

## Review Article

# **Cuscuta reflexa Traditional miracle plant: A Review on ethnomedicinal and therapeutic Potential**

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	International Archives of Integrated Medicine, Vol. 11, Issue 1, January, 2024. Available online at <a href="http://iaimjournal.com/">http://iaimjournal.com/</a> ISSN: 2394-0026 (P) ISSN: 2394-0034 (O)
	Received on: 14-12-2023 Accepted on: 22-12-2023 Source of support: Nil Conflict of interest: None declared. Article is under Creative Common Attribution 4.0 International DOI: <a href="https://doi.org/10.5281/zenodo.10556608">10.5281/zenodo.10556608</a>
<b>How to cite this article:</b> Muhammad Amjad Chishti, Muhammad Akram, Fethi Ahmet Ozdemir, Aymen Owais Ghauri, Adonis Sfera, Pragnesh Parmar. <i>Cuscuta reflexa</i> Traditional miracle plant: A Review on ethnomedicinal and therapeutic Potential. <i>Int. Arch. Integr. Med.</i> , 2024; 11(1): 1-8.	

## Abstract

In the realm of complementary and alternative medicine, *Cuscuta reflexa* is sometimes referred as an Aftimoon, Amarbel, Akashbel, or Dodder. It is known as the miracle plant traditionally. The plant's medicinal characteristics are used to treat a number of ailments. It is frequently employed in the Unani system of medicine for its beneficial therapeutic benefits because of its active ingredients. Since ancient times, many herbal doctors have utilized this plant to cure a variety of illnesses, including epilepsy, schizophrenia, melancholia, and other neurological and mental diseases. It is also used as a mufrad (single drug) in the forms of powder, decoction, mixture, and murakkab (compound formulations) for the treatment of a variety of different ailments, including hepatitis, palpitations, and skin disorders including vitiligo, pityriasis, etc. Many compounds with medicinal potential and

pharmacological and ethnomedical properties have been identified from this wonder plant. Cuscutin, Cuscutalin, Bergenin, Kaempferol, Amarbelin, and Sterol Glycosides are a few of the significant compounds found in it. Diverse pharmacological studies of Aftimoon have been reported such as anti-inflammatory, cytotoxic, antipyretic, hepatoprotective, anticonvulsant, nematicide, anti-androgenic, hypocholesterolemic, antiandrogenic, hemolytic, diuretic, dermatogenic, immunostimulant, antiarthritic, antiasthma and anticancer activities. The information and understanding on ethnomedical applications, pharmacological studies from numerous classical Unani literature as well as contemporary research journals, and various scientific studies being done on *Cuscuta reflexa* will be provided through this review.

## Key words

*Cuscuta reflexa*, Mufrad, Cuscutin, Cuscutalin, Immunostimulant, Aftimoon, Hypocholesterolemic anti androgenic.

## Introduction

Due to their therapeutic potential, medicinal plants have been utilized in traditional medicine for eons. The quest for new drug candidates for treating various diseases has been facilitated by the discovery of medicinal plants [1]. In the Unani system of medicine, *Cuscuta reflexa* a member of the Cuscutaceae family, is referred to as Aftimoon [2]. Since ancient times, it has been utilized by unani doctors to treat a variety of illnesses, including neurological disorders including melancholia, schizophrenia, and epilepsy. It is also used to treat a number of other conditions, including hepatitis, palpitations, and skin conditions [3]. The world's temperate and tropical regions are home to *Cuscuta*, which has a large diversity of species in its tropical and subtropical habitats. It happens all over India. The northern parts of the nation, the Bengal Plains, the Western Ghats, Ceylon, the Satara region, Himachal Pradesh, Uttar Pradesh, and Uttarakhand are all home to this species. Additionally, it can be found in the plains of Bangladesh, Pakistan, Malaysia, Nepal, and Thailand [4].

The plant's aerial portions are often employed in dried form in the unani medical system. Aftimoon is regarded as being of the greatest grade and is peculiarly fragrant, reddish, and thin stemmed. It is also known as devil's gut, strangle tare, beggar weed, hell weed, and scald weed [5].

Every year, it grows on the same plant during the wet season. *Cuscuta reflexa*, often known as amarbel or dodder, is a perennial parasitic twining herb with no roots and no leaves in the Convolvulaceae family. It cannot produce its own nourishment through photosynthesis since it lacks chlorophyll. Dodder plant is able to move toward its prey with notable accuracy and efficiency in addition to being able to detect its host plant. On the basis of the volatile compounds released by the host plant during its regular process of transpiration, the dodder plant can also select an ideal host among a variety of species. It moved from one host plant to another, twining and adhering firmly to each victim with unique branching organs known as haustorium. Haustorium enters the host, connects to its xylem and phloem, and absorbs from it both water and complex dietary substances like sugar and amino acids [6]. It is thought that parasitic plants draw healthy, potential sap from their hosts, and if those hosts are medical plants, the parasite plants exhibit many of the same traits as their hosts. Traditional healers pay particular attention to *Cuscuta* species that feed on widely used therapeutic herbs. It has no connection to the ground throughout its whole life and relies on tiny, abundant seeds to help it develop. The lifespan of seeds in the soil is 5–10 years and they have a thick layer [7].

Alkaloids and other active metabolites from the plant it hosts are accumulated by *Cuscuta*.

Alkaloids, glycosides, flavonoids, and other compounds are included. Amabelin and kaempferol are among the active substances it contains; the stem includes cuscutin, cuscutalin, bergenin, beta-sitosterol, luteolin, and kaempferol [8]. Pharmacological activity has so far been identified for a number of bioactive compounds that have been isolated. Aftimoon is said to have several pharmacological qualities in the classical Unani literature, including *Mushil-i Sawd* (purgative of black bile), *Mushil-i Balgham* (purgative of phlegm), *Mudir-i Bawl* (diuretic), and *Muhallil Waram* (anti-inflammatory), which will be explored below. The generation of evidence-based data is necessary in the current situation, and there is a tremendous opportunity to work with the pharmacological attributions mentioned and used by eminent Unani physicians.

### **Botanical Description**

The parasitic climber *Cuscuta reflexa* has a thin stem and branches. Long, somewhat robust, densely twining, branching, glabrous stems with pale greenish yellow color and occasionally red spots. Flowers can be found alone, in umbellate clusters of 2-4, or in short racemes. Bracts are 1.5 mm long, ovate-oblong, and fleshy at the obtuse end. Calyx almost completely divided at the base, with 3 mm long, somewhat uneven, broadly oval, acute, glabrous, and fleshy lobes. Scales are practically at the base of the corolla tube and are big, oblong, subquadrate or somewhat obovate, fimbriate and incurved at the apex. The corolla is white; the tube is 6-8 by 4 mm, almost cylindrical; the lobes are 2.5-3 mm long, deltoid, acute, and reflexed. The corolla tube has stamens in the throat, few filaments, and anthers that extend approximately half way above the top. The ovoid ovary is simple, very short, and thick; the stigmas are two; they are distinct, big, thick, and meaty, and 1.5 mm long. Depressed-globose, glabrous, and circumscissile near the base capsules measuring 6–8 mm in diameter. Large, black, glabrous seeds, numbering 2–4 [9, 10].

### **Chemical Constituents**

The existence of medicinal substances such as flavonoids, alkaloids, lignans, saponins, phenolics, tannins, resin, and glycosides have been demonstrated by phytochemical analyses. Luteolin [11], dulcitol [11], quercetin a glycoside [11], or luteolin. The seeds include kaempferol and amabelin. The stem contains resins, oil (3%) and reducing sugars, as well as cuscutin, cuscutatin, beta-sitosterol, luteolin, bergenin, and kaempferolamarvelin [12]. Two known and twelve new compounds were found when the bioactive components of *Cuscuta reflexa* stems were extracted using GC-MS [13].

### **Ethnomedicinal uses**

Chhattisgarh's rural residents blend its juice with milk and use it to treat jaundice. Additionally, rheumatism, gout, and headaches have all been treated with its warm paste [14]. Jaundice is treated with a combination of plant juice and *Saccharum officinarum* juice [15]. The stem is used to cure bilious disorders as well as constipation, flatulence, liver complaints, and bilious affections. It is also used internally to treat prolonged fevers and externally to treat body aches and itchy skin. Additionally, used as a stimulant of hair growth is *Cuscuta reflexa*. As a blood purifier, seeds are claimed to be tonic, diaphoretic, and demulcent. In cases of discomfort and stomach ache, a cool infusion of seeds is administered [16].

### **Therapeutic uses**

As a blood purifier, emmenagogue, diuretic, aphrodisiac, expectorant, carminative, anthelmintic, sedative, and reliever of muscle and joint discomfort, it is reportedly utilized. The stem of the plant is helpful in bilious and liver problems since it has purgative and alterative effects. Carminative and anodyne are externally helpful in itching and seeds [17]. Constipation, flatulence, body aches, itchy skin, frequent urination, dry eyes, white discharge from the vagina, ringing in the ears, lower back discomfort, impaired vision, and sleepy eyes are among the conditions it is used to treat. It is also

utilized to encourage hair development. According to the classical Unani literature, it is a good purgative for phlegm, black bile, and yellow bile and is helpful for a variety of diseases caused by the dysregulation of these humors, especially sawda and balgham. Due to its virtue of being a Blood Purifier and deobstruent, it is reported to be helpful in treating Melancholia, Epilepsy, Nightmares, Paralysis, Numbness, Anxiety, Schizophrenia, and different skin disorders, Tonic, demulcent, and resolvent [18–21].

### **Pharmacological actions**

#### **Antibacterial activity**

To assess their antibacterial activity, *Cuscuta reflexa* whole plant extracts were tested against Gram positive (*Bacillus subtilis* and *Staphylococcus aureus*) and Gram negative (*Escherichia coli* and *Salmonella typhi*) bacteria. 500 g/mL of the plant extract produced the largest zones of bacterial suppression across three of the bacteria out of the four concentrations that were examined (200 g/mL, 300 g/mL, 400 g/mL, or 500 g/mL). In contrast, regardless of extract concentration, *Salmonella typhi* multiplication did not stop. Overall, even though *E. coli* at a concentration of 500 g/mL was shown to have the strongest antibacterial activity [22].

#### **Antioxidant activity**

Both *Cuscuta reflexa* and *Cassythafiliformis* have antioxidant activity, according to the study, though *Cuscuta reflexa* is superior to *Cassythafiliformis* at scavenging free radicals and superoxide radicals [23]. By calculating the level of non-enzymatic haemoglobin glycosylation, the *in vitro* antioxidant activity of *Cuscutareflexa* stem extract was assessed calorimetrically at 440 nm. The ethanolic extract's ethyl acetate fraction shown greater activity than the other fractions [24].

#### **Anti-inflammatory activity**

In a carrageenan-induced paw edema model in rats, the alcoholic and aqueous extracts of

*Cuscuta reflexa* stem were tested for their anti-inflammatory activity and compared to Ibuprofen's anti-inflammatory effects. Prior to the injection of carrageenan, these extracts were administered orally at concentrations of 100, 200, and 400 mg/kg bd. Wt. In comparison to the standard medication Ibuprofen, which reduced edema volume by 96.36%, both the extracts at medium and higher doses, i.e. 200 mg/kg and 400 mg/kg, reduced edema volume by 47.27%, 72.72%, and 57.72%, 80.00% respectively at 5 hours. As a result, this study found that the chosen *Cuscutareflexa* extracts significantly reduced inflammation in a rat model of carrageenan-induced paw edema [25].

#### **Antitumor Activity**

The *Cuscuta reflexa* chloroform and ethanol extracts were tested against the Ehrlich ascites carcinoma (EAC) tumor in mice at doses of 200 and 400 mg/kg body weight orally. According to Chatterjee D, et al's (2011) report, the results of the study showed that the extracts have antitumor activity comparable to that of the gold standard, 5-fluorouracil, in EAC-bearing mice [26].

#### **Antipyretic activity**

The results of the study demonstrated that yeast-induced elevations in body temperature in rats caused both aqueous and ethanol extracts of *Cuscuta reflexa* to exhibit significant ( $p < 0.05$ ) antipyretic action. The effects are similar to those of the standard antipyretic medication (paracetamol). It was discovered that the ethanol extract was marginally more powerful than the aqueous extract. The presence of the aforementioned group of phytoconstituents, flavonoids and saponins, in *Cuscutareflexa* may be the cause of the activity [27].

#### **Anxiolytic activity**

According to the study, *Cuscuta reflexa* 400 mg/kg methanol extract considerably lengthened the time spent in the open arms and reduced the frequency of entrances into the closed arms. In both models, the 400 mg/kg extract significantly reduced anxiety compared to the 200 mg/kg

extract. The 400 mg/kg impact was similar to the average. As a result, *Cuscuta reflexa*'s methanol extract might work well as anxiolytics and appears promise for the creation of plant-based anxiety medications [28].

#### **Anticonvulsant activity**

According to Gupta M, et al. (2003), methanolic extract from the stems of *Cuscuta reflexa* demonstrated notable protection against convulsions brought on by chemo convulsive drugs in mice. The mice treated with the processed extract had considerably more catecholamines. In comparison to the control groups, the extract also markedly increased GABA, glutamine, and glutamate levels. According to the study, *Cuscuta reflexa* extract has anticonvulsant properties [29].

#### **Hepatoprotective activity**

The results of the study showed that *Cuscuta reflexa* methanol extract enhanced liver function by lowering serum levels of ALT, AST, and alkaline phosphatase in hepatotoxic rats. It also decreased the levels of both ALP and total bilirubin, showing that it had a protective impact on the liver and increased its functional effectiveness [30].

#### **Hair growth promoting activity**

The results of the study showed that *Cuscuta reflexa* petroleum ether extract had promising anagen/ telogen ratio, follicular density, and skin section results in terms of encouraging hair development. The extract may have corrected androgen-induced baldness by preventing the conversion of testosterone to dihydrotestosterone, as suggested by the inhibition of 5reductase activity by extract and isolate [31].

#### **Anti-diabetic activity**

According to the study, *Cuscuta reflexa* has potent anti-diabetic properties. A considerable increase in glycosylated hemoglobin was avoided by the ethanolic extract in vitro, with an IC<sub>50</sub> value of 11.25 /ug/ml, which is equivalent to the

reference medication tocopherol. In the single dose trial, the extract significantly reduced blood glucose levels in alloxan-induced hyperglycemic rats as compared to the control, and its effects are comparable to those of the medication glibenclamide [32].

#### **Hypoglycemic activity**

*Cuscuta reflexa* Roxb methanolic.'s extract and the ethyl acetate fraction it produced significantly inhibited -Glucosidase. The small intestine's epithelium contains this membrane-bound enzyme. The duration of time that glucose remains in the circulation after a meal is extended by this enzyme's inhibition [33].

#### **Anti-HIV activity**

The anti-HIV activity of the crude water extracts of *Cuscuta reflexa* may have resulted from interactions with substances with various mechanisms of action. *Cuscuta reflexa*'s methanol extract demonstrated antibacterial and free radical scavenging properties [34].

#### **Anti-arthritic and nephroprotective effect**

In vivo formaldehyde and turpentine oil-induced arthritis models, in vitro formaldehyde and turpentine oil-induced arthritis models, and in vitro protein denaturation procedures were used to assess the antiarthritic efficacy of *Cuscuta reflexa* aqueous and methanol extracts. With a maximal inhibition of 71.22% at the 6th hour for turpentine oil and 76.74% on the 10th day for formaldehyde, AMECR at 600 mg/kg effectively reduced joint and paw edema. Moreover, in vitro studies support a considerable concentration-dependent improvement in protection at 800 g/mL against denaturation of both egg albumin (93.51%) and bovine serum albumin (89.30%). This finding demonstrates that AMECR offers defense against nephrotoxicity and arthritis, which may be brought on by the presence of phytoconstituents [35].

#### **Effect on Cardiovascular system**

In a series of tests, his plant's alcoholic extracts caused a dog's blood pressure to drop. Atropine,

merpyramine, or propranolol did not prevent this effect; hence it could not be carried out through cholinergic, histaminergic, or adrenergic mechanisms [36]. In pentothal-anesthetized rats, an ethanolic extract of the stem of *Cuscuta reflexa* reduced arterial blood pressure and heart rate in a dose-dependent manner, whereas atropine had no effect on this outcome. *Cuscuta reflexa* was discovered to have hypotensive and bradycardiac effects without being affected by cholinergic receptor stimulation or adrenergic blockade [37].

## Discussion

This review paper demonstrates the significance of *Cuscuta reflexa* as a miraculous therapeutic plant in ethnobotany. This article thoroughly examined the research on Aftimoon's pharmacological properties and historical applications in order to illustrate, focus, and advance our understanding of its usefulness and effectiveness. However, clinical evidence and Published data in the field of Unani medicine have yet to be achieved in terms of evidence-based scientific studies. Traditional medicines, like the Unani medicine system, have been using this plant as medicine in the form of single and compound formulation since ancient times, based on well-established literature and its use on the basis of experience by various Unani renowned scholars suggesting its effectiveness.

## Conclusion

Applying a LAGB as a revision over either a failed gastric sleeve or RYGB can be immensely useful for a select group of patients who meet the criteria. Our follow up study showed a mean estimated weight loss of all treatment groups of 41.7 lbs over the course of 5 years, with LAGB over RYGB yielding the most promising results. For future analysis, larger sample sizes with more diverse subjects should be conducted to minimize confounding factors.

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