

Nutraceuticals of Guava- An Apple Tree for the Poors

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ABSTRACT

Guava is a tropical American tree and shrub belonging to the genus *Psidium* (family Myrtaceae). The word "guava" is thought to come from the Arawak word *guayabo*, which means "guava tree" in Spanish. The leaves and bark of the *P. guajava* tree have a long history of medical usage, which continues today. Guava is known as the "poor man's apple" because of its inexpensive cost, easy availability, and great nutritional value. Guava is sometimes advertised as "super-fruits" due to its high nutritional value. Guava can be eaten fresh or processed into drink, syrup, puree, jams, jellies, slices in syrup, preserved guava puree, fruit bar, fully prepared beverage, dried items, flavouring agent in sweets, cakes, biscuits, and chocolate bars, or added to other fruit juices or pulps. It was determined that putting Guava into processing processes will assist increase and improving the fruit's worth, as well as making it available all year for greater use. Many portions of the plant are employed in various indigenous medical systems, particularly to treat gastrointestinal ailments. Crushing the leaves and using the liquids that come out of them to wounds, cuts, ulcers, boils, skin and soft tissue infection sites, and rheumatic locations are some of the ethnomedicinal uses. This review article contains all the data related to its nutraceutical products, techniques, uses and cultivation and propagation.

Keywords: *P. guajava*, Propagation Techniques, Nutraceuticals Techniques, Nutraceuticals Products.

INTRODUCTION

Guava is a tropical American tree and shrub belonging to the genus *Psidium* (family Myrtaceae). The word "guava" is thought to come from the Arawak word

guayabo, which means "guava tree" in Spanish. It has been adapted in a similar manner in many European and Asian languages.

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Apple guava, yellow fruited cherry guava, strawberry guava, and red apple guava are all common guava varieties. The fruit of the common Guava has a yellow skin and white, yellow, or pink flesh. Guava is a tiny tropical tree that grows up to 35 feet tall and is frequently cultivated in the tropics for its fruit. It belongs to the Myrtaceae family, which contains 133 genera and about 3,800 species. The leaves and bark of the *P. guajava* tree have a long history of medical usage, which continues today. Guava is known as the "poor man's apple" because of its inexpensive cost, easy availability, and great nutritional value. Guava is sometimes advertised as "super-fruits" due to its high nutritional value. Guava can be eaten fresh or processed into drink, syrup, puree, jams, jellies, slices in syrup, preserved guava puree, fruit bar, fully prepared beverage, dried items, flavouring agent in sweets, cakes, biscuits, and chocolate bars, or added to other fruit juices or pulps. It was determined that putting Guava to processing processes will assist increase and improve the fruit's worth, as well as making it available all year for greater use. Guavas are well-known for their sweet, tart flavour and numerous applications, but there's a lot more to this fruit than meets the eye. Because of its wide range of nutrients and medical properties, many people regard it as a "magical" fruit. *P. guajava* has a long and illustrious ethnomedical history. Many portions of the plant are employed in various indigenous medical systems, particularly to treat gastrointestinal ailments. Crushing the leaves and using the liquids that come out of them to wounds, cuts, ulcers, boils, skin and soft tissue infection sites, and rheumatic locations are some of the ethnomedicinal uses (Uzzaman et al., 2018; Joseph & Priya, 2011; Kanwal et al., 2016; Omatio et al., 2018; Singh et al., 2019; Singh, 2018; & Chauhan et al., 2015).

PROPAGATION METHODS

SEEDS

Ripe fruits of selected plants are gathered in the seed propagation process. The seeds are then extracted, washed under running water, and dried for 10 days in the shade. Seeds can be planted in nurseries or directly in polybags with the well-drained medium. Germination can reach 90% of the time and takes about 15-20 days. Seedlings with a diameter of 12-20 mm should be used for grafting.

Guava seeds germination was increased by putting them in tap water before planting. Immersion in cold water was also beneficial, whereas immersion in hot water was harmful. The guava seeds germinated 96 percent of the time after being soaked in distilled water for 48 hours. Fruit seeds are manually collected, washed in a fine colander under running water, dried for three days at room temperature, and then pressed with a roll of paper, sandpaper, or filter paper at 20-30°C. Poor, uneven, and late germination can be caused by seed coating, seed dormancy, and tannin. Seed germination was boosted by 10 percent HCl treatment for 12 hours, resulting in a 90 percent success rate. When compared to other treatments, GA3 enhanced seed germination among diverse growth regulators.

CUTTING

The roots are cut roughly 0.5-1 m from a mature tree's trunk." Root cutting shoots are removed along with their roots and put in 5-liter plastic bags. However, because it is possible to cause guava wilt disease through root wounds with this procedure, it is not recommended. With this procedure, the data revealed that the plant did not have a root absorption system. According to Fracaro (2004), the primary roots had appropriate quantities, were spread evenly around the plant, had suitable development and branching, and provided sufficient anchoring and easy conditions for exploring huge volumes of soil in search of water and nutrients.

AIR LAYERING

Between August and February is the best time to do air-layering (southern hemisphere). It is necessary to choose a strong and direct shoot on from the girdled area. From the tip to the point where the bark ring is formed, the selected shoots must be 500 mm long. A 25 to 40 mm wide piece of bark is pulled away from the chosen branch. The cambium layer between the bark and the wood must be scraped or opened and allowed to dry for two days. The surface is subsequently covered with PVC polysheets and damp moss grass, sterile sphagnum moss, or a 50:50 mixture of peat and sterilised humus. The use of rooting hormones is not required because there is no root problem with this procedure. Depending on the environmental conditions, the roots can be stimulated in as little as 2-3 months. The layers are removed from the parent plant and preserved in a 5 litre plastic bag until they are strong enough to be transplanted into the garden once 50% of the roots have been stimulated."

STOOLING AND MOULD LAYERING

During the dormant season, a plant is cut into the ground and the base of the newly grown shoots is covered with earth. After giving the root rooted shoots the time they need to start, they are separated and taken as individual layers. In mid-June to September, live propagation through layers of heap preserved in guava cv. L-49 (cv. Sardar). More leaves 45 days after transferring into polyethylene bags (8.94), early sprouting (7.90 days), maximum rooting rate (90.73 percent), maximum number of main roots (15.72), maximum number of secondary roots (30.82), and early sprouting (7.90 days) were all observed.

GRAFTING

Grafting is done using apical stem branches that should be 3 or 4 months

old. "Three to four buds, 15-18cm long and 8mm in diameter, should be used to make the shoot." Between 5 and 7 days before separation, the chosen shoot should be clipped and defoliated on the parent plant. This activity aids the swelling buds that may grow after the transplant. This is thought to be essential for effective grafting" (Singh, 2007). The rootstock stem is removed from the soil surface by 15 to 18 cm before grafting. To reduce dehydration and increase the success rate, the graft should be covered in clear polyfilm following union. "Following the polyethylene is removed, sprouting commences between 9 and 12 days after transplanting. The success rate in the greenhouse might range from 70 to 92 percent." 2007 (Singh). When rootstocks reach 200mm in height, they can be grafted with a diameter of roughly 5 - 7mm. Fungus-resistant plant materials used in the grafting process should be treated before use. Scion shoots for grafting should be the same thickness as rootstock shoots or thinner than the rootstock to be grafted. A biodegradable substance, Parafilm® film, is used to completely cover the cut. The buds begin to swell after around 2-3 weeks. The leaf can be removed if the shoots break the Parafilm® leaf and develop roughly 6 to 8 firm leaf buds. To eliminate competition, all shoots growing under the graft should be cut on a regular basis (Singh et al., 2019; & Singh, 2018).

TECHNOLOGIES USE IN THE PROCESSING OF GUAVA NUTRACEUTICALS

GUAVA'S DIETARY FIBRE POTENTIALS

Guava was identified as a source of natural antioxidant chemicals and antioxidant dietary fibre by examining its content and the antioxidant activity of linked bioactive components. Antioxidants

found in Guava, including phenolic acids, flavonoids, anthocyanins, and tannins, have been linked to a variety of health advantages. The notion of antioxidant dietary fibre (AODF) was recently proposed, and one of Guava's primary qualities as a natural product is that it is high in both DF and polyphenolic chemicals. Adding value to fermented dairy products Probiotics are most commonly found in dairy products such as fermented milks. They are live microorganisms that, when given in sufficient amounts, provide health advantages. Probiotic bacteria from the genera *Lactobacillus* and *Bifidobacterium* are the most commonly used strains in dietary formulations around the world. (Ram & Bhavadasan, 2002).

YOGHURT GUAVA

Children, teenagers, and the elderly like sweet fruit yoghurt. As a result, there is a lot of room for yoghurt to become more popular, especially fruit yoghurt. In India, there is practically little research on yoghurt. Yogurt, on the other hand, has a lot of potential in India. Guava fruit yoghurt was made with a starter culture of *S. thermophilus* and *L. bulgaricus* in cow's milk and 5% guava pulp and 6% sugar, and it had a better flavour, texture, and nutritional component than plain yoghurt (Walkunde et al., 2009).

SHRIKHAND OF GUAVA

Shrikhand, a semisolid soft, sweetish sour fermented dairy product. In Gujarat, Maharashtra, and Karnataka, it is a popular delicacy. The procedure for making shrikhand began with heating skim milk, cooling it at 30°C in a batch pasteurizer, adding lactic acid bacteria (LAB) starting culture, and thoroughly mixing it with a mixer. The temperature of the pre-sterilized storage tank was kept at 37°C for 8-12 hours. The contents of the curd were transferred to another vessel using a clean, moist muslin cloth when it was properly

set. Sugar and guava powder were added to this chakka, and it was thoroughly kneaded or blended to a homogenous consistency, either manually or mechanically. It's commonly packaged in polystyrene cups and kept in the refrigerator (Kumar, 2011).

WHEY BEVERAGES MIXED WITH GUAVA JUICE

Singh et al. (1999) created a drink using paneer whey and Guava. Diversification of products utilising whey as a partial replacement for water without a significant change in quality is possible (Divya & Kumari, 2009). For Guava must fermentation and guava vine production optimization, Seveda (2011) used *Saccharomyces cerevisiae*. *Clavispora lusitaniae*, a yeast isolate, was used to create a low-alcohol naturally carbonated fermented beverage with Guava and lemon (Sahota et al., 2010).

GUAVA PULP

Guava pulp, on its own or in combination with other fruit pulp, might be used as a base for a variety of goods. Guava pulp was made from Allahabad Safeda, Lucknow-49, Apple colour, chittidar, and Red Fleshed guava cultivars. Pulp was tested for Total Soluble Solids (TSS), acidity, and ascorbic acid concentration before and after storage at low temperatures for 30 and 60 days. Allahabad Safeda was the best cultivar in terms of chemical composition and organoleptic evaluation, followed by Lucknow-49.

PURREE, JUICE AND NECTAR

Juice processing companies prepare guava puree, which is then frozen until it is sent to a food firm for use in various juice mixes. Pasteurized guava puree, on the other hand, deteriorates with storage at cold temperatures, resulting in the development of flavour and a reduction in Guava juice sensory quality. The findings

showed that standard processing could not prevent changes in juice flavour and quality.

GUAVA JELLY

Guava jelly is a sweet, semisolid, slightly resilient spread or preserve produced from fruit juice and sugar that has been cooked to a thick consistency. Hossen et al. (2009) investigated how to make jelly from guava juice at various stages of extraction. The jellies' sensory qualities and preservation studies were also assessed. Up to 210 days, the colour and flavour of the jellies were satisfactory, but after 210 days, the colour and flavour of the jellies had changed due to fungal development and incipient deterioration. Guava preserves are made by processing the edible parts with sugars, water, pectin (0.5 to 1.5 percent), pH adjuster (3 to 3.4), and other ingredients and authorised additives until the desired consistency is achieved, ensuring product stability. After processing, the preserves should be appropriately packaged and stored in a controlled atmosphere. Guava jam or preserves should have a colour that is distinctive of the product, ranging from yellowish red to brownish red, a guava-like taste and flavour, and a gelatinous and solid consistency.

GUAVA PUREE

Dehydrating fruit purée into a leathery sheet is how guava leather is made. Leathers can be eaten as a dessert or cooked into a sauce. In the tropics, there is a scarcity of information on the chemical and organoleptic qualities of guava leathers. Guava leather, according to studies, has a substantially higher fruitiness fragrance and general acceptability, as well as better compositional qualities.

CANNED SLICED

Guava in syrup is a product that retains the fruit's original shape and appearance. The fruit is soaked in syrup at high

temperatures for a predetermined amount of time in this method. Calcium supplementation improved smoothness in general.

MINIMAL PROCESSING

The process of removing non-edible parts of fruits, such as rinds, stems, and seeds, followed by cutting, washing, classification, sanitization, centrifugation, packaging, and storage, possibly with low levels of irradiation and whitening, to make them ready-to-eat without losing their freshness, with good quality and degree of sanitization, is known as minimal processing of fruits.

DEHYDRATED PRODUCTS

Guava powder is made using a dehydration process, which is an effective method for storing fruit since a decrease in water activity is linked to a decrease in chemical and enzymatic reactions that cause food to deteriorate. The dehydration process works by extracting a small amount of water from foods, just enough to keep them fresh for a long time.

GUAVA BEVERAGES

Guava wine may prove to be a quality wine with alcohol (stimulant) and high levels of phenols and ascorbic acid (antioxidants) plus enhancing the economic standing of Indian farmers, especially during period of abundance. Guava juice requires „chaptalization“ so as to adjust \sits brix and produce a superb wine out of it. The chaptalized juice ("must") is processed with pectinase or a combination of enzymes before being fermented with typical yeasts at 22 to 30°C and a 6 to 11 percent (v/v) inoculum size. The organoleptic and sensory properties of guava wine enhance with ageing and racking (Kanwal et al., 2016; Osorio & Carriazo, 2011; Jain et al., 2007; Lim, 1990; Hossen et al., 2009; & Mori et al., 1998).

IMAGES OF NUTRACEUTICALS OF GUAVA AVAILABLE IN THE MARKET



Figure1-

https://www.marketplace.bm/shop/meat/yogurt/la_yogurt_probiotic_guava_blended_lowfat_yogurt_sabor_latino_6_oz_cup/p/78031



Figure2-

<https://www.bhuirajams.com/product/guava-jelly-470gm/>



Figure3-

https://www.marketplace.bm/shop/meat/yogurt/la_yogurt_probiotic_guava_blended_lowfat_yogurt_sabor_latino_6_oz_cup/p/78031



Figure4- <https://harvesttimefoods.com/guavas-frozen-7503015177406-34570/>



Figure6- <https://www.ishopindian.com/deep-guava-slices-frozen-pr-26353/>



Figure5-

<https://images.app.goo.gl/FgS3LgmJt37e5R8x6>

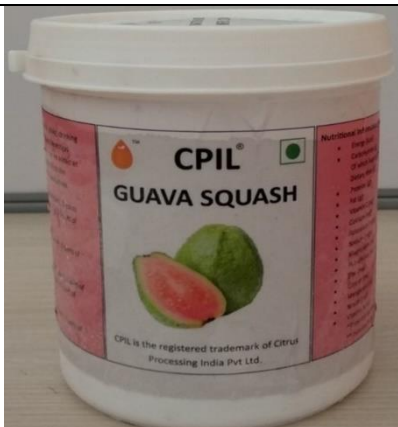


Figure7- <https://m.indiamart.com/proddetail/pink-guava-squash-19256733688.html>



Figure8- <https://images.app.goo.gl/FgS3LgmJt37e5R8x6>



Figure9- <https://m.indiamart.com/proddetail/250g-guava-fruit-powder-22682318930.html>

CONCLUSION

The current review article contains all the information regarding guava nutraceutical value. It contains various techniques through which we are able to find out that Guava has use on large scale by nutraceutical industries. The nutritional value of Guava has more time increase through these techniques. The more is the production, the more is the raw guava material is need so, to increase its yield, we have also studied various propagation and cultivation techniques like grafting, cutting, and propagation through seeds. By using these cultivation practices, we are able to find out that how can we increase the production of raw Guava. But still, we need to qualify, quantify, validate and standardize the product of Guava and raw Guava. So, more and more research is needed to maintain its quality, quantity.

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