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Review Article

An Overview on Medicinally Important Plant - *Annona reticulata* Linn

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ABSTRACT

Annona reticulata linn is a highly apparent plant in ayurvedic system of medicine for the treatment of various ailments. The plant is traditionally used for the treatment of epilepsy, dysentery, cardiac problems, worm infestation, constipation, haemorrhage, antibacterial infection, dysuria, fever, ulcer etc. It also has antifertility, antitumour and abortifacient properties. This plant is reputed to possess varied medicinal properties.Several research workers investigated the pharmacological activities of different parts of the plant. Present review gives an overview on botanical description,ethnomedical and therapeutic importance and chemical constituents of *Annona reticulata* linn

Key words- epilepsy, haemorrhage, ethnomedical, *Annona reticulata* linn

INTRODUCTION

Plant Profile

Scientific classification -

Domain : Eukaryota
Kingdom : Plantae
Class : Angiosperms
Division : Magnolids
Order : Magnoliales
Family : Annonaceae
Genus : Annona
Species : Reticulata
Botanical name : *Annona retiulata*
Synonyms : Shubha, Sitaphala
Common names : Custerd apple,
Vernacular names
Hindi : Sitaphal,Sharifa
Assamese : Atlas,Ata
Gujrat : Sitaphal
Punjub : Sharifa
Oriya : Ato

Distribution: It is found wildly and cultivated throughout India upto an altitude of 900m. It is found growing gregariously and widely in the hilly tracts, waste lands and has become completely naturalized in several districts of Andhra Pradesh, Punjab, Rajasthan, Uttar Pradesh, Madhya Pradesh, Bihar,West Bengal,Assam, Gujarat, Maharashtra, Karnataka, Kerala and Tamil Nadu. It is a native of South America and West Indies.[1]

Botanical Description: A tree about 6m high. Bark thin and grey. Leaves simple, alternate, 3.5-8 x1.5-4 cm, oblong – lanceolate or elliptic, obtuse or subacute, pellucidpunctate, glabrous above, glaucous and pubescent beneath when young; lateral nerves 8-11 pairs, petiole upto 2 cm long. Flower bisexual, drooping, green, solitary, leaf opposed or 2-4 on short extra axillary branchlets. Fruit globose, 5-10 cm in diameter, usually with a glaucous bloom on the surface when young, yellowish-green when ripe, easily broken into large pieces; areoles well marked,

pulp white, sweet. Seeds many, arilate, brownish-black, smooth or polished and hard. Flowering: March – July; Fruiting: August -January .[2]

Pharmacognosy [3,4]

Macroscopic

Leaf- Fresh leaves simple, 4-15x2-5.5 cm, oblong-lanceolate, entire, acute, glaucous beneath, pellucid-punctate, petiole upto 2cm long, more or less swollen and grooved towards upper surface; venation reticulate, distinctly visible on both surface, main nerves upto 12 pairs, mid-rib thick on the lower surface; colour green; odour slightly unpleasant; taste somewhat mucilagenous followed by slightly bitter. Dried leaves are crumpled and irregularly bent towards upper surface mainly; surface more or less wrinkled; fracture more or less brittle; colour light green; odourless; taste somewhat
slimy and then slightly bitter.

Microscopic

Petiole: Transverse section of petiole has circular with somewhat wavy outline. It shows single layer of epidermis

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composed of squarish to rectangular cells having thick cuticle. Within the epidermis is a 8-12 layered collenchymatous hypodermis. The cells of collenchyma are rounded to oblong and containing few oily globules and granular substance. Hypodermis is followed by cortex composed of more or less loosely arranged rounded to squarish parenchymatous cells, many containing granular substance, sphaeraphides of calcium oxalate and simple starch grains. Groups of rounded to oblong pitted stone cells are found scattered throughout cortex. Pericycle represent in patches of sclerenchymatous fibres in the form of discontinuous ring. Vascular bundles are oval, 5-7 in number, collateral, conjoint and arranged in arch. Each vascular bundle consist of phloem externally and xylem elements towards centre. Phloem parenchyma has thin wall, arranged compactly.

containing few oily globules. Phloem ray parenchyma are mostly uniseriate, squarish to rectangular cells and containing many simple starch grains. Xylem is composed of radially arranged vessels, xylem fibres and xylem parenchyma. Vessels are arranged vertically, lignified, having annular, spiral, scalariform thickenings and few shows tyloses. Xylem fibres are 2 -3 in groups with wide lumens and tapering ends. Xylem parenchyma almost unlignified, cells are polygonal, containing simple starch grains and prismatic crystals of calcium oxalate. Pith parenchyma cells at the centre are polygonal, compactly arranged, few cells pitted, containing prismatic crystals of calcium oxalate and simple starch grains.

T. S. of midrib: Transverse section of midrib is rounded with wavy outline. It shows upper single layered epidermis consisting of squarish to rectangular cells and bearing thick cuticle. Lower epidermis is made up of rounded cells, dentate, with thick cuticle. Trichomes are absent. Hypodermis is represented by a

patch of 2-3 rows of rounded to oblong collenchymatous cells. It is followed by rounded to oval and squarish compactly arranged parenchymatous cells. Few cells of parenchyma are obliterated. Parenchyma represents few pitted cells, containing sphaeraphides of calcium oxalate in upper region and starch grains in lower parenchyma region. Large vacuoles are arranged in a ring in lower parenchyma region. Endodermis is distinct, cells are rounded to oblong. The vascular bundle is oval, flattened, bulging towards lower epidermis and completely surrounded by sclerenchymatous pericycle. Vascular bundle consists of continuous ring of phloem cells containing prismatic crystals of calcium oxalate. Xylem is composed of vessels, xylem fibres and multiseriate medullary rays. Vessels are arranged vertically, rectangular in shape and bearing annular, spiral, scalariform thickenings.

Some vessels shows tyloses. Pith parenchyma cells are rounded to oval or oblong, loosely arranged containing few sphaeraphides of calcium oxalate. Few duct are present in the pith.

T. S. of Lamina: Lamina shows dorsiventral structure. Upper epidermis is single layered, with cuticle, cells are squarish to tabular having straight anticlinal walls, cells in surface view are oval to oblong, wavy walled and containing few prismatic crystals of calcium oxalate. Stomata are absent. Mesophyll is differentiated into palisade and spongy tissue. The palisade is single layered, composed of anticlinally elongated palisade parenchyma followed by 4-6 rows of loosely arranged spongy parenchyma containing few prismatic crystals of calcium oxalate. Vascular bundles are small, oval, covered by sclerenchymatous cap towards lower region. Vessels show spiral and scalariform thickenings. Stomata are anomocytic and present in lower epidermis only. The single layered lower epidermis is made up of oval cells with cuticle.

Seed: More or less oblong or oval, smo oth, glossy, shining, hard, blackish or brownish-black polished; 1-2 cm X 0.5 cm; endospermic; internally white; odour none; taste bitterish.Transverse section show peripheral testa composed of outer epidermis followed by zone of lignified, pitted, round ish to oval stone cells; cotyledon consisting of compactly arranged rounded, squarish or polygonal thin-walled

cells packed with starch grains like substance, not becoming bluish with Iodine and big oily globules; endosperm is ruminated composed of polygonal compactly arranged cells containing oily globules; few conducting strands are also present .

Powder microscopy: Leaf powder green in colour slightly unpleasant having slimy taste; shows groups of upper epidermis in surface view containing prismatic crystals of calcium oxalate; groups of lower epidermis in surface view with anomocytic stomata; fragments of upper epidermis with palisade and spongy tissue in

sectional view; isolated as well as groups of round to oblong stone cells with wide lumen and thick-walled; isolated vessels; isolated vessels bearing scalariform, annular and spiral thickenings, isolated liginified fibres with pitted lumens and pointed ends, groups of collenchyma cells; occasional

rounded to oblong simple starch grains measuring, 14.4-21.6-28.8 µ in diameter occasional compound starch grains having two components, measuring 10.8-14.4-18 µ in diameter and few prismatic crystals of calcium oxalate, measuring 14.4-25.2-36X10.8-14.4-18 µ .

Parts used**:** Most commonly used plant parts are Root, leaf, fruit, seed, bark.

Ethnomedicinal uses: The root is powerful purgative. It is used in mental depression, spinal disorders and blood dysentry. The leaves are suppurative, stimulant, antispasmodic, sudorific, anthelmintic, insecticidal and are useful in destroying lice. Leaves made into a paste without adding water are applied to unhealthy ulcers while fresh juice to nostrils in hysteria and fainting. Ripe fruit is sweet, maturant, cooling, good tonic and sedative. It enriches the blood, increases muscular strength, lessens burning sensation, tendency to biliousness and vomiting. Unripe fruit is given in diarrnoea, dysentery and atonic dyspepsia. Seeds are detergent, insecticidal and abortifacient. Bark is also an astringent and tonic.It is also used traditionally as a oxytocic, uterotonic, antispermatogenic, anti implantation, antifertility, antifungal , antiplatelet aggregation. abortifacient, antiovulatory, diuretic,

piscicidal, antiseptic ,anticonceptional, anticonvulsant, spasmogenic, vermicidal, -adrenergic stimulating , molluscicidal, antiheadlice , analgesic, antifeedant, growth disrupting agent.[5]

Scientifically explored medicinal values: This plant is reputed to possess varied medicinal properties. Its use as an insecticidal agent has been investigated by several workers. Various phytochemical, pharmacological, antibacterial and antiovulatory studies have already been carried out with the seed extract. Ayurvedic practitioners use stem and leaf extracts as indigenous uterotonic drug. Postcoital antifertility activity of *A. reticulata* is reported in the seed extract,[6] while aerial parts are inactive. From the leaves of *A. reticulata*, a tetrahydroisoquinoline alkaloid with cardiotonic activity and a bioactive acetogenin from its bark have been isolated. Leaves shows potent antidiabetic activity. Some workers isolated flavonoids from leaves. Ethanol extract of the leaves and stem is reported to have anti-cancer activity.[7] Aporphine alkaloids terpine derivatives, glycoside and a novel diazepine, squamolone were isolated from this plant.[8]

Chemical constituents

Leaf: Leaf contains anonaine, roemerine, norcorydiene, corydine, norisocorydine, dienone isocorydine, norlaureline, glaucine hyperoside, rutin and quercetin, n-hexacosanol, n-octacosanol, n-triacontanol, 16-hentriacontanone, campsterol, stigmasterol and -sitosterol.Leaf also contains essential oils , Carvone, linalool , (+) O-methyl armepavine. Some workers isolated flavonoids from leaves 14.[9]

Seed: Seed contains Annotemoyin-1, annotemoyin-2, squamocin and cholesteryl Glucopyranoside , samoquasine A – a benzoquinazoline alkaloid , annonaceousacetogenins-squamocin, reticulatain-2, squamocin-I, squamocin-B, squamocenin, motrilin, squamostatin-D, squmostatin-E, cherimolin-1 and 2, reticulatain-2,annotemoyin , squamocins, squamostatin A. squamocin-Onew adjuscent bis-tetrahydrofuranic acetogenins.[10]

Bark: Bark contains Kaurenoic acid, phenolic and nonphenolic alkaloids , two crystalline alkaloids – muricine, muricinine, (2, 4-cis and trans)-squamolinone, (2, 4-cis and trans)-9-oxoasimicinone, bullacin B, 4-deoxyannoreticuin-cis-4-deoxyannoreticuin and (2, 4-cis and trans)-squamoxinone , annosquamosin Bas (19-nor-ent-kaurane-4 , 16 ,-17-triol), bullatacin, bullatacinon and squamone, a new bioactive acetogenin Cycloprop(e)azulene,germacrene D, bisabolene, caryophylleneoxide etc.[11]

Stem: It has Annosquammosin A (16 -hydroxy-19-al-ent-kaurane-17-yl-16 - hydro-19-al-ent-kaurane-17-oate), annosquamosin C (16 -hydro-17- hydroxy-nor-ent-kauran-4 -o1), annosqumosin D (16 -acetoxy-17-hydroxy- 19-nor-ent-kauran-4 -o1), annosquamosin E (16 -hydroxy-17-acetoxy-19- nor-ent-kauran-4 -formate), annosquamosin F (16 -hydroxy-17-acetoxy-18-nor-ent-ent-kauran-4 -hydroperoxide), annosquamosin G.[12]

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