

Nutritional and Ethnomedicinal Potential Plants of the Qur'an: An Overview - IV

TP Mall

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Abstract

Our ancient literatures of Hindus', Muslims as well as of Cristian's are full of plants described about their nutritional and medicinal potential. A significant number of plants described in their texts are still unidentified because of least or no interest in plant taxonomy among neither great scientists in well-developed different organisations nor respected teachers of Universities or Colleges of repute. We can say with confidence that there are no teachers who can teach Plant Taxonomy in significant numbers of academic institutions. A man of Biotechnology can do nothing if he/she cannot identify the plant on which the work has to be worked out. As a result, due to non-identification of plants we cannot use our wealth of knowledge which has been provided by our ancestors present in form of scripts. We were presented a book written by Dr. M.I.H. Farooqi entitled "Qur'ani Poudhe-Vagayanic Dhristi Se" while in Seminar organised by UP Biodiversity Board, Lucknow. We found that there are seventy-one plants being reported in Holy Qur'an and Bible. We have consulted the literatures available as well as the tribal of Bahraich about the uses of the plants available. The perusal of the alphabetical list of plants of Holy Qur'an reveals that there are 71 plant species representing 48 genera of 30 families. Brassicaceae, Cucurbitaceae and Moraceae family were found to be the biggest family represented by 6 plant species each whereas Caesalpiniaceae, Papilionoideae and Poaceae with 5 plant species each; Rosaceae and Rhamnaceae with 4 plant species; Mimosaceae, Liliaceae, Pinaceae, Euphorbiaceae, Oleaceae, Lytharaceae, Lamiaceae and Arecaceae with 2 plant species and rest fourteen species viz., Malvaceae, Asclepiadiaceae, Lauraceae, Bixaceae, Dipterocarpaceae, Juglandaceae, Cupressaceae, Lecnoraceae, Lorantheaceae, Anacardiaceae, Sterculiaceae, Ericaceae, Salvadoraceae, and Vitaceae is being represented by single plant species each.

Keywords: Ethnobotanical; Ethnomedicinal; Potential; Plants; Qur'an.

Introduction

Herbal Medicine is the oldest form of medicine known to mankind. It was the mainstay of many early civilizations and still the most widely

practiced form of medicine in the world today,

Ethnobotany is one of the most interesting themes of economic botany which might have first of all came into the existence probably when earliest man of "stone age" observed the animals mostly the apes and monkeys eating certain plants or plant parts ex. Fruits, leaves and even inflorescences to satisfy their hunger. Therefore, on the basis of plants usage first of all by animals and later on by the human beings the concepts of Ethnobotany and Ethnozoology were evolved, which merged into a common term known as Ethnobiology. However, the term Ethnobotany was first of all used in the last of 19th century by J. W. Harsh Berger (1895) to indicate the interrelationship of plants with aboriginal people or tribal societies

Author Affiliation: Professor & Head, Postgraduate Department of Botany, Kisan PG College, Bahraich, Uttar Pradesh 271801, India.

Corresponding Author: TP Mall, Professor & Head, Postgraduate Department of Botany, Kisan PG College, Bahraich, Uttar Pradesh 271801, India.

E-mail: drtejpratapmall@gmail.com

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[Trivedi and Sharma, 2011]. In many parts of the world, wild plants are obtained from forests or wild areas designated for extractive resources and managed by local communities [Jadhav et al., 2011]. Wild edible plants provide food quantity as well as medicines [Patale et al., 2015].

India is one of the twelve mega-biodiversity countries of the World having rich vegetation with a wide variety of plants. As per the 2001 census, the tribal population of India is 8.43 crore, constituting 8.2% of total population of the country [Annual Report, 2005-2006]. With enormously diversified ethnic groups and rich biological resources, India represents one of the great emporia of ethnobotanical wealth [Pal, 2000]. Even today, tribal's and certain local communities in India still collecting and preserving locally available wild and cultivated plant species for their day today life [Mahishi et al., 2005 and Ayyanar et al., 2010].

We were presented a book written by Dr. M.I.H. Farooqi titled "Quruani Poudhe-Vagayanic Dhristi Se" while in Seminar organised by UP Biodiversity Board, Lucknow. We found that there are seventy-one plants being reported in Holy Qur'an and Bible. We have consulted the literatures available as well as the tribal of Bahraich about the uses of the plants available. The perusal of the alphabetical list of plants of Holy Qur'an reveals that there are 71 plant species representing 48 genera of 30 families. Brassicaceae, Cucurbitaceae and Moraceae family were found to be the biggest family represented by 6 plant species each whereas Caesalpiniaceae, Papilionoideae and Poaceae with 5 plant species each; Rosaceae and Rhamnaceae with 4 plant species; Mimosaceae, Liliaceae, Pinaceae, Euphorbiaceae, Oleaceae, Lytharaceae, Lamiaceae and Arecaceae with 2 plant species and rest fourteen species viz., Malvaceae, Asclepidiaceae, Lauraceae, Bixaceae, Dipterocarpaceae, Juglandaceae, Cupressaceae, Lecnoraceae, Loranthaceae, Anacardiaceae, Sterculiaceae, Ericaceae, Salvadoraceae, and Vitaceae is being represented by single plant species each. We have enumerated five plants viz., *Acacia nilotica*, *Acacia senegal*, *Acacia seyal*, *Alhigimaurorum* and *Allium cepa* in detail in first part and eight plants viz., *Allium sativum*, *Astragaluhadscendens*, *Bombax ceiba*, *Brassica arabica*, *Brassica juncea*, *Brassica nigra*, *Brassica rapa* and *Brassica schimperii* in second part of the manuscript. and in third part of the manuscript we have enumerated seven plants viz., *Butea monosperma*, *Calotropis gigantean*, *Cedrus libani*, *Cedrus deodara*, *Ceratonia siliqua*, *Cinnamomum camphora* and *Citrullus colocunthis*. In the present fourth part we are enumerating eight

plants viz., *Cochlospermum religiosum*, *Cucumis melo*, *Cucumis utilisimus*, *Cucurbita pepo*, *Cydonia vulgaris*, *Dryobalamops aromaticum*, *Euphorbia resinifera* and *Ficus benghalensis*. The present review is an attempt to compile most of the information available regarding the distribution, cultivation, phytochemical characteristics, Ayurvedic properties, ethno-pharmacological, medicinal and non-medicinal uses of the plants.

Eneumerations

Cochlospermum religiosum (Linn.) Alston Buttercup tree, silk-cotton tree (Bixaceae):

Common names

Buttercup tree, Yellow silk cotton tree, Golden silk cotton tree, Karita • Hindi: Galgal • Marathi: Ganeri • Tamil: Kattupparutti • Konkani: Kondagogu • Bengali: Sonali simul • Kannada: Arasinaburuga • Malayalam: Cempanni • Telugu: Konda gogu

Synonyms

Bombax gossypium, *Cochlospermum gossypium*, *Maximiliana gossypium*

Buttercup tree is native to India, Burma and Thailand. It is a small tree growing upto 7.5 m. The bark is smooth and pale grey. It is sparsely clothed with leaves and sheds them at the height of the flowering season. The leaves appear at the tips of the branches and are palmately lobed. The flowers of the Buttercup tree are the most conspicuous part of the tree. They are large, growing upto about 10 cm, buttercup shaped and bright yellow. The stamens are orange. The flowering season is between February and April, particularly after the leaves are shed. The fruits are brown and oval shaped. They come in the form of a capsule made up of five segments. The capsule splits open to release the seeds which are embedded in the silky cotton contained within. This silky cotton is said to induce sleep when stuffed into pillows. The botanical name has the following meaning - *Cochlospermum* because the seed resembles a snail. *religiosum* because the flowers are used as temple offerings.

It is also known as silk-cotton tree because the capsules containing the seeds have a fluffy cotton-like substance similar to kapok [USDA]. Another common name is buttercup tree because its yellow and bright flowers look like large-sized buttercups [Flowers of India].

In Theravada Buddhism, this plant is said to have used as the tree for achieved enlightenment, or Bodhi by nineteenth Lord Buddha called "Siddhaththa". The plant is known as Kihiriyaa in Sinhala, and Kanikaara in Sanskrit.

The habitat is Cultivated ground [Flora Malesiana Series 1]. Dry forests, especially on stony hills [Chopra et al., 1986]. The plant succeeds well in a well-drained but moisture-retentive soil and a sunny position [Huxley, 1992]. Plants can flower and fruit all year round [Flora Malesiana Series 1].

Ethnobotanical Potential

The oil cakes from the pressed seed can be eaten [Flora Malesiana Series 1].

The insoluble gum obtained from the plant can be used as a substitute for tragacanthin when making ice cream [Facciola, 1998].

An oil is obtained from the seed [Flora Malesiana Series 1; Dodge, 1897].

The source of an insoluble gum that can be used as a substitute for gum tragacanthin [Uphof, 1959].

It occurs in irregular, rounded, translucent clumps of a pale buff colour [Uphof, 1959].

Gum tragacanthin, obtained from several *Astragalus* spp, has a wide range of uses including in cosmetics, calico printing, confectionary, medicinally as a suspending medium for insoluble medicines etc [Uphof, 1959].

The seeds possess a short but very soft and elastic floss [Dodge, 1897]. This floss is much too short to be of any service as a textile but, along with the flosses of *Bombax malabaricum*, *Eriodendronan fruticosum* and *Calotropis gigantea*, it has been classed as a 'silk cotton'. In some parts of India, the floss of this tree is collected and used for stuffing pillows, for which purpose it would seem better suited than the floss from *Bombax malabaricum*, since it is not so liable to get matted [Dodge, 1897]. The floss is said to induce sleep when stuffed into pillows [Flowers of India]. It might also be found serviceable as a gun cotton [Dodge, 1897].

The wood is extremely soft [Flora Malesiana Series 1].

Ethnomedicinal Potential

The gum obtained from this plant is sweetish, cooling and sedative [Chopra et al., 1986].

It is used in the treatment of coughs and gonorrhoea [Chopra et al., 1986].

The dried leaves and flowers are stimulant [Chopra et al., 1986].

Cucumismelo Linn. Kharbuza, Melon, Muskmelon (Cucurbitaceae):

Common names

Melon, Muskmelon, Cantaloupe, Honeydew, Sweet melon, Dudaim melon, Queen Anne's melon, Armenian cucumber, Snake cucumber, Wild melon, Orange melon, Pickling melon, Serpent melon, Snap melon, Round melon, Casaba, Winter melon, Melão (Portuguese), Kharbuz/Kharbuza (Pakistan), Tian gua (Pinyin, China) [Reznicek et al., 2011; Tropicos.org, 2013; USDA, NRCS. 2013; Plants for A Future, 1996-2012].

Cucumis melo is an annual trailing vine with pubescent striated stems, lacking stipules, bearing unbranched tendrils at the base of the 4-12 cm long petioles. The leaves are simple and alternate, nearly round, basally cordate, and may have 3-7 shallow palmate lobes. The blades are 6-15 cm both broad and long (occasionally up to 20 cm), undulate-dentate, with pointed hairs on both sides, and palmate venation [de Melo et al., 2000]. Melons use their tendrils to climb over structures or other vegetation (Lu and Jeffrey, 2011)

The melon fruit is a fleshy berry that is round to ellipsoid, hairy during its early development, and smooth to reticulate at maturity. Melons are highly variable in colour, showing shades of yellow, green, orange, white, and often mottled or striped; the flesh is also variable and usually yellow, orange, pink, white, or green. Melons weigh 0.4-2.2 kg, bear many seeds and can taste and smell sweet, or not [Reznicek et al., 2011; Grubben, 2004; Lu and Jeffrey, 2011].

The smooth seeds are elliptic and flattened, 0.5-1.2 cm long × 0.2-0.7 cm broad; they germinate epigeally. The seeds are rich in lipids, protein, and contain 24 fatty acids (Grubben, 2004; de Melo et al., 2000).

The fruits are consumed by animals, such as birds, that spread the seeds; the seeds also can be transported by water. Due to the agricultural importance of melons, much of the dispersal is attributed to escapes [Sebastian et al., 2010; Schaefer et al., 2009].

Ethnobotanical Potential

The fruit is widely consumed for its juice and flesh,

and can be dried and made into a powder for cooking and future use [Chittendon, 1951; Hedrick, 1972; Uphof., 1959; Tanaka and Nakao, 1976].

Edible oil can be extracted from the seeds.

Very watery but with a delicate flavour, it is very refreshing. Rich in vitamins B and C [Allardice,1993].

The flesh of the fruit can be dried, ground into a powder and used with cereals when making bread, biscuits etc [Moerman, 1998].

The size of the fruit varies widely between cultivars but is up to 10 cm long and 7 cm wide [Huxley, 1992].

Seed consumed raw [Schery, 1954; Organ,1963; Tanaka and Nakao,1976].

Rich in oil with a nutty flavour but very fiddly to use because the seed is small and covered with a fibrous coat [Fern, 2014].

The seed contains between 12.5 - 39.1% oil [Duke and Ayensu, 1985].

An edible oil is obtained from the seed [Tanaka and Nakao, 1976; Facciola, 1990].

Agroforestry Uses

Grows well with corn and sunflowers but dislikes potatoes [Riotte, 1978;Allardice, 1993].

The weeds fat hen and sow thistle improve the growth and cropping of melons [Allardice, 1993].

Other Uses

The seed oil is used as a humectant and skin conditioner in commercial cosmetic preparations [Cos Ing Publications].

Ethnomedicinal Potential:

The flowers are expectorant and induce vomiting.

The fruits are used medicinally to promote skin hydration, to treat light burns and scrapes, and as a stomach tonic.

The seeds are cough suppressant, fever reducer, and a digestive aid.

A seed powder is mixed with water and used as a vermifuge.

The roots are diuretic and induce vomiting. *Cucumis melo* seedlings are toxic [Plants for A Future, 1996-2012].

An extract from melon has anti-inflammatory and antioxidant properties [Vouldoukis et al., 2004].

The fruits can be used as a cooling light cleanser or moisturiser for the skin [Allardice,1993].

They are also used as a first aid treatment for burns and abrasions [Allardice,1993].

The flowers are expectorant and emetic[Duke and Ayensu, 1985].

The fruit is stomachic [Dukeand Ayensu, 1985].

The seed is antitussive, digestive, febrifuge and vermifuge [Dukeand Ayensu, 1985].

When used as a vermifuge, the whole seed complete with the seed coat is ground into a fine flour, then made into an emulsion with water and eaten. It is then necessary to take a purge in order to expel the tapeworms or other parasites from the body [Chiej, 1984].

The root is diuretic and emetic [Duke and Ayensu,1985].

The leaves are used to treat scrotal hernias [De Filippis et al., 2004].

Cucumis utilissimus Roxb. Karkati., Káknur, Beng, Kakri (Cucurbitaceae):

Fl. Ind. (ed. Carey) 3: 720. 1832.

Cucumis utilissimus Roxb. Sans is a synonym of *Cucumis melo* Linn. It is also as *Cucumis melo* L. var. *utilissimus* (Roxb.) Duthie & Fuller.

The seeds of this useful species of *Cucumis* are described as cooling, edible, nutritive and diuretic, and are used in painful micturition and suppression of urine. Two drachms of the seeds rubbed into a pulp with water, are given alone or in combination with salt and kánjika.

The seeds of *Cucumis sativa*, (Sans. Trapusha, Trapusha. Vern. Khira, Hind.) and of *Benincasa cerifera* (Sans. Kushmánda.) are also used as diuretics like those of *Cucumis utilissimus*.

Cucurbita pepo Linn. Pumpkin, Field pumpkin, Courgette (Cucurbitaceae):

Common Names:

Pumpkin, Field pumpkin • Hindi: Safed kaddu, Kumrha • Manipuri: Mairén • Marathi: Kohala, Bhopli • Tamil: Parangi • Malayalam: Kumpalam, Kumpalanna • Telugu: Budadegummadi, Budidegummadi, • Kannada: Bude-kumbala-kayi, Bileegumbala, Boodugumbala • Bengali: Safed kaddu, Lanka • Sanskrit: Karkaru, Kkurkaru, Kurlaru, Kkushmanda • Oriya: Kakharu

Synonyms:

Citrullus variegatus M. Roem., *Cucumis pepo* (L.) Dumort., *Cucumis zapallo* Steud., *Cucurbita aurantia* Willd., *Cucurbita ceratoceras* Haberle ex Mart., *Cucurbita clodiensis* NoCCA, *Cucurbita courgero* Ser., *Cucurbita elongata* Bean ex Schrad., *Cucurbita esculenta* Gray *Cucurbita fastuosa* Salisb., *Cucurbita grisea* M. Roem., *Cucurbita hybrida* Bertol. ex Naudin, *Cucurbita lignosa* Mill., *Cucurbita mammeata* Molina, *Cucurbita mammosa* Gmel., *Cucurbita marsupiiiformis* Haberle ex Roem., *Cucurbita melopepo* Linn., *Cucurbita oblonga* Link., *Cucurbita polymorpha* Duchesne, *Cucurbita pomiformis* Roem., *Cucurbita pyridaris* Duchesne ex Poir., *Cucurbita pyxidaris* DC., *Cucurbita subverrucosa* Willd., *Cucurbita succado* Nägeli ex Naudin, *Cucurbita succedo* Arn., *Cucurbita tuberculosa* Schrad., *Cucurbita urnigera* Schrad., *Cucurbita variegata* Steud., *Cucurbita venosa* Descourt., *Cucurbita verrucosa* Linn., *Pepo citrullus* Sageret, *Pepo potiron* Sageret, *Pepo vulgaris* Moench.

Pumpkin is a creeping plant which is creeping or semi-shrubby, annual, velvet-hairy. Broadly ovate-heartshaped to triangular-heartshaped leaves, 20–30 cm long, 20–35 cm broad, are often with three to five deep lobes, and with toothed margins. Tendrils have two to six branchlets, or are simple and little developed tendrils in the semi-shrubby types. The plant has solitary, flowers borne in leaf axils. The male flowers have stalks 7–20 cm long, a bell-shaped sepal cup of 9–12 mm, linear sepals 1.2–2.5 cm long. Flowers are tubular/bell-shaped, 5–10 cm long, which are divided into five petals for up to one-third or more of its length. Flowers have three stamens. The female flowers have sturdy stalks, 2–5 cm long. the ovary is round, ovoid, cylindrical, smooth, and the sepal cup is very small. The fruit is very variable in size and shape. It is smooth to heavily ribbed, with a rigid skin varying in colour from light to dark green, plain to minutely speckled with cream or green contrasting with yellow, orange or two-coloured. The flesh is cream to yellowish or pale orange. It ranges from soft and not bitter to fibrous and bitter, has numerous seeds which are narrowly or broadly elliptical or rarely circular, slightly flattened and 3–20 × 4–12 mm.

The plant is widely cultivated in temperate and tropical zones, mainly for its edible fruit but also for its leaves, seed, oil and medicinal uses. In the tropics, it tends to grow better at elevations of 500 m or more [Tindall, 1983]. The sprouting seeds produces a toxic substance in its embryo [Frohne and Pfänder, 1984].

Ethnobotanical Potential

Fruit are cooked and consumed [Hedrick, 1972; Vilmorin-Andrieux, 1985; Uphof, 1959; Tanaka and Nakao, 1976].

Used as a vegetable, it has a very mild flavour and is very watery [Fern, 2014].

It is often harvested when still very young when it is called courgettes. The fruit has very little flavour of its own and so is often used as a base for making savoury dishes, the seeds being scooped out of the fruit and a filling being put in its place - this can then be baked [Fern, 2014].

A nutritional analysis is available [Duke and Ayensu, 1985].

Seed consumed raw or cooked [Shrey, 1954; Organ, 1963; Facciola, 1990].

The seed can also be ground into a powder and mixed with cereals for making bread etc [Facciola, 1990].

Rich in oil with a pleasant nutty flavour but very fiddly to use because the seed is small and covered with a fibrous coat [Fern, 2014].

The seeds can also be sprouted and used in salads etc [Facciola, 1990].

An edible oil is obtained from the seed [Uphof, 1959; Tanaka and Nakao, 1976; Facciola, 1990].

Leaves and young stems cooked as a potherb [The Plantsman, 1986; Facciola, 1990].

Flowers and flower buds cooked or dried for later use [The Plantsman, 1986; Facciola, 1990].

Root are cooked and consumed [Reid, 1977] but Fern, 2014 had reported some doubts on this report [Fern, 2014].

The seed contains 34–54% of a semi-drying oil. It can be used for lighting [Uphof, 1959; Protabase].

Ethnomedicinal Potential

The pumpkin has been much used as a medicine in Central and North America. It is a gentle and safe remedy for a number of complaints, especially as an effective tapeworm remover for children and pregnant women for whom stronger acting and toxic remedies are unsuitable [Chevallier, 1996].

The seeds are mildly diuretic and vermifuge [Chiej, 1984; RHS. 1987; Chevallier, 1996].

The complete seed, together with the husk, is used to remove tapeworms. The seed is ground into a fine flour, then made into an emulsion with water and eaten. It is then necessary to take a purgative

afterwards in order to expel the tapeworms or other parasites from the body [Chiej, 1984]. As a remedy for internal parasites, the seeds are less potent than the root of *Dryopteris felix-mas*, but they are safer for pregnant women, debilitated patients and children [Bown, 1995]. The seed is used to treat hypertrophy of the prostate [Duke and Ayensu, 1985]. The seed is high in zinc and has been used successfully in the early stages of prostate problems [Chevallier, 1996]. The diuretic action has been used in the treatment of nephritis and other problems of the urinary system [Chevallier, 1996].

The leaves are applied externally to burns [Chopra et al., 1986]. The sap of the plant and the pulp of the fruit can also be used [Chevallier, 1996].

The fruit pulp is used as a decoction to relieve intestinal inflammation [Chevallier, 1996].

Cydonia vulgaris Pers. Amritphal, Bihi (Rosaceae):

Common Names

Sanskrit Amritphala; Hindi Bihi; Tamil Shimaimathala; Telugu Simadanimma; Kannada Simedalimbe; Kashmir Bamsutu, Bam-tsuntu

Cydonia vulgaris Pers. and *Pyrus cydonia* Linn. are a synonym of *Cydonia oblonga* Mill.

Cydonia vulgaris Pers. is the cultivated and economically important species of genus *Cydonia*. *Cydonia vulgaris* Pers. (*Cydonia oblonga* Miller) is a small shrub belonging to the family Rosaceae and is a native to Southwest Europe and Minor Asia. The plant is commonly called Quince. There are three varieties of the tree namely *Cydonia vulgaris* Pyriformis, *Cydonia vulgaris* Maliformis and *Cydonia vulgaris* Lusitanica.

It is a small tree with bright golden yellow pome fruits, when mature. The bark is smooth and brown approaching to black. The leaves are roundish or ovate, dusky green above and whitish underneath. The fruit of *C. vulgaris* Pers., known as Quince, resembles an apple, but differs in having many seeds in each carpel. The fruits are globular, oblong or pear-shaped form of rich yellow or orange coloured when ripe of an austere taste and emitting a peculiar and pleasant smell [Browne, 1804; Wallis, 2005]. The seeds called bihidana, are in great use medicinally, and highly valued as demulcent tonic. It mainly grows in Europe, Persia, Afghanistan, in India it grows in Kashmir in Himalayan valley [Browne, 1804; Kapoor, 2002].

The quince prefers a moist but free soil near water and a situation rather opened but sheltered. In dry soils neither the tree nor the fruits attain the large size, and in situation exposed to high wind the fruit is liable to fall before mature. The finest specimen of quince-trees in Britain are said to be found in old orchards adjoining ponds; it being customary formerly to plant a quince-tree in every apple orchard.

The quince may be as readily propagated from seeds as the apple and pear, but the quickest mode of raising plants is by layers. It will also grow by cuttings, planted in autumn in moist sandy soil.

The trees when planted as standards should be situated about ten feet apart and once set out, require but little attention, beyond that of removing suckers from the roots and side shoots from the main stems. To have the fruit of large size the head of the tree should be kept open by thinning out the shoots; and the fruit ought also to be thinned out, leaving no more on the tree than it can well mature. The tree is of moderately rapid growth, when young, acquiring in four or five years, a height of six or eight feet, and in ten or twelve years it attains an elevation of fifteen feet after which it continues to increase chiefly in the width of its head [Browne, 1804].

Quince seeds are ovoid and flattened, about 5 to 10 mm long, 2 to 5 mm. wide and 2 mm thick. The two larger flattened surfaces meet in a straight acute edge on one side and are united by a strongly arched rounded surface on the other side. They frequently adhere to one another in small irregular masses, being usually arranged in two more or less regular rows, and cemented together by dry mucilage, which is visible in the form of whitish flakes on the surface of the seeds. This mucilage is derived from the cells of the epidermis of the seed-coat. The seeds are pointed at one end, where the hilum appears as a minute paler spot, and are obtuse at the distal or chalazal end; the raphe is evident as a paler line extending from the hilum along the acute ridge to the chalaza. Within the mahogany-brown testa is a very narrow endosperm surrounding a straight embryo composed of two piano-convex whitish cotyledons and a small radical. The kernel possesses a taste resembling that of bitter almonds but much fainter. The seed-coats, when chewed are mucilaginous constituents. The seeds contain about 15% of fixed oil in the cotyledons together with proteins and probably a small amount of amygdaline and emulsion, which yield the odour and taste resembling that of bitter almond when they are crushed with water [Wallis, 2005].

The *Cydonia vulgaris* is commonly medicinally used as demulcent, in treatment of asthma. Other usages of the plant are as a source of flavour in marmalade, liqueur, candies, brandy, jelly and preserves [Patel et al., 2011].

Chemical Constituents

The powerful and characteristic odour of Quince fruit has attracted considerable attention as a source of flavour in recent years, particularly appreciated in marmalades, candies, fruits, sweets and brandy.

Two ionone glycosides, β -D gentiobioside and β -D glucopyranoside of (3R), 3-hydroxy- β -ionone along with 2,7-dimethyl-8-hydroxy-4(E), 6(E)-octadienoic acid and its diol have been isolated from the fruit. The aglycone, 3-hydroxy- β -ionone yields a number of volatile C13 norisoterpene degradation products, including (E)-3,4-dihydro- β -ionone and 1,1,6-trimethyl-1,2-dihydronaphthalene. The presence of C15-carotenoid metabolites, (S)-abscisic alcohol, trans-abscisic alcohol- β -D-glucopyranoside and (4R,1'E,3'E)-4-(5'-hydroxy-3'-methyl-1',3'-pentadienyl)-3,5,5-trimethyl-2-cyclohexen-1-one- β -D-glucopyranoside together with trace amount of C12-terpenoids, viz. quince oxepine and quince oxepines' (Cis and Trans) is also reported in fruits. Besides, marmelon oxide having a strong, characteristic quince odour is reported in fruits [Guldner and Winterhalter, 1991; Lutz, 1992, 1993; Escher and Niclass, 1991].

The nor-isoprenoids contribute to overall flavour impression of the fruit. The juice from ripe fruits contains C13 nor-isoprenoids, viz. 3-hydroxy- and 4-hydroxy- β -ionols, 3-hydroxy-7,8-dihydro- β -ionol, 3-oxo- α -ionol, 4-oxo- β -ionol, 3-hydroxy-4-hydroxy- and 5,6-dihydroxy- β -ionones, vomifoliol, dehydrovomifoliol and 7,8-dihydrovomifoliol together with (2S,5S)-(-) and (2S,5R)-(+)-theaspirones. The presence of 4-hydroxy-7,8-dihydro- β -ionol, a natural precursor of theaspirins which are widely used in flavour industry, is also reported in quince fruit juice. Theaspirins are not present in original volatiles but are formed at natural pH of the fruit pulp i.e. in acidic conditions (pH 3.5 - 3.8) from a labile precursor. The industrially quince fruit constituents are found to be vitispiranes, bicycle [4.3.0] nonane derivatives, 3,4-didehydro- β -ionol, metastigma-4,6,8-triene-3-ones and theaspirones. [Winterhalter and Schreier, 1988; Herion et al., 1993].

A number of ionone-related compounds have been reported in quince essential oil. They

are not original volatiles of fruit but are formed during technological processes such as heating degradation of acid labile and non-volatile precursor compounds. The major important C13-norisoterenoids formed on the heat treatment at normal pH (pH 3.5) of the quince juice are; 2,2,6,7-tetramethylbicyclo[4.3.0]nona-4,7,9(1)-triene, 3,4-didehydro- β -ionol and 2,2,6,7-tetramethylbicyclo[4.3.0]nona-4,9(1)-dien-8-ol. The natural precursor of these compounds has been characterised as 3-hydroxy- β -ionol- β -D-gentiobioside. [Winterhalter et al., 1991]

The fruit juice (pH 3.0) from Japan contained glucose, 1.98; fructose, 454; sucrose, 0.91; malic acid, 1.29; polyphenol, 0.59%; besides vitamin C, 29; calcium, 350.0; pectin, 175.8 ppm. A juice sample from Poland was similar to citrus juice in the level of monosaccharides (1.90% vs. 1.82%), total sugars (2.06% vs. 1.96%), protein (0.56% vs. 0.47%), pectin (0.32% vs. 0.32%) and thiamine (0.035% vs. 0.044%). It has a higher content of ascorbic acid, β -carotene, and phenolic compounds but lower percentage of citric acid. However, as compared to pomegranate and grapefruit juices, it contains higher percentage of citric acid, pectin, ascorbic acid, phenols and mineral elements. The fruit paste can be used as a partial substituent for sugars in pastries. Vinegar with good flavour can be prepared from the fruit juice. The fruit pectin (yield 0.53% fresh weight) is similar to that of apple. It has high galacturonic acid content (6.78%) [Anonymous, 1990].

In Greece, a tea prepared by boiling dry seeds in water is given in cystitis. The kernel oil is used for massage. The major water-soluble polysaccharide in mucilage of seeds has been identified as a partially O-acetylated (4-O-methyl-D-glucuronate)-D-xylan having a proportion of glucuronic acid residues [Malamas and Murselos, 1992; Lindburg et al., 1990]

Quince seeds contain 3 β -(18-hydroxylinoleoyl)-28-hydroxyurs-12-ene, 3 β -linoleoylurs-12-en-28-oic acid, 3 β -oleoyl-24-hydroxy-24-ethylcholesta-5,28(29)-diene, tiglic acid 1-O- β -D-glucopyranoside and 6,9-dihydroxymegastigmasta-5,7-dien-3-one 9-O- β -D-gentiobioside. [Alesianiet al., 2010] (2E,4E)-2,7-dimethyloctadiene-1,8-diol, (2E,4E,7Z)-2,7-dimethyldecatriene-1,10-diol and (4E,6E)-2,7-dimethyl-8-hydroxyoctadienoic acid, three acyclic precursors of the marmelooxides, of the marmelolactones and of quince oxepine respectively, as well as three acyclic C10 compounds ((3E)-2,7-dimethyloctene-1, X-diol, (2E,4E)-2,7-dimethyl-8-hydroxyoctadienoic acid and (2E,4E)-2,7-dimethyloctadienedioic acid) were isolated

from the glycosidic fraction of quince fruit (*Cydonia oblonga* Miller). Quince brandy contains a number of mixed acetals of aliphatic and aromatic aldehydes, C13 nor-isoterpenoids, substituted C12 hydro oxipenes and marmelo oxide derivatives. [Regula and Velluz, 1991]

The isolation of four new flavanol glycosides and nine new R-ionol-derived glycosides together with the known 3-oxo- α -ionol 9-O- β -D-apiofuranosyl-(1 \rightarrow 6)- β -D-glucopyranoside, vomifoliol 9-O- β -D-glucopyranoside (roseoside), and vomifoliol 9-O- β -D-apiofuranosyl-(1 \rightarrow 6)- β -D-glucopyranoside from the MeOH extract of the aerial parts of *C. vulgaris* Pers. [Tommasi et al., 1996a].

The CHCl₃-MeOH extract of *Cydonia vulgaris* Pers. was shown to contain four new sesterterpene esters, namely 24, 25-O-diacetylvulgaroside, 25-O-acetylvulgaroside, 24-O-acetyl 25-O-cinnamoylvulgaroside, and 25-O-cinnamoylvulgaroside [Tommasi et al., 1996b].

Quince leaves presented a common organic acid profile, composed of six constituents: oxalic, citric, malic, quinic, shikimic and fumaric acids. [Oliverire et al., 2008]

Ethnobotanical Potential

Quince fruit is recognized as a good, cheap and important dietary source of health-promoting compounds, due to its biologically active constituents which are characterized by their antioxidant, antimicrobial and anti-ulcerative properties [Garcia-Alonso, 2004; Hamauzuet al., 2005, 2006; Silva et al., 2004; Wang et al., 2006; Yildirim, 2006; Fattouch et al., 2007 and Olivera et al., 2010]. It has protective effect against oxidative haemolysis of human erythrocytes [Magalhaes et al., 2009]

Pomes of Quince, known in Italy as 'cotogna' apple, have hard flesh of high flavour, but very acid, and these are largely used for marmalade, liqueur, jelly and preserves [Wallis, 2005].

Ethnomedicinal Potential

It has been reported that the leaves and fruits of Quince have some positive effects in the medical treatment of various conditions, including cardiovascular diseases, haemorrhoids, bronchial asthma, and cough.

Quince seed mucilage has a wound healing activity [Hemmati et al., 2010].

Cydonia oblonga Miller leaves have been used,

after decoction or infusion, in folk medicine for their sedative, antipyretic, anti-diarrheic and antitussive properties and for the treatment of various skin diseases [Magalhaes et al., 2009].

Dryobalanops aromatica Gaertn. Sumatran camphor, Malay camphor (Dipterocarpaceae):

Synonyms:

Dipterocarpus dryobalanops Steud., *Dipterocarpus teres* Steud., *Dryobalanops camphora* Colebr., *Dryobalanops junghuhnii* Becc., *Dryobalanops sumatrensis* (Gmel.) Kosterm., *Dryobalanops vriesii* Becc., *Pterigium teres* Corrêa, *Shorea amphorifera* Roxb.

Dryobalanops aromatica, commonly known as Borneo camphor, camphor tree, Malay camphor, or Sumatran camphor, [Sumatra Camphor, 2009] is a species of plant in the Dipterocarpaceae family. The species name *aromatica* is derived from Latin (*aromaticus* = spice-like) and refers to the smell of the dammar (resin). This species was one of the main sources of camphor and attracted early Arab traders to Borneo, at that time being worth more than gold, and used for incense and perfumes [Ashton, 2004]

It is found in Sumatra, Peninsular Malaysia and Borneo.

It is a large emergent tree, up to 65 m [Ashton, 2004] or even 75 m [Carder, 2005] tall, found in mixed dipterocarp forests on deep humid yellow sandy soils. It is a heavy hardwood sold under the trade names of Kapur. It is recorded from at least two protected areas (Lambir and Gunung Mulu National Parks).

The tree is classified as critically endangered in the IUCN Red List of Threatened Species (2009), with only small subpopulations of the species having been found in forest reserves [IUCN Red List of Threatened Species Publication].

Bergenin, malaysianol A, laevifonol, ampelopsin E, α -viniferin, ϵ -viniferin and diptoindonesin A can be isolated from the stem bark of *D. aromatica* [Wibowo et al., 2011].

Dryobalanops aromatica is one of several tree species known to exhibit a behaviour called crown shyness.

Habitat

Undisturbed mixed dipterocarp forests at elevations up to 300 m [Trees of Sungai Wain]. Usually found growing on hillsides and ridges with sandy soils

[Trees of Sungai Wain]. In secondary forests it is usually present as a pre-disturbance remnant tree [Trees of Sungai Wain].

The plant is propagated through seeds.

Ethnobotanical Potential

Young trees produce a clear yellow, aromatic liquid, known as 'oil of camphor' [Bown, 1995].

This sometimes crystallises in cavities in the trunks of older specimens to form true camphor [Bown, 1995].

An essential oil is obtained from the camphor. It is used in perfumes with a camphoraceous note [Bown, 1995].

The heartwood is reddish brown to pinkish brown; it is clearly demarcated from the 4–8 cm wide band of whitish to yellowish brown sapwood. The texture is medium; the grain straight or interlocked; there is a strong camphor-like smell when freshly cut. The wood is moderately heavy; soft to moderately hard; moderately durable, being resistant to fungi and dry wood borers, and moderately resistant to termites. It seasons slowly with only a slight risk of checking or distortion; once dry it is stable in service. The wood has a fairly high blunting effect, satellite-tipped and tungsten carbide tools are recommended; it splits easily; nailing and screwing are good, but require pre-boring; gluing is correct, though resin exudation can cause problems. It is used for a wide range of applications including house construction, bridges, boards, heavy carpentry, joinery, panelling, turnery, tool handles, boxes and crates [Uphof, 1959; Chudnoff, 1984; Tropix-7, 2017].

Ethnomedicinal Potential

Borneo camphor has a long history of medicinal use, both the aromatic liquid known as 'oil of camphor' and the crystallised exudate, or true camphor, being employed. A bitter, pungent, stimulant herb, it is analgesic, antibacterial, anti-inflammatory, anti-spasmodic and febrifuge [Bown, 1995].

It is used internally to treat conditions such as fainting; convulsions associated with high fever; cholera and pneumonia [Bown, 1995].

It is used externally to treat a range of skin conditions, including ulcers, mouth ulcers, abscesses, boils, cold sores and ringworm [Bown, 1995].

It is also used to treat rheumatism, sore throats, chest infections and conjunctivitis [Bown, 1995].

In aromatherapy, it is used both internally and externally as an antiseptic, sedative and tonic for the heart and adrenal cortex [Bown, 1995].

It is particularly valued for skin problems, rheumatism, infectious diseases, depression and convalescence [Bown, 1995].

***Euphorbia resinifera* Berger Resin spurge (Euphorbiaceae):**

Accepted name in Ilifle Database: *Euphorbia resinifera* f. *monstruosa* hort. [Llifle-Encyclopedia of Succulents].

Common names

Resin Spurge, Moroccan Mound, Moroccan Mound Spurge, Moroccan Ground Spurge, Official Spurge, Spurge, Poisonous Gum-Thistle, Farbiyun, Euphorbium, Euphorbe, Euforbium, African Spurge, Gum euphorbia

Synonym

Euphorbia resinifera Berg in Berg & Schmidt, *Euphorbia officinarum*, *Tithymalus resiniferus* (Berg) Karst., *Euphorbia resinifera* var. *chlorosoma* Croizat, *Euphorbia resinifera* f. *compacta* hort., *Euphorbia resinifera* var. *typica* Croizat, *Euphorbia sansalvador* Hort. ex Jacobsen

This is probably the oldest known succulent plant of all, having been discovered by an eastern king about 25BC, and may have been the plant which was originally named Euphorbia [Llifle-Encyclopedia of Succulents].

Euphorbia resinifera, the resin spurge, is a species of spurge native to Morocco, where it occurs on the slopes of the Atlas Mountains. The dried latex of the plant was used in ancient medicine. It contains resiniferatoxin, a capsaicin analog tested as an analgesic since 1997.

It is a shrub growing to 61cm tall, forming multi-stemmed cushion-shaped clumps up to 2 m wide and evergreen, stiff, mounding, interesting, dry. The stems are erect, succulent, superficially like a cactus, four-angled, with short but sharp pairs of 6mm spines on the angles, spaced about 1 cm apart up the stem [Huxley, 1992]. Xeric textural accent sub-shrub often used as a specimen, containers.

A dense, slow growing succulent shrub growing to 2 to 2.5 feet tall, forming multi-stemmed cushion-shaped clumps up to 5 feet wide.

Generally leafless, stems photosynthetic, dull

green to glaucous, four-sided, stem ridges armed with short white spines; medium coarse texture.

Flowers & fruits: The flowers are small, simple, and bright yellow, and the fruit a small capsule with one seed in each cell. Flowering is rare out of its native range.

Euphorbia resinifera is a species of spurge native to Morocco, where it occurs on the slopes of the Atlas Mountains [Huxley, 1992]. It is similar to its relative *Euphorbia echinus*, which occurs on the Moroccan coast and the Canary Islands. Due to its origin it is also called the African spurge.

Stem cuttings (resin spurge branches profusely and stem segments are readily available). Allow stem segments (propagules) to dry for a week before planting so the wound can seal. Unsealed cuttings, planted too soon, will easily rot before they can grow roots. Before drying, washing the stem segment to remove the latex is highly recommended.

Chemical constituents

Euphorbia resinifera contains a milky fluid or latex, which in its dried form is called Euphorbium. It has high concentration of resiniferatoxin, an analog of capsaicin, the primary vanilloid compound found in hot peppers. It can interact with a vanilloid receptor on primary sensory neurons mediating pain (nociception) and neurogenic inflammation. The pain sensing cation channel is TRPV1 [Appendino and Szallasi, 1997]. Resiniferatoxin has been used as a starting point in the development of a novel class of analgesics. Desensitization to topical resiniferatoxin has been tested in clinical trials to evaluate its potential to relieve neuropathic pain, as in diabetic polyneuropathy and postherpetic neuralgia [Appendino and Szallasi, 1997] resiniferatoxin injected subcutaneously into a rat hind paw several minutes before a surgical incision reduced postsurgical pain for 10 days in a NIH study published March 2018 [Stephen et al., 2018]. It has been tested to treat pain with advanced cancer [NIDCR, 2008].

Resiniferatoxin was isolated in 1975 [Appendino and Szallasi, 1997]. Euphorbium has been used since at least its first written record from the time of Roman Emperor Augustus [Appendino and Szallasi, 1997]

Ethnomedicinal Potential

Euphorbia resinifera is widely used by the local

population of Berber community to treat cysts. Moreover, it was also used in Moroccan traditional medicines to treat various diseases. It might possess laxative, anti-inflammatory, hypoglycemic as well as anti-tumour activity [Lahlou et al., 2014].

This plant has poison characteristics.

All parts of the plant are poisonous.

Poison Delivery Mode is through Dermatitis.

Symptoms: Nausea, vomiting, diarrhoea when ingested; redness, swelling, blisters after some delay following contact with skin.

Toxic Principle: Diterpene esters in milky latex. Severity causes only low toxicity if eaten. The skin irritation is minor and lasts only for a few minutes.

Found in: Houseplant or interiors Cape [NC State University].

The chemical is so hot that it destroys nerve endings in a Good Way [https://www.wired.com/story/resiniferatoxin/].

Ficus benghalensis Linn., Banyan, Bargad (Maraceae):

Synonyms

Ficus benghalensis var. *krishnae* (CDC) Corner, *Ficus chawoi* G. Nicholson, *Ficus cotoneifolia* Vahl, *Ficus cotonifolia* Stokes, *Ficus crassinervia* Kunth & Bouché, *Ficus karet* Baill., *Ficus lancifolia* Moench, *Ficus lasiophylla* Link, *Ficus procera* Salisb., *Ficus pubescens* Heyne ex Roth., *Ficus umbrosa* Salisb., *Perula benghalensis* Raf., *Urostigma benghalense* (L.) Gasp., *Urostigma crassirameum* Miq., *Urostigma procerum* Miq., *Urostigma pseudorubrum* Miq., *Urostigma rubescens* Miq., *Urostigma sundaicum* Miq., *Urostigma tjiela* Miq. [The Plant List, *Ficus benghalensis*].

Banyan is a type of strangling fig native to India and Pakistan. Known in Hindu mythology as 'the wish-fulfilling tree', banyans represent eternal life.

Native to India and Pakistan, banyan is a type of strangling fig. The plant begins life growing on other trees and eventually envelops them completely. Aerial roots hang down from the branches and these eventually become trunks. This circle of trunks deriving from one original tree can reach an enormous size - 200 m in diameter and 30m in height.

Their welcome shade has made them important gathering places. Known in Hindu mythology as

'the wish-fulfilling tree', banyans represent eternal life.

Tree, often very large, up to 30 m tall, with many aerial roots which can develop into new trunks so that the tree goes on spreading laterally indefinitely; a single tree can thus cover a very wide area.

The leaves are leathery, entire, ovate or elliptic, 20–40 cm long with prominent lateral veins.

Fruits of the figs are 1 to 2 cm in diameter, without stalks, in pairs in leaf axils, and when ripe are bright red.

Ficus benghalensis, commonly known as the banyan, banyan fig and Indian banyan, [GRIN, 2016] is a tree native to the Indian Subcontinent. Specimens in India are among the largest trees in the world by canopy coverage.

Ficus benghalensis is the national tree of India [National Tree, 2019]. The tree is considered sacred in India [Simoons, 1998] and temples are often built beneath. Due to the large size of the tree's canopy it provides useful shade in hot climates.

In Theravada Buddhism, this tree is said to have been used as the tree for achieved enlightenment, or Bodhi by the twenty fourth Buddha called "Kassapa". The sacred plant is known as "Nuga" or "Mahanuga" in Sri Lanka [Bali, 2019].

The giant banyans of India are the largest trees in the world by area of canopy coverage. Multiple individual trees have achieved notoriety: Thimmamma Marrimanu; Kabirvad; The Great Banyan

The largest, known specimen of tree in the world in terms of the two-dimensional area covered by its canopy is Thimmamma Marrimanu in Andhra Pradesh, India, which covers 19,107 square metres. This tree is also the largest, known specimen of tree in the world in terms of the length of its perimeter, which measures 846 metres [Bar-Ness, 2010].

Nearchus, an admiral of Alexander the Great, described a large specimen on the banks of the Narmada River in contemporary Bharuch, Gujarat, India; he may have described the specimen presently named "Kabirvad". The canopy of the specimen which Niarchos described was so extensive that it sheltered 7,000 men. James Forbes later described it in his Oriental Memoirs (1813–5) as almost 610 m in circumference and having more than 3,000 trunks [Wikisource, 1911]. Currently the area of its canopy is 17,520 square metres with a perimeter of 641 metres [Bar-Ness, 2010].

Other notable Indian specimens include The

Great Banyan in the Jagadish Chandra Bose Botanic Garden in Shibpur, Howrah, which has a canopy area of 18,918 square metres and is about 250 years old, and Dodda Aladha Mara in Kettohalli, Karnataka, which has a canopy area of 12,000 square metres and is about 400 years old.

Monsoon and rain forests [New Crops Fact Sheet]. Evergreen to deciduous lowland forest [PROSEA].

Ethnobotanical Potential

Banyan fruits can be eaten fresh or dried, and the young leaves and shoots are also eaten as famine food.

Fibre from the bark is used for making paper and ropes.

The tree is sacred to Hindus and Buddhists in India and is frequently planted around temples. Being a majestic ornamental tree, it is also planted in parks and along streets in the tropics. In temperate climates it is grown as a houseplant.

Ripe fruit consumed raw [Manandhar, 2002]. A sweetish flavour [Hedrick, 1972]. Relished by children [Manandhar, 2002]. Generally, only eaten when better foods are not available [Hedrick, 1972; Mansfield Database]

This species can be a very noxious weed in the forest, occupying a large amount of space to the exclusion of more useful species [Ecocarp]. Further, it is very destructive to any walls or buildings it grows near to and is extremely difficult to eradicate [Ecocarp].

The aerial roots are used for temporary binding materials [Manandhar, 2002].

The bark and leaves contain tannins [Mansfield Database].

The latex obtained from all parts of the plant can be used to produce an inferior quality rubber [Whistler and Arthur, 2000].

The wood is light in weight, water-resistant [Manandhar, 2002; Howard, 1934]. A low-quality wood, it is not suitable for general use, but it might be employed for secondary cabinet work, such as the linings of drawers and cabinets [Howard, 1934]. It is used locally for poles, cart yokes, furniture and to line wells [Manandhar, 2002].

Production of shellac

Banyan is used in the production of shellac, an important ingredient of French polish. Shellac

is derived from a resinous secretion called lac, produced by various insects living on the tree, the most commercially important of which is the lac insect (*Laccifer lacca*). Shellac has many industrial uses, and is an ingredient of hair lacquer. Lac dye is used in skin cosmetics.

Banyan wood is hard, and durable in water. Although considered to be of little value, it is used for furniture and house building. The wood from aerial roots is stronger and is used as poles and for cart yokes.

Ethnomedicinal Potential

Banyan has many uses in traditional medicine, for example, the milky sap is applied externally for treating pains and bruises, and is a remedy for toothache. Despite this, scientists are only now beginning to investigate the plant, for example leucocyanides, which may have potential for treating diabetes, have been isolated from the tree.

The leaves are used to remedy dysentery and diarrhoea [PROSA]. They are used in a decoction with toasted rice as a diaphoretic [Mansfield Database].

The young leaves are heated and used as a poultice [Manandhar, 2002]. They are applied to abscesses as a poultice to promote suppurations and discharge of pus [PROSA].

The concentrated latex, combined with the fruit, is aphrodisiac and is used to treat spermatorrhoea and gonorrhoea [PROSA]. Mixed with sugar, it is used as a treatment for dysentery in children [Manandhar, 2002].

The milky latex in the plant is applied topically to treat toothache, bruises, painful areas, rheumatic joints and lumbago [Manandhar, 2002; PROSA]. It is dripped into wounds in order to kill or expel germs, and is applied to treat bleeding and swelling of the gums [Manandhar, 2002].

The bark is tonic and diuretic. An infusion is antidiabetic and a decoction are used as an astringent in the treatment of leucorrhoea [PROSA].

A decoction of the root fibres is useful as a treatment against gonorrhoea, whereas the tender ends of the aerial roots are used for obstinate vomiting [PROSA].

An infusion of the twigs is a useful remedy for haemoptysis [PROSA].

The milky latex is used against pains and fever, rheumatism and lumbago, toothache, and applied

to cracked and inflamed soles [PROSA].

The fruit is tonic and has a cooling effect [PROSA].

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