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A REVIEW ON PASSION FRUIT AND IT'S PHARMACOLOGICAL BENIFITS

1. Rohit Sanjay Sahane
2. Dipak Madhav Sanap

1. Deparment Of Pharmacology RBT , Chhatrapati Sambhajinagar , India
2. Deparment Of Pharmacology GMCP , Chhatrapati Sambhajinagar , India

Abstract

Passiflora Edulis is a passion fruit, due to the various pharmacological activities of these fruits. This plant has a base of medicinal properties used as a home remedy. The largest family of passionflowers is the Passifloraceae. Passion fruit used as a variety of marketed products. Passion fruit and the whole plant are very useful, it has pharmacological activities such as antidiabetic , anxiolytic , antineoplastic, antioxidant, analgesic and antiinflammatory. With around 500 species, the Pass flora genus is the largest of the Passiflora family. Among them, passionflower has many medicinal values .It comes from the passionflower vine, native to Brazil, Paraguay and Argentina. A member of the passionflower family, it is widely grown in South America, the Caribbean, South Florida, South Africa, and Asia. The fruit is native to South America, belongs to the Pass flora family and is one of the fruits with the highest export value. Passiflora comes in two different forms, standard yellow , which vary in acidity and starch content. The annual production is about 120 tons. Variety There are two types of passion fruit in Bhutan, the purple type and the yellow type. However, the purple type is the most commonly grown type in Bhutan. Climate The purple type can generally grow between 900 and 2000 meters above sea level, and the yellow type can generally grow below 1000 meters above sea level. The temperature of 18-23 ℃ is conducive to flowering and fruit setting of purple passion fruit type, but higher temperature is needed to promote juice production and improve quality Soil Passion fruit grows on a variety of soil types, but light to heavy sandy loam of medium texture is suitable And there are also many useful chemical components, such as volatile oils, flavonoids , lipids and triterpenoids , as well as aldehydes , ketones , tridecone , palmitic acid , stearic acid, linoleic acid , quercetin, apigenin, vitaxin. This chemical constituent can be used for various pharmacological activitie . This review can provide factual information on the relevant physicochemical properties, nutritional value, pharmacological and biological activities and market potential of plant and herbal preparations made from the leaves, stems, fruits and pericarp of P .edulis.

Keywords: Krishna Phul, Fruit,Passiflora Edulis,Krishna kamal

INTRODUCTION

Passion fruit (Passiflora edulis) is popular in producing countries in Africa, Latin America and Asia where it is commonly processed into juices and other products. In Kenya, it is one of the most important fruit trees and it is mainly grown by small farmers across the country. Passion fruit can be eaten fresh, but it is most often heated or cooled to extract and preserve the pulp. The juice has a unique, full-bodied flavor and high acidity, making it a natural concentrate. Delicious non-concentrated, it is delicious and mixes well with other fruit juices.

Soil with a pH of 6.5 to 7.5 is best. Preparation of the ground The ground must be well prepared by deep ploughing, leveling and fertilization. Areas with strong winds should be avoided to avoid damage and trellising work on the vines typical processed products are ice cream, sorbet, nectars, fruit juices, concentrates, pumpkins, jams and jellies.

In addition, passionflowers are often grown as ornamental plants for their showy flowers. There are two distinct forms in this species, the standard violet and the yellow, which are distinguished as P. edulis f. yellow fruits

Figure 1 image by pixxel

Passion Fruit Flower

Yellow pulp is generally larger than purple pulp, which is less acidic and more intensely flavored, often with a higher juice percentage than yellow pulp. Either way, both types of passion fruit make excellent juice blends. Purple passion fruit is the dominant species of the two fruits in Kenya, with the highest production in the Rift Valley, followed by the Eastern Highlands (together accounting for over 74% of national production). Passiflora (Krishna Phal: Indian name) is a famous herb with a variety of pharmacological activities and can also be used as medicine to treat various diseases. With around 500 species, the Passiflora genus is the largest of the Passiflora family. Among them, passionflower has many medicinal values [1]. It comes from the passionflower vine, native to Brazil, Paraguay and Argentina. A member of the *Passifloraceae* family .

COMMON VARITIES OF PASSION FRUIT

1. Purple Passion Fruit
2. Yellow Passion Fruit

PLANT PROFILE

Figure 2-Image by pixxel

Passion Fruit Plant

TAXONOMY	PASSION FRUIT
Kingdom	Plantae
Phylum	Tracheophytes
Division	Magonoliophyta
Class	Magnoliopsida
Family	Passifloraceae
Genus	Passiflora
Species	Edulis

BACKGROUND

it is widely grown in South America, the Caribbean, South Florida, South Africa, and Asia. Native to South America, it belongs to the Passiflora family and is one of its most valuable fruits for export.

Variety

There are two types of passion fruit in Bhutan, the purple type and the yellow type. However, the purple type is the most common type in Bhutan.

Recommended Seeding Rate

Seeding rate varies depending on the type of cropping system and cultivar used. The Kniffin drive system is commonly used. In this system of plants planted at a spacing of 2m x 3m, it will accommodate approximately 670 plants/acre. Passiflora occurs in two distinct forms, standard yellow (Passiflora edulis f. flavicarpa Deg.) and purple (Passiflora edulis f. edulis), which vary in acidity and starch content. The annual production is about 120 MT.

Field Preparation

The land must be adequately prepared by deep plowing, leveling and fertilization. Areas with strong winds should be avoided to avoid damage and trellising work on the vines. Dig 45cm x 45cm x 45cm pits at 3m x 2m or 3m x 3m intervals on hillsides or plains. The pit is filled with a mixture of three parts topsoil and one part compost.

Nursery Management

The nursery should be constructed in a location where the greenhouse and water supply facilities are convenient. All types of passionflower species can be propagated by seed, cuttings, aerial layers or grafting. Rootstocks are made entirely from seed.

Seeds

Fruit from good yielding, quality vines. The pulp is extracted and left to ferment for 72 hours to separate the seeds from the pulp. The passionflower seeds are then carefully washed, dried and sown in well-prepared beds as soon as possible in March-April. The seedlings, after developing 4-6 leaves, were transplanted into 10 cm x 22 cm plastic bags filled with a mixture of soil, compost and sand (2:1:1). After about three months, these seedlings will be ready for transplanting to major countries.

Climate

The purple type can generally grow between 900 and 2000 meters above sea level, and the yellow type can generally grow below 1000 meters above sea level. The temperature of 18-23 ℃ is conducive to flowering and fruit setting of purple passion fruit type, but higher temperature is needed to promote juice production and improve quality.

Soil

Passion fruit grows on a variety of soil types, but light to heavy sandy loam of medium texture is suitable. Soil with a pH of 6.5 to 7.5 is best.

Cuttings

Cuttings of semi-hardwood of about 30-35 cm with 3-4 nodes are ideal. Cuttings should first be placed in sand beds/pots for rooting, then transferred to plastic bags to facilitate rooting.

Grafting

Grafting is also a method of propagating hybrids and reducing pest damage using passion fruit resistant rootstocks. Rootstock material should be planted in a separate area to avoid hybridization with other fruiting varieties. Scionwood is collected from plants of the desired variety. Split or wedge grafts are the most effective grafting methods.

Planting

planting is best planted in cloudy weather in June-July after the onset of the monsoon so that the plants develop well at the end of the monsoon.

Cultural practices

Passion fruit is a woody vine that requires supports and trellises for good growth and fruiting. Among the different types of trellis, the Kniffin system is the most economical. This drive system requires 2.5m long poles spaced 6m apart with 8-10 gauge wire attached to the poles.

Pruning

Pruning is usually done twice a year, once in March and April and again in October and November, depending on the crop.

Nutrient Management

The application of organic fertilizers is essential for vigorous plant growth and optimum yield. 10 kg of FYM per stock are recommended the first year of planting and 15 kg of FYM per stock from the second year. Fertilization should be carried out in February-March.

Water management

Crops need 750 to 1250 mm of regular rainfall. A prolonged dry period between January and March reduces the main summer harvest and negatively affects flower development, leading to premature fruit drop and fruit shrinkage. Supplemental irrigation such as drip irrigation can be very helpful in times of drought. On average, passion fruit requires 12-15 L/vine/day in summer and 6-8 L/vine/day in winter).

Pests

Passion fruit has not reported any serious pest problems. There have been reports of bedbugs puncturing young passion fruit, but the fruit usually develops more or less normally without any control measures being necessary.

Diseases

Brown spot disease

Figure 3 image by google CCL

The most common passion fruit disease is brown spot caused by Alternaria macrospores. Appears mainly in spring and early summer. The disease presents as concentric brown spots bordered with green. In severe cases, a branch belt and premature defoliation will occur, Affected branches should be cut and burned. Another disease is root rot caused by Phytophthora nicotianae. A parasite that eventually kills the plant. Rinse with 1% Bordeaux mixture to help control disease. Affected plants should be filled with soil to encourage new root formation. Fusarium wilt or crown rot is a destructive disease caused by Fusarium oxysporum/F. passiveloae. Affected plants die immediately within a day or two.

There is no control other than having tolerant/resistant varieties or using resistant rootstocks.

Harvest

The vines start fruiting 10 months after planting and the fruit peaks at 16-18 months. The fruit takes about 80-85 days to ripen after flowering. The purplish fruit and a small amount of stem/pedicel should be collected. The fruit quickly turns from green to dark purple (or yellow) when ripe, before dropping to the ground within a few days. The skin will wrinkle when dry, but the pulp will hold well for days. It can produce 3 to 7 tons per hectare. The normal productive life is 3 years in tropical climates and up to 8 years in subtropical climates.

Post-harvest management

Passion fruit is generally not eaten as table fruit. It has good commercial value, especially in the processing industry as a raw material for the preparation of juices, concentrates, pumpkins, ice creams and candies, etc. Purple passion fruit can be stored at 5°C with 80-90% humidity for up to 5 weeks with minimal quality loss.

However, yellow passion fruit can be stored at 5-7.5°C for about a week.

Uses in traditional or ethnic medicine

Passionflower varieties have been widely used as folk medicines due to their calming and sedative properties. Early European travelers to North America noted that the Algonquian Indians of Virginia and the Creeks of Florida ate P. edulis fruits from both cultivated and wild sources. European settlers of the time also ate the fruit and praised its taste, suggesting that prehistoric people consumed passionflower as a fruit (Brickell, 1968). Passionflower was first praised for its medicinal use in Peru in 1569 by the Spanish researcher Monardus. Various varieties of passionflower are widely used in traditional healing systems in many countries. In South America, extracts from the leaves of P. edulis are commonly used to treat symptoms of alcoholism, anxiety, migraines, nervousness and insomnia. A drink made from the flowers is believed to treat asthma, bronchitis and whooping cough. In traditional medicine, the plant has been used as a cardiotonic, mild diuretic, digestive stimulant and treatment of urinary tract infections.

Brazil, the species, called "maracuja", is used as an anxiolytic, sedative, diuretic and analgesic. P Edulis is used in South America as a sedative, stimulant and tonic for high blood pressure, menopausal symptoms, diuretic, vermifuge, antidiarrheal , and colic in infants. In Madeira, the fruit of P. edulis was considered a digestive stimulant and used as a remedy for stomach cancer Fresh leaves of P. Edulis in Nagaland (India). Eating fruit can relieve constipation.

An infusion of the leaves of P. edulis has been used in Nigeria to treat hysteria and insomnia. The plant is widely This plant is widely used by South African traditional healers. These traditional uses include alcohol abstinence, antibacterial, anticonvulsant, antispasmodic, aphrodisiac, asthmatic, ADHD, burns (skin), cancer, chronic pain, cough, drug addiction, Epstein-Barr virus, fungal infections, gastric (nervous) disorders .stomach), Helicobacter pylori infection, hemorrhoids, high blood pressure, menopausal symptoms (hot flashes), neuralgia, pain (general), skin inflammation, tension and prevention of wrinkles. revention of wrinkles.

IN VITRO AND IN VIVO PHARMACOLOGICAL STUDIES

Antioxidant activity

The leaves of P. edulis, traditionally used in American folk medicine for inflammation and nociception, are rich in polyphenols, which are reported to be natural antioxidants. sThe antioxidant capacity of P. edulis leaves was also examined against DPPH radicals and various reactive oxygen species (superoxide radicals, hydroxyl radicals, and hypochlorous acid), which showed to be concentration dependent, although hydroxyl radicals have been noted to have pro-oxidation. . These findings suggest that P. Edulis leaf extract has potent in vitro and ex vivo antioxidant properties and can be considered as a possible new source of natural antioxidants. Further research is needed to investigate the potential use of P. edulis extracts in the prevention of diseases such as diabetes and neurodegenerative diseases in which oxidative stress damage to proteins appears to play a major role .

The previous results obtained by Kandandapani et al. showed that subacute administration of P. edulis extract significantly controlled blood sugar in diabetic rats. In addition, seaweed extract protects end organs by restoring antioxidant enzymes, significantly increasing the level of superoxide dismutase in internal organs, and reducing the levels of catalase and thiobarbituric acid reactive substances.

In conclusion, P. edulis extract has antidiabetic and antioxidant effects on streptozotocin-induced diabetes.

Antifungal activity

These peptides are generally characterized by a low molecular weight and a cationic charge. Pellegrini et al. dedicated to the purification and characterization of a new plant peptide extracted from 50 kDa, Pe-AFP-1 (antifungal peptide), purified from passion fruit seeds (P. edulis). In vitro tests showed that PeAFP-1 was able to inhibit the development of the filamentous fungi Trichoderma harzianum, Fusarium oxysporum and Aspergillus fumigatus with IC50 values of 32, 34 and 40 µg/mL, respectively (Pelegrini et al, Pe- The discovery of AFP1 could in the near future contribute to the development of biotechnological products such as antifungal agents and transgenic plants that are more resistant to pathogenic fungi.

Antitumor activity

The inhibitory effect of the fruit decoction of P. edulis on the activity of matrix metalloproteinases gelatinases (MMP-2 and MMP-9), involved in tumor invasion, metastasis and angiogenesis, has been evaluated. Different concentrations of aqueous extracts of P. edulis inhibit these enzymes (Puricelli et al., 2003).

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Cytotoxic activity

The Artemia lethality biological test is widely used in the biological assay of bioactive compounds (Meyer et al., 1982; Zhao et al., 1992). A simple animal organism (Artemia) is used as a convenient monitor for screening. Artemia eggs were collected and hatched in artificial seawater 8% NaCl solution) for 48 hours to mature shrimp called nauplii. Cytotoxicity assays were performed on brine shrimp nauplii using the Meyer method (Meyer et al., 1982). Crude petroleum ether and chloroform extracts of leaves and stems of P. edulis were less lethal to brine shrimp than a Salt marsh after 24 hours of exposure of samples to the vincristine sulphate positive control. This technique is used to determine the general toxicity of plant extracts. The chloroform extract of the stems had the lowest values and the petroleum ether extract of the leaves had the highest LC50 values of 6.63 and 11.17 g/mL.

Anti-inflammatory activity

Aqueous extracts of leaves of plants of the genus Passiflora have shown potent anti-inflammatory effects in experimental in vivo models (Benincá et al., 2007). Aqueous extract of leaves of P. edulis has significant anti-inflammatory activity in mice. Systemic administration showed significant anti-inflammatory effects characterized by inhibition of leukocyte influx into the pleural cavity and correlated with myeloperoxidase, nitric oxide, tumor necrosis factor and interleukin in an acute model of induced inflammation Significant blockade of -1 levels correlated by intrathoracic injection in mice. In one experiment, P. edulis was more effective than dexamethasone in suppressing tumor necrosis factor and interleukin-1 levels (Capasso and Sorrentino, 2005). Therefore, P. edulis could be a source of new therapeutic candidates with a spectrum of activity similar to current anti-inflammatory steroids such as dexamethasone.

Anti-anxiety activities

Anxiety is a very common mental health problem in the general population. P. edulis is a popular remedy used to treat anxiety disorders. Several species of passionflower have been widely used as traditional medicines due to their calming and sedative effects (Barbosa et al., 2008). The anxiolytic activity of P. edulis was assessed based on the performance of mice in elevated maze, open field, and horizontal line tests (Coleta et al., 2001).

The aqueous extract showed anxiolytic activity without any significant effect on locomotor activity. When comparing the muscle relaxant effects of diazepam (6 mg/kg) and chrysin (13), Compound 13 did not show muscle relaxant effects in the horizontal line test even in the dose range from 0.6 to 30 mg/kg, This suggests that 13 is an anxiolytic with no sedative or muscle relaxant side effects, unlike diazepam, which exhibits muscle relaxant effects. Compound 13 has been shown to be a ligand for central and peripheral benzodiazepine receptors (Medina et al., 1990).

Antihypertensive activity

Despite advances in pharmacological and mechanical therapy, cardiovascular disease remains the leading cause of morbidity and mortality worldwide. Passiflora's relative, P. edulis, has been reported to have antihypertensive effects and is used in traditional medicine to treat hypertension. Ichimura et al. (2006) reported that oral administration of a methanolic extract of this plant (10-50 mg/kg) or Compound 8 (50 mg/kg), a polyphenol in the extract, significantly reduced systolic blood pressure and diastolic blood pressure in spontaneously hypertensive patients. rats (SHR). Quantitative analysis by liquid chromatography tandem mass spectrometry (LC-MS/MS) showed that the extract contained 20 g/g dry weight of 8 and 41 g/g dry weight of luteolin-6-C -glucoside. It also contains gamma-aminobutyric acid (GABA, 2.4 mg/g dry weight by LC-MS/MS), which is believed to be an antihypertensive substance. Due to the higher concentration of GABA in the extract, the antihypertensive effect of the extract in SHR may be mainly due to the antihypertensive effect induced by GABA, partly due to the vasodilating effect of polyphenols, including luteolin.

CONCLUSION

Passion fruit is appreciated for its attractive nutritional and organoleptic properties for the health and wellbeing of consumers around the world. The secondary metabolites of passion fruit have attracted considerable attention as these compounds have numerous health benefits and economic value, and have therefore been used in nutraceuticals, cosmetics and medicine. Passion fruit and its by products are rich in various chemical compounds and phytonutrients, high in water and relatively low in nutrients, while purple fruits are rich in vitamin C, vitamin A, fiber and calcium. Different plant parts (leaves, buds, skin, and pulp) and growth stages of P. edulis contain various bioactive components such as total food and polyphenols.

Yellow passion fruit has a higher pectin content in the peel, a higher carotene, quercetin and kaempferol content in the pulp, and a higher total dietary fiber content in the seeds. The purple fruit is characterized by a high content of anthocyanins in the skin and seeds. As food waste, passion fruit rind accounts for 50% of the total fruit, and because it is rich in bioactive ingredients, it is also highly susceptible to obtaining functional ingredients. Due to passion fruit's unique bioactive components, various nutritional and medical benefits have been studied and documented. P. Different excerpts from different parts. edulis has shown various pharmacological activities, including antioxidant, analgesic and anti-inflammatory, antibacterial, antihypertensive, hepatoprotective and lung-protective, antitumor, antidiabetic, hypolipidemic, antidepressant and anxiolytic-like properties. In particular, acute and subacute toxicity studies suggest that passion fruit may be safe in reasonable daily doses. These excellent results suggest that passion fruit may have a range of health benefits, such as controlling inflammation and neurological disorders, and preventing certain chronic diseases, such as high blood pressure and heart disease. hyperlipidemia.

There are also research opportunities to better utilize passion fruit and its by-products for human consumption. Passion fruit and its by-products are rich sources of polyphenols, so it is important to optimize appropriate processing methods to stabilize and improve the quality of this processed product.

The structure and properties of polysaccharides in fruits remain to be studied. Pesticides may be present on the fruit and must be strictly monitored and controlled. The effects of genetic diversity, processing methods and living environment on the chemical composition and nutritional value of passion fruit need further investigation. Research on P. edulis species is very limited, especially on the confusion between P. edulis and P. incarnata still exist and deserve special attention from botanists. Reports on the pharmacological activity of P. edulis plants are mainly based on preliminary evaluations using models without appropriate criteria or reasonable doses. P. edulis has shown therapeutic potential as an in vitro anticancer agent against various tumor cell lines, but the in vitro cytotoxic activity needs to be supported by in vivo studies and clinical trials to confirm its role as an anticancer agent. coming. The structure-activity relationship and molecular mechanism of its biologically active compounds or crude extracts will also be the focus of future research and practice. Additionally, there are few clinical trials on the efficacy and safety of P. edulis to support claims of efficacy.

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