavenging activity for sapota pulp powder as depicted in Table-3. The radical scavenging activity of ethanol extract was 83.72±1.01. In aqueous extract the antioxidant activity was 79.34±0.87. Sapota are found to possess extremely high antioxidant capacity that is not attributed to L-ascorbic acid, a constituent that is partly responsible for the antioxidant capacity of many fruits [15].

**Table 2:** Phytonutrient analysis of sapota pulp powder

Phytonutrient	Aqueous extract Sapota pulp powder
Tannin (mg)	37.69±0.61
Total polyphenol (mg/GAE)	51.49±1.34

Data represent mean of three sample analysis (n=3) ±s.d

**Table 3:** Antioxidant activity of the sapota pulp powder

Methods of processing	Antioxidant capacity (%)
Samples	Sapota pulp powder
Ethanol extract	83.72±1.01
Aqueous extract	79.34±0.87

Data represent mean of three sample analysis (n=3) ±s.d Stand-ard ascorbic acid -96%

**CONCLUSION**

It may be concluded from the study that sapota has a good quantity of phytonutrient and antioxidants. Moisture, protein, iron, calcium, potassium, phosphorus vitamin C, - carotene, sodium, fibre and sugar content are present in high amount in sapota pulp powder. sapota as a functional food for human health because its soluble fibers have the ability to delay gastric emptying and slow down the digestion process. It is decrease serum cholesterol due to the increased excretion of bile acids in the intestine

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