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Sapota a wonderful fruit from nature: A review

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Abstract
Sapota (*Manilkara achras Mill*) being to family Sapotaceae, is one of the major Fruit crop. Grown In India. It is a good source of sugar with ranges between 12 and 14 per cent, The most common cultivars grown are kali Podhi, Chaatn, Dhola, Diwani, Long, Bhuri Bhurpotti, Jingorpala, Cricket boll, oval, Bangalore and calculta round. Fruit contain about 72 to 78% moisture (wb) and TSS ranges from 12 to 18 brix. It is liked by people of all ages. It is a most popular fruit is Asia. Sapodilla fruit has a short shelf life. Medicinal properties of sapota are due to chemical constituents such as polyphones, ascorbic acid, glycoside saponin etc. Application of sapota in various fields such as medicinal properties, Traditional uses and Cosmetic value.
Value added product of sapota is sapota squash, sapota jam, sapota slices, sapota butter, sapota cheese, sapota candy, sapota milk shake, sapota powder, sapota biscuit, sapota ice cream, sapota shrikhand, sapota pulp, sapota juice, osmo-dehydrated sapota slices, sapota nectar, sapota lassie, sapota chocolate, sapota bar, sapota tree chewing gum, sapota toothy - fruity. These are value added product its useful for the Eyes, Wellspring of energy, Calming agent, Avoidance of certain cancers, Sound bones, Help from Constipation Benefits amid Pregnancy, Hemostatic properties, Hostile to viral and anti- bacterial properties, Hostile to Diarrheal, Emotional wellness,Frosty and Cough, Help in Wight loss, as a detoxifying agent, Tooth cavities.

Keywords: sapodilla, cricket boll, medicinal properties, sapota bar, sapota powder

1. Introduction
Sapota (*Manilkara achras Mill*) being to family Sapotaceae, is one of the major Fruit crop. Grown In India. (Kulkarni *et al.*, 2007) [10]. It is a good source of sugar with ranges between 12 and 14 per cent (Bosc and mitra 1990) [4]. It is popularly known as Chikku, but some other MVMC are found in Sapota, Sapodilla Plum, Chico, Zapote, Nispero (Yahia *et al.*, 2001) [5]. The most common cultivars grown are Kali Podhi, Chaatn, Dhola, Diwani, Long, Bhuri Bhurpotti, Jingorpala, cricket boll, oval, Bangalore and calculta round. Fruit contain about 72 to 78% moisture (WB) and TSS ranges from 12 to 18 brix. (Seema kumari, 2012) [17].
Sapota is mainly valued for its sweet and delicious Fruits of humid tropical and subtropical regions Sapota is mainly valued for its sweet and delicious Fruits. It is primary used as descant Fruit. Sapota Fruit is a good Sources of digestible sugar, which range From 12 to 20 percent and it is virtually a treasure of minerals such as iron and calcium. The Fruit have and appreciable amount of protein, fat, fibers, calcium, Phosphorous, iron, carton and Vitamin C. (Shanmugavelu and Srinivasan, 1973) [18].
Sapota Fruits are the more nutrient value are producing i.e. water content -78%, Calories -83, protein – 0.49, Fat – 1.19, cholesterol – o mg, carbohydrate – 20.09, Total directory Fiber S. 39 calcium -21 mg, Iran – 0.8 mg, magnesium – 12.0 mg, phosphorus 12.0 mg, potassium – 193.0 mg, sodium, 12.0 mg, Vitamin C-14.7 mg and Vitamin – A 60 IV. C sources: USDA. National, Nutrient database for standard Reference, Release (2014).
Sapota are used for the inking Jams, Jellies, asmo-dehydrated slices and squash (Reddy, 1959) [15] product like sweet chutney dried sapota pieces, sapota milk shake, nectar, India is the largest producer of sapota in state are present in the India Karnataka, Maharashtra, Tamil Nadu, Andhra Pradesh, West Bangal, Haryana, Daman, Pondicherry (Maya *et al.*, 2003) In India production of sapota was 4.7 Thousand hetaeras during the year 2005-2006 and 4.00 Thousand hectors during the year 2010-2011. The growth rate is 4.08% and the production during 2005-2006. Is 49.02 Thousand tones and 43.58 Thousand tones during 2011-2012 By exporting of diffract countries about 2.693 thousand tones of sapota. India earned about Rs. 4, 28, 34, 567 in the year of 2011-12 (Sauces:- National Horticulture Board, Ministry of agriculture, Govt of India) 2012. Banded sapota drinks, pickle, preserve and candy and wine can also be prepared with good sensory quality (Sawant 1989, Gautam and Chundawat, 1998) [6]. Now-a-days, there has been considerable increase in the consumption of fruit beverages in the world and tropical country like India, fruit beverages such as nectar, squashes play an important role in summer months and become important due to their thirst quenching property apart from the nutritive value. Like many other fruit juices such as mango, orange, pineapple, etc., sapota juice cannot be consumed as such because it contains negligible acids affecting the optimum sugar-acid blend and palatability. The sapota juice therefore, needs to be converted in the form of beverages like nectar and squashes for improving the flavor and palatability of the juice. The acceptability of fruit beverages is very much dependent on the juice content as well as brix: acid ratio in beverage. Hence, standardization of optimum recipe of nectar and squash is most important to develop quality beverages of sapota. Osmotic dehydration is a simpler preservation technique.

2. Materials and Methods

2.1 Botanical Description

2.2 Habit

The sapodilla tree is an attractive upright, slow growing, evergreen tree, which has extensive root system. Tree may develop a dense and rounded crown with age which can be sometimes open or irregular in shape, but at young stage it is distinctly pyramidal in shape sapodilla tree is very rich in white, gummy latex called chuckle. In the tropics, height of the tree can reach up to 100 Feet, but grafted cultivars are relatively shorter.

2.3 Leaves

The leaves are 3 to 4-1/2 inches long and 1 to 1-1/2 inches wide. They are green, glossy, alternate and spirally deserted at the tip of forked twinges. Stomata are more on upper part.

2.4 Flowers

Sapodilla Flowers are small (8-12 mm) inconspicuous and bell-like approximately 318 inch in diameter with three (Broun) outer and three inner sepals. They enclose a pale green to white tubular corolla and six stamens and the stigma extends beyond the corolla. They are borne on slender stalks in the axil of the leaves. There are several flushes of flowers throughout the year.

2.5 Fruits

The sapodilla Fruit is round or egg-shaped, 2-4 inches is diameter the skins is brown and Scroll when ripe. The Flesh, which various from yellow to shades of brown, has smooth or a granular texture. The raw fruit has a high latex remains even in the ripe fruit. The raw fruit skin is rough and leathery and it becomes smooth on ripening. Unripe fruit has high amount of tannin, which can pucker mouth. The flavor of ripe fruit is deliciously sweet and pleasant. It ranges from a pear flavors to crunchy sugar. (Parle Millind *et al*., 2015) [13].

2.6 Application of sapota in Various Fields

The fruit and crushed seed of sapodilla are used in prevent in gaedema due to diuretic and bladder stores. When half- a dozen seed of sapota are sonsuncd stomach pain is experienced due to presence of sapotine and sapotinin raw sapodilla Fruits contains high amount of latex and tannins, which contribute to its extremely bitter tests. Mouth ulcers, prickling in the throat and dyspnoca especially in small, children is observed upon eating of raw fruits.

As merrtienced dove, for many year the latex from the sapodilla tree called chick was the main ingredient of chewing gum. It contains 15% rubber and 38% resin and it's tasteless. Steps to process the latex into chewing gum drying melting, eliminator of foreign matter mixing with other gum, sweetness and flavor and finally rolling into sheets. And cutting in to different sizes. (Morton, 1987)

The wood Form the sapodilla tree is dark red, hard, heavy and durable and has been used for Railway cross-trees, flooding tool handles, etc. The sapodilla red heart wood is also valued for Furniture, banisters and cabinet work (Garcia, 1988) [7].

2.7 Medicinal Properties of sapota

Several medicinal properties have been ascribed to different parts of the sapodilla tree. For instance, the tannins in young Fruits are used to step diarrhea, tea is made for the young fruits and the flowers are used for plum many problem. Tea from old leaves is used for young fruit and the flowers are used to treat coughs, colds and diarrhea crushed seed are used as a diuretic, sedative, soforic and for kidney stones; the latex can be used to fill tooth cavities temporally and the bark can be used to make tea for treating fevers (morton 1997).

Sapodilla, being for treating Flavor and rich in naturists can be used as herbal remedy for skin infections and particularly for beauty enhancement. The Vitamin E, A and C of the Fruit of sapota make the skin healthy due to its acid, polyphones and Flavonoids help in reducing weakness. Worst and fungal growth on the skin is cleared away by the milky sap of the sapodilla plant. The seed oil helps in mistrusting the scalp and softening bear. It yields beneficial result in the management of Curly Hair. The sapodilla seed oils helps in treating hair fall due to seborrheic dermatitis. (Preeti *et al*, 2015) [13].

2.8 Traditional uses of sapota

The fruits and crushed seeds of sapota are used in preventing edema due to diuretic property. They also prevent formation of kidney and bladder stones. The latex content of sapodilla fruit is used as materials for filling tooth cavities. The sapota fruits reduce inflammation and pain in gastritis, reflux esophagitis and bowel disorders. Paste of seed of sapodilla is used to alleviate pain and inflammation due to stings and bites. Sapota strengthens the intestines, boosts immunity and prevents from many bacterial infections due to presence of vitamin C. It is useful in pregnancy due to its high nutritional content. It reduces weakness, nausea and dizziness and prevents anemia. A decoction of bark and fruit is used for fevers and diarrhea. Tea made of the bark and fruit is used for fevers and diarrhea. And it is also useful in constipation and piles. The fiber and vitamin A content of sapota fruit prevents colon cancer, lung cancer, and oral cavity cancers. A paste of the mixture of sapodilla flowers and fruits relieves as well as prevents the respiratory disorders. Sapota fruits are also a good anti-spasmodic agent.

2.9 Cosmetic value of sapota

Sapota being rich in nutrients can be used as a herbal remedy for skin infection and particularly for beauty enhancement. The vitamins E, A and C of the fruit *Manilkara Zapota* makes the skins healthy due to its moisturizing effects. Presence of antioxidant like ascorbic acid, polyphenols and flavonoids help in reducing wrinkles. Warts and fungal growth on the skin is cleared away by the milky sap of the scalp and softening hair. It yields beneficial result in the management of curly hair. The sapota seed oils helps in treating hair-fall due to seborrhea dermatitis.

2.10 Value added Technology of sapota

Value added product of sapota is sapota squash, sapota jam, sapota slices, sapota butter, sapota cheese, sapota candy, sapota milk shake, sapota powder, sapota biscuit, sapota ice cream, sapota shrikhand, sapota pulp, sapota juice, osmo-dehydrated sapota slices, sapota nectar, sapota lassie, sapota chocolate, sapota bar, sapota tree chewing gum, sapota toothy - fruity. These are value added product its useful for the Eyes,

Wellspring of energy, Calming agent, Avoidance of certain cancers, Sound bones, Help from Constipation Benefits amid Pregnancy, Hemostatic properties, Hostile to viral and anti-bacterial properties, Hostile to Diarrheal, Emotional wellness, Frosty and Cough, Help in Wight loss, as a detoxifying agent, Tooth cavities.

2.11 Sapota squash

Sudha *et al.,* prepared sapota squash from GA, treated and untreated sapota fruits of pkm-1, and co-2 cultivar. It was noticed they GA2, treated Fruits of PKM-1 recorded Maximum overall acceptability score (3.10) as compared to undated PKM -1 (3.0) Total sugar control of squash in all the treatments. Increased during storage of 30 days. Sapota squash prepared into a recipe of 1 kg Juice, 1-2 kg sugar, 1 kg water and 40 g citric acid could be stored for a period more than six months (Aran, 1999) [3].

2.12 Sapota Jam

The studies on preparation of sapota jam conducted by koli *et al* (2004) [9] reheated that jam prepared using 100 g sugar, 10 g pectin and 6 g citric acid per kg pulp had better acceptability after storage of go days. A slight decrease in moisture and tannin content in jam was reported with increase in acidity, tss, reducing and total sugar after 90 day of storage. The sapota jam could be prepared with a recipe of 2 kg pulp, 1.5 kg sugar, 250 g water and 15-18 g citric acid (Anan, 1999).

2.13 Sapota slices

Vaghani and Chandawat (1986) [20] shied the effect of various pretreatments sun dried Sapota slices. Steeping of sapota slices in 40^0 B syrup + 1% kms recorded maximum recovery (33.88%). The total sugar content increased from 46.06 percent initially to 54.05 percent after storage of II Month whores reducing sugar increased from 32.59 per cent to 39.59 per cent during storage. Based on the tests, the dried product was acceptable up to 9 month. Patil *et al*., (2002) while working on dehydration of sapota reported recovery (30.46%) and to west dehydration ratio (2.38 %) in slices exposed to sulphuring 4 g per kg of slices For 2 hours.

2.14 Sapota Butter

The method was preparation of sapota Butter was Just like for sapota jam as given in 3.2.4 expects the spice bag with ground spices like cinnamm and cardamom. 3.0 g per k.g. pulp each, clove and black paper 1.5 per kg pulp each was immersed in the boiling hot mixture of sapota pulp and sugar in the Ration of 1:1 and 0.5 percent citric acid. The point of sapota butter was determined by refractorneter lest as followed in sapota Jam. At the end the spice bay was squeezed to and spicy extract and flavor to the butter as much possible. The preservation, sodium benzoate was also added 200 ppm of the finished product and the sapota butter was filled in pre-sterilized glass bottles of 200 g capacity, seated of tight and stored of a cool and dry place.

2.15 Sapota cheese

Extract butter was added 60º p gm kilogram of the pulp when the TSS of the cheese the prepared was filled into pre-sterilized jam bottle, sealed and stored at cool and dry place.

2.16 Sapota powder

The pulp residue was then dried in cabinet dry or at 60^0 C to a desirable moisture level and further converted into powder. The obtained was sieved through 150 mesh sieve to get finely textured powder and packed in aluminum fall laminated pouches.

2.17 Sapota milkshake mix

For the Preparation of Instant sapota milkshake mix, the sapota pulp residue powder was first prepared as per the procedures given in milkshake was for mulaled by just mixing through powder and powdered sugar in the ratio of 8:10 on weight basis. It was packed in aluminum foll laminated pouches and storage at a cool and dry place in ambient tomperchene condition.

2.18 Sapota candy

Preparation of sapota fruit candy from deseeded slices was a two stage process first the sliced fruit were osmotically dehydrated using syrup of selected combinations as 20/30/40˚Brix, 30/40/50 ˚Brix, and 40/50/60 ˚Brix. For three days to partially remove moisture the osmosed slices were than dehydrated in convective tray dryers at selected temp three concentrated of sugar solution. Were employed during osmotic dehydration step initially starting with lower concentration and increasing it to designed concentration in next two days by way of adding additional sugar. And the sugar syrup of sapota candy of desired quantity of sugar in water in a vessel to obtained 40˚Brix sugar syrup 450 g of sugar was dissolved in 750ml of water at room temperature and the contain were heated to 80˚c for 10 min and the temperature was reduced to 50˚c for 10 min (A.R. Divya *et al*., 2012) [1].

2.19 Sapota its food and Pharmaceutical product

2.20 Sapota Shrikhand

The concentrated heartwood extract of Acacia Catechu (Khair) is commonly known as katha. The extract of the heartwood of khair tree gives reddish brown to brown Colour is known to passes several medicinal properties, the extract is a mixture of phytochemical and finds use in leather and textile industries as coloring agent in this project and Colour was extracted in water from catechu heartwood by heat Extraction method. The extract was heat concentration to get a concentrated Colour preparation (CCP). The CCP was used as a Coloring agent in sapota shrikhand. Preparation at various level and its acceptance was studied the addition of CCP improved brown Colour to shrikh and was well accepted when used at 2% level. The sapota pulp was used in shrikhand preparation at various level. The sapota pulp Colour matched with the catechu Colour and was well accepted when used at 15% level. Color was evaluated by measuring reflectance value as well as RGB values firmness; consistency and index of viscosity of shrikhand were also studied. It was concluded that catechu heartwood extract can be used can be used as a natural coloring agent in shrikhand. (Swapnil *et al*, 2014).

2.21 Sapota Tree chewing Gum

In the recent years scientific and technological advancements have been made in there each and development of oral drug

delivery systems. The reasons that the oral route achieved such popularity may be primarily due to its ease of administration. Chewing gum is one of the very popular oral confectionary products. It is a potentially useful means of administering drugs either locally or systematically via, the oral cavity. The medicated chewing gum has through the recent years gained increasing acceptance as a drug delivery system. Chewing gum known as gum base (insoluble gum base resin) contains elastomers, emulsifiers, fillers, waxes, antioxidants, softeners, sweeteners, food colorings, flavoring agents, and in case of medical chewing gum, active substances. It offers various advantages over conventional drug delivery systems. Unlike chewable tablets, medicated chewing gums are not supposed to best wallowed and may be removed from the site of application without resorting to invasive means. Moreover medicated chewing gums require the active and continuous masticatory activities for activation and continuation of drug release. An In-vitro apparatus was specially designed and constructed for release testing of medicated chewing gums. Medicated chewing gums are excellent mobile drug delivery systems for self-medication as it is convenient and can be administered discretely without water. (Pagare *et al.*, 2012) [14].

2.22 Sapota seed oil

The chemical composition of the waste from mameysapote (Pouteria sapota) and its oil extracted from the seed (MSSO) of ripe and unripe fruits, was studied. The MSSO from ripe fruits was dry-fractionated, and the thermal and phase behaviors of its fractions and their mixtures with other known natural fats were analyzed. The main components of the mamey peel and the seed were crude fiber (81.32%) and fat (44.41%db), respectively. The seed oil contained oleic, stearic, palmate and linoleic as its main fatty acids. The MSSO showed a simple thermal behavior with a broad fusion range and four maximum temperature peaks. The solid fractions showed maximum melting peaks at higher temperatures than the residual liquid. The MSSO solid fractions showed a potential for use as constituents in mixtures with other natural fats, such as cocoa butter or mango seed fat. (Fuentes *et al.*, 2015) [8].

3. Conclusion

Nature has blessed us with a wonderful flora and fauna, which has made our life beautiful. One of these wonder is a sapodilla fruit. Sapodilla commonly known as Chickoo is made such a fruit, which has a sweet taste that resembles a mixed flavour of brown sugar and bet root. It is liked by people of all ages. It is a most popular fruit in Asia. Sapodilla fruit has a short shelf life. Medicinal properties of chikoo are due to chemical constituents such as polyphenols, ascorbic acid, and glycoside saponin etc. It is an excellent nutrient useful in the management of many diseases like inflammation, pain, diarrhoea etc. It can also be used as diuretic, expectorant and in ophthalmology. Sapodilla fruit is a crop of tropical region. It is consumed in various from either as a natural energy booster as it contains fructose and sucrose. Chickoo is a delicious fruit and every part of the Sapodilla plant has several medicinal and cosmetic properties.

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