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CUSCUTA REFLEXA ROXB. A PARASITIC PLANT IN AYURVEDA

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Abstract

Parasitic plants obtain their nutrients from another plant by penetrating to their host xylem and as well as formulations can be brought into market to the host phloem. They absorb water and food stuffs such as sugar and amino acid from their host plant. There are number of parasitic plants which are medicinally important and one among them is Cuscuta reflexa (Convolvulaceae). It is commonly known as Akashvalli, Amarvalli and Akashvel in Sanskrit. The written evidence of Cuscuta reflexa is available since medieval period in various Nighantu like Raj Nighantu, Bhavprakash Nighantu, Nighantu Adarsh and Shankar Nighantu. The herb has only one formulation, Akashvalli Arka besides having good therapeutic effect. The present work reviews the information of the plant so that more research can be carried out and effective

INTRODUCTION

Cuscuta reflexa Roxb. is a rootless, leafless perennial parasitic twining herb of Convolvulaceae family, commonly known as Akashvalli or Dodder. The plant is distributed worldwide and in India about 6 species are found. It has no chlorophyll and cannot make its own food by photosynthesis. It grows on thorny or other shrubs, sometimes completely covering the bushes and trees [1]. It spread from one host to another, and on each victim, they twine and cling tightly with special branching organs called haustorium. Haustorium penetrate the host and connect to the host xylem as well as to the host phloem and absorb from it both water and elaborated food stuffs such as sugar and amino acid. It lives its entire life without attachment to the ground and grows with the help of seeds which are minute and produced in large quantities. Seeds have hard coating, and survive in the soil for 5-10 years or more. They sprout at or near the surface of the soil. The germination of seeds can occur without a host and for this it has to reach a green plant quickly. The herb grows towards the smell of nearby plants. If the host contains food which is beneficial for it, then it produces a haustorium that insert themselves into the vascular system of the host and then its original root will die. It can grow and attach itself to multiple plants[2]. The *Cuscuta reflexa* is investigated for antitumor[1], antimicrobial[3], hepatoprotective[4], anticonvulsant[5], antioxidant[6], induced alopecia[7] activities. Many chemical constituents have been isolated from *Cuscuta reflexa* such as cuscutin, amarbelin, beta-sterol, stigmasterol, myricetin, qurecetin, cuscutamine, luteolin, bergenin[8]etc.

LITERATURE SURVEY

Cuscuta reflexa has no reference in Vedic and Samhita kala. It was originated from Nighantus.

Raj Nighantu

The synonyms akashvalli, khavalli, asprsha, vyomvallika are mentioned. The synonym of Akash co-joint with valli (climber) word makes the synonym “akashavalli”. Akashvalli has madhur *rasa* (sweet taste). It is pittashamak (cholagogue), rasayana (rejuvenative), balavardhak (strengthen body) and has the properties of divya-ausadhies[9].

Bhavprakash Nighantu

Saints says that synonyms of Aakashballi is Amarballri, so akashballi, khaballi, amarballri are the names of Amerbel. It is tikta (bitter) and kashaya (astringent), malasangrhahak (stool binder), pischil (sticky), netraroganashak (eye disorders), jathragnibardhak (appetizer), hridya (cardiotonic) and destroys the pitta (bile), kapha (cough) and aam (undigestive food)[10].

Nighantu Adarsh

The plant is distributed with the name of aakashbel and amarbel. It is found on some trees and mentioned under karpurtwakadi varga. Both *Cassytha filiformis* and *Cuscuta reflexa* are morphologically same and identified only with the help of its fruit. It is balya (strengthen body), keshya (hair strengthening), vranropan (wound healer) and vrishya (aphrodisiac)[11].

Shankar Nighantu

The synonyms are akasvalli, amerbel, akashbel and aaloklata. Its taste is bitter, yellow colored with white flower. The dose is 1 to12 masa. The properties are pichil (sticky), netrarog nashak (eye disorders), jathragnibardhak (appetizer) and hridya (cardiotonic). It spreads over Ber and Aadu trees. It is a rootless climber so it is called as Akashbel[12].

Controversial Drugs in Indian Medicine

Cuscuta reflexa and *Cassyatha filiformis* is not mentioned in the Vrddhatrayi. Later writers have included it. Both are parasitic, yellow in color and exactly resemble each other and create controversy. But both are belongs to different families and identifies with the help of flowers and fruits. Both plants are separately growing on the fences or on the trees[13].

Taxonomical classification of *Cuscuta reflexa*

Kingdom ……Plantae

Subkingdom…….Tracheobionta

Superdivision……..Spermatophyta

Division……Angiospermes

Class……Eudicots

Subclass……Asterids

Order……Solanales

Family……..Cuscutaceae alternate Convolvulaceae

Genus……..*Cuscuta*

Species……*reflexa* Roxb[14].

Synonyms

There are many of the synonyms that create the controversy in this plant that are listed in Table-1[15, 16, 17, 18, 19, 20, 21]

Habitat

This parasitic herbaceous plant climbs over the shrubs and trees. It is common throughout India, abundant in Bengal plains. It has no root under the ground, but only grows as a parasitic twinner on other plants, and hence called akaswel (sky-twinner)[20,21].

Morphological characters

Stem: - It is very long, rather stout, closely twining, branched, glabrous, pale greenish yellow, sometimes dotted with red.

Flower: - Solitary or in umbellate clusters of 2-4 or in short racemes, pedicels short, glabrous, usually curved (rarely 0), bracts 1.5 mm. long ovate, oblong, obtuse, fleshy. Calyx divided almost to the base. Lobes are 3mm long, slightly unequal, broadly ovate, obtuse, glabrous and fleshy. Corolla white, tube 6-8 by 4mm, almost cylindrical, lobes 2.5-3mm. long, deltoid, acute, reflexed, scale almost at the base of the corolla, tube large, oblong, subquadrate or somewhat ovate, fimbriate and in curved at the apex. Stamens in the throat of the corolla tube, filaments scarcely any, anther about ½ exserted beyond the top of corolla tube. Ovary is ovoid; style simple, very short and thick; stigma 2, distinct, large, thick and fleshy, 1.5 mm long, ovoid. Capsules 6-8 mm in diameter, depressed-globose, glabrous, circumscissile near the base.

Seed: - Seeds 2-4, large, black and glabrous[17].

Microscopical Characters

The diagrammatic TS of stem is circular in outline with narrow depression at places. Cortex parenchymatous, traversed with few resion cell, pith very wide, parenchymatous, encircled by a ring of ill developed, conjoint, bio-collateral, vascular bundles. The parenchymatous tissue highly loaded with starch grains.

The detailed TS of stem shows a layer of epidermis covered with cuticle, occasionally

traversed with stomata, especially at the base of notched margin, underneath this line hypodermis consist of a row of parenchymatous cell, almost identical with the cell of the epidermis. Cortex is composed of 8 to 15 rows of parenchyma cell traversed with few resin ducts. The stellar region is composed of a ring of 10 to 15 co-joints, bicollateral, ill developed vascular bundles connected with intra-fascicular band of 4 to 6 rows of thin walled fibers. Xylem is composed of 2 to 10 vessels in each of the bundle, phloem tissue not always associated with xylem but at places seen above the fibrous band. Pith is wide, parenchymatous,cells located in the centre being bigger than surrounding cells and are arranged in the circular fashion. Starch grains plenty, minute, simple, spherical but few of larger in sizes also are embedded in the parenchymatous cells of the whole section[19].

Powder characters

Shows plenty of globular to irregular shaped resin masses and starch grains, scattered as such or embedded in the parenchymatous cell, elongated resin ducts filled with granular contents in surface view, fimbricate appendages of corolla lobes, epidermal cells of stem of surface view, fibrous layer of the anther with papillose epidermis , lignified fragments of pericarp, yellowish coloured spherical pollen grains, papillose epidermis of corolla, fragments of the testa exhibiting elongated thick walled, non-lignified and lignified palisade like cells and hexagonal to rectangular lignified inner cells of the testa of the seed, fragments of fibers and vessels[19].

Chemical Constituents

Cuscutin[10,16,18,19,20,24], amarbelin[18,20], cuscutalin[10,16,18,19,20], mangiferineS[20,25,26], quersetic[16], kuskutin[16], lactone[10], reducing sugar[10], quercetin[22], resins and cuscutine slightly bitter and soluble in ether and chloroform[22], seed contain fixed oil (3%)[10,19], colouring matter (amarbelin)[10,19], wax[19], dulcitol[15], laurotetanine (alkaloid) it create convulsion, if used in large quantity then cause death[15], scoparone, melanettin, hyperoside, aromadendrin, taxifolin, astragalin, myricetin, kaempferol, apigenin 7-O- glucoside, luteolin, quercetin, 6,7 – dimethoxy -2H-1 benzopyran -2-one, 3-(3,4-dihydroxyphenyl) -2- propen- 1- ethanoate, 6,7,8- trimethoxy- 2H- benzopyran- 2- one,

3-(4- O- β- D- glucopyranoside- 3,5- dimethoxyphenyl)- 2- propen- 1 –ol β- sitosterol, α- amyrin, β- amyrin, β- amyrin acetate, α- amyrin acetate, oleanolic acetate, oleanolic acetate, oleanolic acid, lupeol, 3β- hydroxyolean- 12(13)- ene tridecanoate and heptadecanoate, coumarin, 3,4-O- dicaffeoylquinic acid, 3-O- caffeoylquinic acid, D- mannitol, dulcitol, myricetin 3- O- α- rhamnoside[18].

Ayurvedic properties

Rasa (taste):- Kashaya[15,16,20] (astringent), Tikta[15,16,20] (bitter), Katu[11] (pungent), Madhur[11] (sweet);

Guna (property):- Pishchil[15,16,20] (sticky), Ruksha[16] (dry), Laghu[16] (light);

Virya (potency):- Sheeta [15,16, 20] (cold), Ushna[11] (hot);

Vipak (metabolic action):- Katu[11,15,20] (pungent);

Doshakarma:- Kapha-pittahara[15,16,20] (reduce kapha and pitta), Hridya[15,20] (cardiac tonic), Krimighan[15,20] (anti-helmentic)

Part used

Panchang[15,16] (whole plant), Lata[11] (stem), Beej[11] (seed)

Identity, Purity and Strength

The Standard values for the quantitative estimation of constituents in *Cuscuta reflexa* are given in Table- 2[18].

Uses

Amavata (rheumatic arthritis), grahani (dysentery), agnimandya (loss of appetite), krimighan (anti-microbial), keshya (hair strengthening), pittasarak (cholagogue), mutrakrish (urine disorder), gandmalanashak (used in cervical lymphadenitis), plihodar (spleenomagely), balya (strengthen body), kphapitahara (reduce kapha and pitta)[15,20]

It can also be classified according to part used[19]

- Whole plant: - Infusion is used as a wash for sores.
- Stem: - Useful in bilious disorders.
- Fruit: - Used in fever and cough.
- Seed: - Cold infusion is given as a depurative and carminative in pains and stomach-aches.

Another classification according to mode of action[16]

- Internally useful in appetizer, digestive, liver stimulant, anthelmentic and reduces intestinal motility.
- Externally useful in inflammation, pain, hair disorder, conjunctivitis and also used against itch and other skin diseases.

Formulation

Akashvalli arka[23]

RESULT AND DISCUSSION

The extensive literature survey reveals that *Cuscuta reflexa* is a medicinally important parasitic climbing herb. It is commonly known as Akashballi, Amarballi and Akashbel. The plant is astringent and bitter taste. It has the properties of pishchil (sticky), ruksha (dry) and laghu (light). So the potency according to the properties can be sheeta (cold). The whole plant and stem are generally used for curing diseases like amavata (rheumatic arthritis), grahani (dysentery), agnimandya (loss of appetite), krimighan (anti-microbial), keshya (hair strengthening), mutrakrish (urine disorder), gandmalanashak (used in cervical lymphadenitis), balya (strengthen body) etc. The plant need to be explored more so that more formulations can be proposed and used practically for the treatment of various disorders.

Table 1: Synonyms of *Cuscuta reflexa* roxb.

Sanskrit	Akashballi, Amarballi, Khaballi, Dusparsha, Swarnalata, Akashbel
Hindi	Amerbel, Akashbel, Antarbel, Akasbel, Aftimum, Kasus

Beng	Swarnalata, Aloklata, Algusi, Haldi-algusilata, Haldi-algusi-lutta
Guj.	Akasbel ,Amarbel, Antarbel, Akaswel, Amar
Tel.	Nulu tega, Sitama purgonalu, Sitamma pogu nalu, Sitama purgonalu
Mal.	Akashballi, Mutillattali, Akasagarudakkoti
Farsi	Aphtimoon
Marathi	Nirmuli, Akashbel, Akashbelya, Antarbelya
Punj.	Nirabar, Niradhar, Nilathari, Viradhar, Amil, Zarbuti, Niradhara
Eng.	Dordar, Dodder, Dordara vela
Yunani	Aphtimoon
Gwalior	Amarbel
Duk.	Akas-pawan, Amlawel
Pers.	Tukhm-i-Kasusa

Table:-2 (Identity, Purity and Strength)

Foreign matter	**Not more than 2.0 %**
Total Ash	Not more than 5.0 %
Acid insoluble ash	Not more than 1.8 %
Ethanol soluble extractive	Not less than 8.0 %
Water soluble extractive	Not less than 25.0 %

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