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A Review On The Plant Containing Medicinal Important Glycyrrhizin

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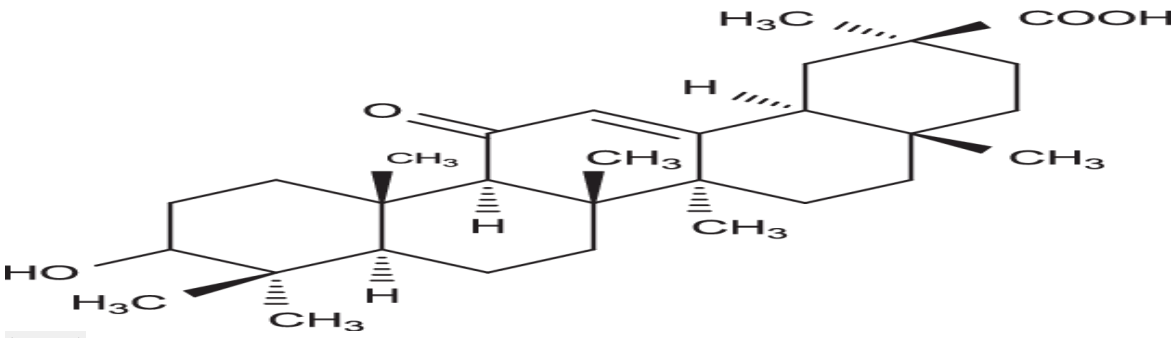
Abstract
Glycyrrhizin is a glycosylated saponin, containing one molecule of glycyrretinic acid. Glycyrrhizin is a triterpene glycoside, also known as glycyrrhizic acid. It is a tribasic saponin composed of a triterpenoid aglycone, glycyrrhetic acid joined to a disaccharide of glucuronic acid. This review systematically collates the identification of different plant with glycyrrhizin and their distributions.The morphological characteristics, distribution, suitable environment, and area of suitable habitat of important medicinal plants were reviewed.

INTRODUCTION

. Glycyrrhizin is a glycoside utilized for various ailments including bronchitis, asthma, peptic ulcers, gastritis, rheumatism, allergies, inflammation, and sore throat. It is a strong immunomodulator and maintains the liver functioning for detoxification of drugs. Moreover, it is also a laxative, diuretic, and exerts a stimulation effect on the adrenal gland. Glycyrrhizin is a natural sweetener with nearly 50 times more sweetness than sugar. Glycyrrhizin is primary a remedy for peptic ulcer and some other stomach diseases. In recent studies, glycyrrhizin displayed enormous therapeutic activities like antiinflammatory, antiviral, hepatoprotective, and anticancer activity . Glycyrrhizin is a triterpene glycoside, also known as glycyrrhizic acid (Fig. 1). It is a tribasic saponin composed of a triterpenoid aglycone, glycyrrhetic acid joined to a disaccharide of glucuronic acid. Glycyrrhizin is extracted from the roots of the liquorice plant, Glycyrrhiza glabra L. where it occurs naturally at levels of 2–15% of the dry matter as a mixture of potassium and calcium salts. It is often converted to the ammonium form on extraction but is also sold as a liquid, paste ('block'), or spray-dried powder extract.



(Fig. 1)

Glycyrrhiza glabra L.

There are different species such as Glycyrrhiza glabra (European licorice) and Glycyrrhiza uralensis (Chinese licorice). G. glabra and G. uralensis are considered as beneficial herbs in Japan while G. glabra, G. uralensis and G. inflate are recognized as medicinal plants in China (parK et al., 2014). Glycyrrhiza glabra L. is a perennial plant from the Fabaceae family, originating from central and southwestern Asia, as well as from the Mediterranean basin. It grows in temperate and subtropical climates, including Europe and Asia. It is a native to Spain, Iraq, Turkey, Russia, Japan and northern China. G. glabra is very important commercial crop that grows slowly from seed or by micropropagation (BadKhane et al., 2014) and then can be difficult to eradicate when well established. The active substance (glycyrrhizin) of licorice is contained in the roots of the plant (omar et al., 2012).

G. glabra root is used as a flavouring and sweetening agent for
tobacco, chewing gums, candies, toothpastes and beverages . Licorice is also the most popular ingredient in over 70% of Chinese medicines and has been used by people for at least 4,000 years. It was used as an analgesic, antispasmodic or expectorant (wang and nixon, 2001), as well as for the treatment of tuberculosis, infectious hepatitis and bronchitis . G. glabra contains flavonoids and isoflavonoids, which show antiproliferate and oestrogen-like activity. G. glabra extract shows a distinctive gene expression profile, which indicates the presence of potentially useful components other than glycine, which may be effective in hormonal therapy or in anti-cancer therapy. The smooth phytoestrogens contained in the root can be used to treat or alleviate the effects of postmenopausal osteoporosis. Glabridin is the main isoflavan present in the root of G. glabra. In addition to oestrogenic activity, it has a protective effect on the cardiovascular, antiinflammatory, anti-oxidant and anti-neoplastic systems.
There are approximately 29 species of G. Linn. plants worldwide; 15 species have medicinal value, and 9 species contain glycyrrhizic acid. Licorice plants are distributed on six continents with the exception of Antarctica; licorice species are most widespread and diverse in Asia, which has 12 licorice species distributed across 20 countries. The country with the largest area of medicinal licorice species is China, which contains 12 species, and most species are distributed in North China.
Acharas sapota L. Sapota is a tropical fruit. It is believed to be native to Yucatan and possibly other nearby parts of southern Mexico, as well as northern Belize and north-eastern Guatemala. It is believed that sapota was cultivated throughout tropical America, West Indies and southern part of Florida mainland, where it is a tall tree found in forests. Early in colonial times, it was carried to Philippines by the Spanish and later was adopted everywhere in the Old World tropics. From the Philippines, it spread throughout Southeast Asia as a popular fruit tree, where it is not only consumed but also exported. It reached Sri Lanka in 1802. Sapota was introduced to India in 1898.Various species of sapota are now cultivated in Africa, India, East Indies, Philippines,Malaysia, Thailand, the tropical and subtropical regions of America and in almost all tropical countries worldwide. Sapota (Achras sapota L.) belongs to the family Sapotaceae. Sapota is one of the major Fruit crop grown in India. The nutrient value of sapota fruit (100g) includes 0.4 g of protein, 1.1 g of fat, 20 g of carbohydrate, 5.3 g of total dietary fiber, 210 mg of calcium, 0.8 mg of iron, 12.0 mg of magnesium, 12.0 mg of phosphorus, 193.0 mg of potassium, 12.0 mg of sodium and 14.7 mg of vitamin C. Sapota, commonly known as Chickoo has a sweet taste that resembles a mixed flavour of brown sugar and beetroot. It is liked by people of all ages and is a most popular fruit in Asia. Acharas sapota (sapotaceae) is another sweet plant, the latex fruits of which contain glycyrrhizin as sweet principle. Sapodilla is the medium-sized tree native to Central America, but it alsogrown elsewhere in the tropics. It is best known source of chicle gum (the coagulated latex) which is the basis for chewing gum manufacture. It also has chemical compounds like sugar, protein, ascorbic acid, phenolics, carotenoids, glycoside sapotinine and minerals like iron, copper, zinc, calcium and potassium. It is an excellent nutrient useful in the management of many diseases like inflammation, pain, diarrhoea etc. Traditionally, it is used as a diuretic, expectorant and in ophthalmology. Sapota plant is usually grown in tropical areas, but can also be grown in semi-tropical areas in green-house. It can be grown up to 1200 m. above sea level. Being a tropical fruit, it needs warm (10-38°C) and humid climate (70% relative humidity) for growth. Alluvial, sandy loam, red laterite and medium black soil having good drainage system, with
acidic to neutral pH, provide best environment for sapota. For good yield, fertilizers containing 6-8% nitrogen, 2-4% phosphoric acid and 6- 8% potash every 2-3 months and increasing gradually to 250g per plant are used in the first two years. In after second year, 2 to 3 applications per year prove to be sufficient. Very little pruning is required for the plant. Mostly sapota are picked un-ripe. At normal summer temperature and relative humidity (RH), the hard and immature sapota ripen within 9 - 10 days and rot in two weeks but extremely low temperature seriously retards the ripening of the fruit and damages its quality. Low relative humidity causes the fruit to wrinkle and shrivel up and extreme humidity causes sogginess. Sapota can be stored for long under proper conditions.Harvested fruits can be stored for 2 to 3 weeks at 12 to16°C with 85 to 90% RH. The fruits can also be stored with 5% CO2 for 18 days at normal temperature. Fully matured/ripe fruits can be kept at a temperature of1.67°C for as long as six weeks.

Geographical distribution

Cultivation of sapota is done in the warm and humid areas of the world. It is indigenous to southern Mexico, Yucatan Peninsula, Central America and South America. It is very popular in Asian countries like Phillipines, Sri Lanka, Thailand, Malaysia and India. In India, sapota is grown in several states including Tamil Nadu, Andhra Pradesh, Maharashtra and Gujarat.

Abrus precatorius Linn.

Abrus precatorius is used as abortifacient, antidote, aphrodisiac, con-traceptive, anti-diuretic, emetic, and also in the treatment of convulsion, cough, diarrhea, gingivitis, gonorrhea, hook-worms, jaundice, ophthalmic disease, rheumatism, trachoma, vermifuge, etc. Abrus is possibly native of Indian, Africa and most of the tropics. Previous workers have claimed that glycyrrhizin is the sweet principle of A. precatorius leaves. According to some literature the roots contain higher percentage of glycyrrhizin than leaves. Chemically, glycyrrhizin is a triterpeniod glycosidic saponin present in roots and rhizome of Liquorice plant Glycyrrhiza glabra and roots and leaves of A. precatorius (Wild liquorice or Indian liquorice). The crude dried aqueous extract 4-25% (also known as black liquorice) may contain glycyrrhizinic acid in the form of calcium, magnesium and potassium salt. Glycyrrhizin, which consists in the calcium and potassium salts of glycyrrhizic acid (Glycyrrhizinic acid) is converted upon hydrolysis into the aglycone glycyrrhetic acid (glycyrrhetinic acid) plus two molecules of glucouronic acid. The acid form is not particularly water-soluble, but its ammonium salt is soluble in water at pH greater than 4.5

Like liquorice, roots of this plant also contain glycyrrhizin. Abrusprecatorius is a climbing shrub, indigenously found throughout India. The plant is propagated through seeds. Leaves and roots of this plant contain sweet tasting Triterpene glycoside principles. Leaves taste sweeter than roots, seeds are poisonous and contain Abrin, a poisonous substance. Leaves contain Triterpene glycosides Abrusosides, A, B, C, D and E. Roots contain the sweet oleanane type Triterpene glycoside glycyrrhizin. Hence this plant is used as substitute for liquorice. Abrusosides are non-toxic.Abrisosides A, B, C and D are found to be 30, 100, 50, 75 times sweeter than 2% w/v sucrose, respectively. Abrusoside E is marginally sweet but the monomethyl ester proved to be more potently sweet. Leaf extract (purified abrusosides A-D) is commercially used for sweetening foods, beverages and medicines. Leaves, roots and seed are used for medicinal purposes. Preparations of Abrus have been used for centuries as folk remedies for cancer, contraceptive, convulsion, cough, diarrhea, diuretic, gonorrhea, jaundice, rheumatism, trachoma, and as vermifuge. It is also used as sweetener, aphrodisiac, abortifacient etc.

Taverniera cuneifolia(Roth) Arn.,

The genus Taverniera belongs to family of Fabaceae includes twelve species and is endemic to the Northeast African and Southwestern Asian countries (Stadler et al., 1994). Taverniera cuneifolia (Roth) Arn, commonly known as Indian liquorice, is an herb and occurs along the bank of small streams. Roots of this species are sweet in taste and are used by the tribal people as a substitute for the commercial liquorice Glycyrrhiza glabra (Naik 1998). The commercial liquorice has tremendous medicinal properties. The roots of G. glabra are widely used in traditional systems of medicines all over the world (Grieve 1992) and are rich in bioactivities like antiulcer, anti-inflammatory, antibacterial, antimalarial, antithrombic, antidiuretic, anti therrosclerotic, antifungal, estrogenic, antiallergic, antidiabetic and antimutagenic Rastogi and Mehrotra, 1993; G. glabra extract, glycyrrhizin and its derivatives are reported to inhibit growth of viruses like HIV, SARS, Hepatitis B & C, Influenza through the potentiation of immune system, inhibition of reverse transcriptase and induction of interferon production.

The genus Taverniera belonging to the family of Fabaceae, includes twelve species and is endemic to the Northeast African and Southwestern Asian countries (Naik, 1998; Stadler et al., 1994). Literature available onthis plant is scarce, except for Taverniera abbysinica, which is used as a 'drug for sudden illness' in the Africansubcontinent (Stadler et al., 1994). Taverniera cuneifolia(Roth) Arn., is often referred as Indian licorice as its roots are sweet and taste very similar to that of Glycyrrhiza glabra

CONCLUSION

There are approximately 4 known plants worldwide; contain glycyrrhizic acid. all plants are distributed all over the world. The desire for sweet taste is inborn. Since the ingestion of sugar increases caloric intake and can lead to obesity, a risk factor for some chronic diseases, this common sweetener has been restricted in the diet of diabetics. The availability of natural sweeteners has made it possible to offer consumers sweet taste without the calories that a diet high in sucrose implies.
For fast multiplication of these plants, developments of suitable techniques are required not only to save them from becoming extinct but also to enable their large scale cultivation. Furthermore, simple techniques for the extraction of these principles are required which could be adapted at small-scale level.

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