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A CRITICAL ANALYSIS OF THE MEDICINAL PLANT CUSCUTA REFLEXA (DODDER PLANT)

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ABSTRACT

Over 80% of people utilize herbal remedies, which are more widely accepted in both developed and developing nations because of their safety and the availability of scientific research supporting their positive impact on a range of medical ailments. C. reflexa has been characterized as the preferred medication for Amrad Sawdawiyya (melancholic disorders), according to Unani system of medicine (USM). Nerve, brain, and psychological ailments including nightmares (Kābūs), melancholia (Mālankhūliya), insanity (Junūn), paralysis (Fālij), cancer (Sartan), epilepsy (Ṣarʿa), facial palsy (Laqwa), and schizophrenia are all included in Sawdawi Amrad. The literature also stated that the medication has a number of pharmacologically active ingredients, and research has been conducted to support its use in a variety of fields, including anti-HIV, anticancer, antioxidant, and anticonvulsant properties, with encouraging outcomes.

Keywords: Herbal Remedies, C. Reflexa, Unani System Of Medicine, Pharmacology.

I. INTRODUCTION

The oldest type of medicines is made from medicinal plants, which have been used for thousands of years in traditional medicine in many nations worldwide. Over the years, empirical evidence of their positive impacts was passed down through human communities. While decorative plants are typically considered to a small extent, ethnobotanical studies primarily concentrate on plant species that have historically been utilized as food or for medicinal purposes. However, a plant's widespread use for decoration could also serve as the basis for research into additional possible applications. (1)

India's cultural heritage is rich, dynamic, and varied. The concept of health and healing is important to this culture and heritage. Thus, all ethnic communities across the many ecosystems have a substantial body of knowledge pertaining to health and healing. But over the past few centuries, this body of knowledge has been weakened by more mainstream cultural influences that mock regional health customs. Effective recording and assessment procedures must be implemented immediately to revive local health customs; else, this wonderful people's health culture would irretrievably disappear. This nation is aptly referred to as the botanical garden of the world and is arguably the world's largest producer of medicinal plants. India formally acknowledges the therapeutic use of more than 3000 plants. Over 6000 plants are thought to be used in traditional, folk, and herbal medicine in India. India formally acknowledges the therapeutic use of more than 3000 plants. Over 6000 plants are thought to be used in traditional, folk, and herbal medicine in India. Since medicine is a viable method for creating new medications, there are currently more publications in this area, and both public and commercial organizations are funding research initiatives all around the world. (2)

PLANT PROFILE

Kingdom: Plantae

DIVISION: Angiosperms

Class: Eudicots

Order: Solanales

Family: Cuscutaceae

Genus: Cuscuta

Species: reflexa (3)

COMMON NAME

Arabic: Shajar-ul-Zibagh, Aftimoon

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English: Dodder

Gujarati: Akaswel, Amar bel

Hindi: Amarbel, Akashbel

Persian: Darakht-e-pechan

Unani: Aftimoon, Kashus, Kasoos

Urdu: Aftimoon, Aftimoon Hindi (3)

DESCRIPTION

This parasitic plant species grows over a host plant, such as huge trees with garlands that drop down from the canopy up to 10 meters (33 feet), and is a leafless, twined, thin vine. The tiny, bell-shaped flowers have golden filaments and are white in color. The bloom produces seeds and fruits. (4)

DISTRIBUTION

Both tropical and temperate areas, including India, Malaysia, Thailand, Nepal, and Afghanistan, are home to it. In India it is found widely in the states of Karnataka, Kerala, Tamil Nadu, Assam, Maharastra, Meghalaya, Odisha (5,6)

TRADITIONAL USES

This herb is used to maintain the hepatic system, relieve pain, edema, and tumors, and treat skin infections and jaundice. Additionally, it has historically been used to treat fever, fits, diaphore, demulcent, depression, and insanity. (6)

PHYTOCHEMISTERY

The plant was found to contain kaempferol-3-Oglucoside, astragalin, dulcitol, luteolin, quercetin, benzopyrones, myricetin, cuscutin, and cuscutalin. Alkaloids, protein, resin, tannin, glycosides, carbohydrates, a variety of flavonoids, and glucopyranoside are also present. A few minerals were also separated, including potassium, sodium, calcium, iron, and aluminium. The C. reflexa was also used to isolate quercetin, bergenin, sitosterol, and quercetin-3-O-glucoside. Additionally found were corticosteroids, anthraquinones, phenolic compounds, alkaloids, flavonoids, and essential oils. Quercetin and kaempferol were among the flavonoids and flavonoid glycosides that were also isolated. Additionally, C. reflexa was used to isolate 3'-methoxy-3,4',5,7-tetrahydroxy flavones and 3'-methoxy-4',5,7-trihydroxy flavone-3glucoside. Reflexin, 5-hydroxy-7-methoxy-6-(2, 3-epoxy-3-methyl butyl)-flavanone, is found in the stems of C. reflexa. Additionally, it contains several steroids and glycosides. It also yielded carboxymethylcellulose with a high molecular weight. The anther of C. reflexa contains lycopene, sitosterol, apigenin-7-b-rutinoside, and 6-7 dimethoxy coumarin, while the roots consist of stigmasterol, cuscutin, and sitosterol. Gallic acid, quercetin, stigmasterol, and sitosterol are all confirmed by the HPTLC. (3) Wax and reducing sugars are also present in the plant. Amarvelin, resins, 3% oil, and reducing sugars are all present in the seeds. According to reports, these components differ depending on the host that the dodder parasitizes. D-mannitol is produced on Santalum album, whereas leutolin or kaempferol and dulcitol are produced on Glycomis triphylla. Pectin methyl esterase, a crucial enzyme that breaks down cell walls, has been isolated from the filaments that contain haustorium in both A and B forms. (7)

II. REPORTED ACTIVITIES

At 3 hours, the carrageenan-induced paw inflammation. Ibuprofen (100 mg/kg) taken orally resulted in a significant decrease in edema (78.47%) after three hours. At the early stage, the kwath of Cocculus hirsutus extract (KCHP) and the kwath of Cuscuta reflexa aqueous extract (KCRA) both had decreased edema and were equally effective (EC50; 139.8 and 147.3 mg/kg, respectively). At the second stage of inflammation, however, KCRA was more effective than KCHP (EC50=313.6 and 2760 mg/kg, respectively). The kwath blend has successfully prevented paw edema from the sixth hour onward, in contrast to Ibuprofen. (8)

The ABTS, DPPH, and FRAP assays were used to assess antioxidant activity. All of the chosen species' entire plant contents of flavonoids and phenol were examined. The number of total polyphenols in Ipomoea eriocarpa was much greater (0.98 ± 0.073 mg/gdw). Ipomoea carnea Jacq had the highest DPPH value (5.6%), whereas extracts from Convolvulus arvensis L. had the lowest value (3.0%). Convolvulus prostrastus had the highest ABTS, while Ipomoea carnea had the lowest. Ipomoea hederacia produced the highest value in the FRAP assay (2.75), whereas I. arachnosperma Welw produced the lowest value (0.31). Both bacterial and fungal strains

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were used to test the methanolic extracts of the entire plant of each of the chosen species for antifungal and antibacterial properties. To perform antibacterial activity, two gram-positive bacteria (Staphylococcus aureus and Bacillus subtilis), two gram-negative bacteria (E. coli and Pseudomonas aeruginosa), and two fungal strains of Aspergillus niger and Aspergillus oryzae were employed. for comparing the zones of inhibition that plant extracts displayed against strains of bacteria and fungi. As standards for bacterial strains, erythromycin, tetracycline, and cefoparazone were employed. Additionally, Terbinafine and Fungivine were employed as common antibiotics to combat fungal strains. Cuscuta reflexa exhibited the largest zone of inhibition among the fungal strains. Evolvulus alsinoides extract demonstrated the lowest zone of inhibition against Aspergillus oryzae, (0.60±0.28 mm), whereas the extract against Aspergillus niger was 5.55±0.3. (9)

The antioxidative and ROS-dependent apoptotic properties of Cuscuta reflexa. stem extract is examined in relation to their potential as an anticancer agent against human lung cancer. By combining in-vitro experimental validation with network pharmacology, the complex molecular pathways behind the effects were seen. Using the DPPH, ABTS, ferric reducing/antioxidant power (FRAP), hydroxyl free radical scavenging, reactive nitrogen oxide scavenging, and super oxide anion radical scavenging tests, the antioxidant capacity of C. reflexa stem extract was assessed. Furthermore, the established sulforhodamine B (SBR) and Annexin V-PI tests were used to assess the antiproliferative and proapoptotic effects of C. reflexa stem extract against the A549 lung cancer cell line. Assays for estimating total reactive oxygen species and mitochondrial membrane potential (MMP) were carried out. Consequently, a complex network of interactions between the bioactive components of C. reflexa and important proteins linked to the development of lung cancer has been established by network pharmacology analysis. The stem extract demonstrated dose-dependent antioxidant activity against DPPH (IC50 – 318.34 mg/mL), FRAP (IC50 – 698.45 mg/mL), super oxide anion (IC50 – 359.96 mg/mL) and hydroxy free radicals (IC50 – 87.38 mg/mL), reactive nitrogen oxide (IC50 – 526.12 mg/mL) compared to ABTS (892.71 mg/mL), as well as cytotoxic activity against A549 cells (IC50 – 436.80 mg/mL). Apoptosis characteristics have been identified from morphological feature observations in treated cells. Additionally, following treatment with stem extract from C. reflexa, A549 cells showed enhanced ROS production and mitochondrial depolarization, indicating that this therapy has strong apoptotic effects. These results demonstrate the potential relevance of this organic extract as a cutting-edge therapeutic approach for the treatment of lung cancer. (10)

The animals' behavioral, neurological, and autonomic profiles changed when the dried ethanolic extract of C. reflexa was examined for acute oral toxicity. Extracts' anti-cancer activities against mice produced with 1, 2-Dimethylhydrazine (DMH) were evaluated by barium enema X-ray, colonoscopy, and Aberrant CFOs (ACF) investigations. Both treated and untreated animals' blood samples were obtained, and their in-vitro histological parameters were assessed. In addition to showing comparable action to the 5-fluorouracil (5-FU), C. reflexa was found to dramatically lower the Disease action Indexing (DAI) level and ACF counts. Histopathological findings showed that whereas apoptotic bodies increased in mice treated with 5-FU and C. reflexa, they reduced in the DMH-induced group as the malignancy progressed. The administration of C. reflexa effectively repaired the colon damage or slowing the progression of the cancer. In the colonic section, the DMH-induced cancer assay showed significant effects on the levels of hemoglobin, packed cell volume (PCV), red blood cell (RBC) counts, mean corpuscular hemoglobin concentration (MCHC), mean corpuscular volume (MCV), and mean cell hemoglobin (MCH). Furthermore, the neutrophil count in the C. reflexa-administered group was within the normal range when compared to the control. (11)

In rat arthritis models induced by formaldehyde and turpentine oil, the antiarthritic activity of Cuscuta reflexa stem water:methanol mixture (30:70) was evaluated at 200, 400, and 600 mg/kg doses for 10 days and 6 hours, respectively. In vitro protein denaturation (egg albumin, bovine serum albumin) inhibition was investigated at concentrations ranging from 25 to 800 lg/mL. Gentamicin-induced nephrotoxicity in rats at dosages of 200, 400, and 600 mg/kg was implicated in the nephroprotective effect. Paw oedema and joint swelling were considerably decreased by plant extract at 600 mg/kg, with peak inhibition of 71.22% for turpentine oil at the sixth hour and 76.74% for formaldehyde at the tenth day. The data obtained in vitro also confirmed a notable rise in percentage protection against denaturation of both egg albumin (93.51%) and bovine serum albumin (89.30%) at 800 lg/mL, which was dependent on concentration. By lowering serum urea (41.400±0.510 mg/dL), uric acid (0.740±0.032 mg/dL), blood urea nitrogen (18.370±0.328), creatinine

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(3.267±0.076), and limiting kidney weight growth (0.586±0.005) and histological changes on the eighth day, the 600 mg/kg dose also demonstrated the greatest nephroprotection. P-coumaric acid, quercetin, gallic acid, vanillic acid, caffeic acid, and trans-4-hydroxy-3-methoxycinnamicacid were all detected by the HPLC study. These findings support the traditional notion that Cuscuta reflexa protects against nephrotoxicity and arthritis, which may be caused by the presence of phytoconstituents. (12)

The ability of Cuscuta reflexa aqueous methanolic extract to reduce inflammation and promote wound healing in the event of contact frostbite was studied. Three treatment groups with escalating extract dosages, a conventional medication group that received acetylsalicylic acid (ASA), and a metal bar-induced frostbite group comprised the five groups of thirty rats. A 3x3:5 cm metal bar that was frozen at -79°C for three minutes straight on shaved skin caused frostbite injury. To gauge the rate of healing in response to extract administration, percentages of the wounded area were noted. Malondialdehyde content and hematological markers were also recorded. Following extract therapy, there is a significant increase in the rate of healing and a dose-dependent decrease in malondialdehyde, a result of lipid peroxidation. The outcomes were contrasted with those of the standard medication group (ASA) and frostbite. According to these findings, the extract has outstanding wound-healing capabilities against frostbite injuries and may be an invaluable asset in these circumstances. (13)

The purpose of the experimental investigation was to investigate the crude extract's potential for antiulcer and in vivo gastroprotective action. The crude extract of Cuscuta reflexa consisted of a number of secondary metabolites, including saponins, glycosides, flavonoids, carbohydrates, and terpenes. In treated groups, it became apparent that the crude extract at dose of Cuscuta reflexa raised the pH of gastric juice in a dose-dependent way. pH of stomach juice in each group in comparison to the group that was intoxicated. At 7.260±0.349, the Cimetidine-treated group had the highest value among the treatment groups. (14)

The purpose of the study was to evaluate the antiemetic properties of C. reflexa juice (JCR), aqueous extract (CRAE), and methanolic extract (CRME) in pigeons. Ampicillin (300 mg/kg), copper sulphate (100 mg/kg), concentrated sodium chloride solution (1600 mg/kg, PO), and cisplatin (5-HT3 receptor stimulator) (6 mg/kg, IM) were among the GIT irritants that caused vomiting. A positive control was dimenhydrinate (2 mg/kg; IM). Each pigeon received intramuscular injections of JCR [1 ml/kg (1 %) and 1 ml/kg (2 %)], CRAE, and CRME at varying dosages (50, 100, and 200 mg/kg). To assess its antiemetic action, the total number of jerks and vomiting episodes as well as the vomiting-weight were calculated for each group. With the exception of sodium chloride, the JCR had a substantial ($p < 0.05$) antiemetic effect on the frequency and commencement of emesis at 1 ml/kg (2%) against several emesis mediators. The onset and frequency of emesis were also markedly inhibited by CRAE and CRME, with a highly significant ($p < 0.001$) effect at 200 mg/kg. According to the study, C. reflexa juice, aqueous extract, and methanolic extract exhibit strong antiemetic properties and include one or more pharmacologically active constituents that block the emetic mediators by causing 5-HT 3 stimulations and GIT irritation. (15)

Aspirin-induced ulcer models were used to study Cuscuta reflexa (Cs.Cr) antiulcer properties. Six groups of Wistar Albino rats, each with six animals, were created. The test groups received three different doses (30, 100, and 300 mg/kg) of Cs.Cr orally for seven days, followed by two days of aspirin administration (200 mg/kg orally). The control and intoxicated groups received normal saline at a dose of 8 ml/kg, while the standard group received Cimetidine (100 mg/kg).

Rats were put to sleep and killed at the conclusion of the trial. To obtain the gastric juice for measuring pH and acidity, the stomach was cut out and removed. Each group's stomach was assessed for ulcer index and protection percentage. Stomachs were then weighed, and samples were kept for histological analysis in 10% formalin. Mice were used in acute toxicity experiments. In rats with peptic ulcers caused by aspirin, oral treatment of the crude extract demonstrated dose-dependent (30–300 mg/kg) substantial protection. In mice, the Cs.Cr extract was safe up to a dose of 10 g/kg. The plant's crude extract contained a number of metabolites, including glycosides, flavonoids, saponins, terpenes, and tannins, according to phytochemical research. The study's findings unequivocally demonstrated that peptic ulceration was reversed by Cs.Cr. However, more research is required to determine the precise mechanism or mechanisms underlying the plant's protective properties. (16)

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Through in vivo and in silico tests, the neuro-pharmacological, anti-nociceptive, and antidiarrheal properties of the metabolites extracted (methanol) from Cuscuta reflexa (MECR) leaves. MECR (200 and 400 mg/kg) significantly reduced anxiety-like behavior in mice during the anxiolytic evaluation as determined by the elevated plus maze and hole board tests. In the forced swimming and tail suspension experiments, mice administered MECR also showed a dose-dependent reduction in immobility time. Additionally, the chemically produced pain models (acetic acid and formalin) were used to evaluate anti-nociceptive effectiveness. In all situations, 400 mg/kg was the most effective and significantly decreased the mice's formalin-induced licking (pain response) and acetic acid-stimulated writhing. Additionally, the castor oil-induced diarrheal model, which measures antidiarrheal efficacy, clearly showed a reduction in the frequency of diarrheal stools. Thus, the presence of kaempferol, quercetin, isorhamnetol, linoleic acid, coumarin, α-amyrin, and sesamin, which showed outstanding docking scores, may account for the MECR's anxiolytic and depressive action. Kaempferol, myricetin, quercetin, isorhamnetol, linoleic acid, oleic acid, stearic acid, palmitic acid, luteolin, coumarin, and sesamin have all been shown to have analgesic and anti-inflammatory qualities. This may be the cause of MECR's anti-nociceptive action. Similar phyto-compounds, including kaempferol, myricetin, quercetin, isorhamnetol, linoleic acid, oleic acid, stearic acid, palmitic acid, luteolin, coumarin, and sesamin, also docked against both the M3 muscarinic acetylcholine receptor and the 5-HT3 receptor in the antidiarrheal docking analysis. These findings suggest that the investigated phyto-compounds may interact with these target receptors to partially explain MECR's antidiarrheal action. Additionally, five compounds—kaempferol, luteolin, myricetin, astragalin, and quercetin—have been chosen based on the molecular docking study's highest score in order to further investigate their ADME/T and toxicological characteristics. (17)

The antidiabetic properties of C. reflexa leaves methanol extract (CRME) were assessed in Wistar albino rats with diabetes caused by alloxan. For forty-five days, the study was conducted. A diabetic model was created by administering 120 mg/kg of alloxan monohydrate intraperitoneally. Oral administration of CRME (100, 200, and 400 mg/kg/day) and standard (gliclazide, 10 mg/kg/day) began on the day diabetes was induced and lasted for 45 days. By analyzing the lipid profile, insulin, HbA1C, blood glucose levels, and liver function test, the impact of CRME was examined. Additionally, the protective potentials of CRME were investigated using histopathology of experimental rats' kidney, liver, and pancreatic tissues. In comparison to the diabetic control group (249.7 ± 7.3 mg/dL), CRME demonstrated a significant ($p<0.01$) decrease in blood glucose levels (137.1 ± 5.8, 125.9 ± 6.5, and 109.5 ± 5.4 mg/dL at the doses of 100, 200, and 400 mg/kg, respectively). Additionally, at the highest dose, CRME improved insulin levels (3.96% and ng/ml, respectively) and decreased HbA1C. Additionally, CRME demonstrated a marked improvement in the liver function test and lipid profile test when compared to the diabetic control group (7.55% and 6.5 ng/ml, respectively). Finally, CRME significantly reversed the histopathological changes seen in alloxan-induced diabetes. (18)

Albino male mice were used to test the acute toxicity of Cuscuta reflexa seed extract (CRSE) and its ability to minimize the adverse effects of CP. The first group was used as the control group for the acute toxicity analysis, and on the first day of the 14-day experiment, the second group was given CRSE (200 mg/kg/bw). The second group (vehicle control) received corn oil (CO) (2 mL/kg/bw), the third group received CP (20 mg/kg/bw) dissolved in corn oil, and the fourth group received CP (20 mg/kg/bw) and CRSE (200 mg/kg/bw) orally via gavage once daily for 21 days in order to perform hepatotoxicity analysis. . Serum biochemical indicators and histopathological analyses of different organs showed no statistically significant differences between the CRSE-treated and control groups during the acute toxicity examination. This suggests that CRSE is safe at a dosage of 200 mg/kg/bw, with an oral LD50 in mice greater than 200 mg/kg. According to the hepatotoxicity study, CP administration caused oxidative stress and liver damage, but CRSE functioned as an antioxidant and reduced the symptoms of oxidative stress in liver damage. Therefore, co-treatment with CRSE is a viable therapeutic strategy for reducing CP hepatotoxicity. (19)

The animals' behavioral, neurological, and autonomic profiles changed when the dried ethanolic extract of C. reflexa was examined for acute oral toxicity. Extracts' initial anti-cancer activities against mice produced with 1, 2-Dimethylhydrazine (DMH) were evaluated by barium enema X-ray, colonoscopy, and Aberrant CFOs (ACF) investigations. The skilled technician took blood samples from both treated and untreated animals and assessed their in-vitro histological characteristics. In addition to showing comparable action to the common medication 5-fluorouracil (5-FU), C. reflexa was found to dramatically lower the Disease action Indexing (DAI)

level and ACF counts. Histopathological findings showed that whereas apoptotic bodies increased in mice treated with 5-FU (group III) and C. reflexa (group IV and V), they reduced in the DMH-induced group (group II) as the malignancy progressed. On the other hand, animals in groups II and III, IV, and V had more and less mitotic bodies, respectively. The administration of C. reflexa effectively restored the loss, most likely by repairing the colon damage or slowing the progression of the cancer. In the colonic section, the DMH-induced cancer assay showed significant effects on the levels of hemoglobin, packed cell volume (PCV), red blood cell (RBC) counts, mean corpuscular hemoglobin concentration (MCHC), mean corpuscular volume (MCV), and mean cell hemoglobin (MCH). Furthermore, the neutrophil count in the C. reflexa-administered group was within the normal range when compared to the animals in group II. (20)

Glucosides of 2H-pyran-2-one, cuscutarosides A and B, Seven-Oxo-β-sitosterol-3-O-β-d-glucopyranoside,7-(β-d-glucopyranosyloxy) 7β-methoxy-β sitosterol 3-O-β-glucopyranoside-6-methylThe entire plant of Cuscuta reflexa was used to isolate the following compounds: -2H-pyran-2-one, 4-hydroxyacetophenone, piceoside, scrophenoside B, methyl 4,5-di-O-caffeoylquinate, methyl 3,5-di-O-caffeoylquinate, methyl-3,4-di-O-caffeoylquinate, (6S,9R)-roseoside, methyl trans-p-hydroxycinnamate, ethyl trans-p-hydroxycinnamate, and N-trans-feruloyltyramine. Porcine pancreatic lipase (PPL) was used to assess the isolates' antiobesity properties, while rabbit platelets stimulated by collagen, thrombin, platelet activating factor (PAF), or arachidonate (AA) were used to test for antiplatelet aggregation activity. The PPL inhibiting activity of 7β-Methoxy-β-sitosterol 3-O-β-glucopyranoside was modest. Scrophenoside B, cuscutaroside A, and its acetylated derivative (1a) exhibited mild inhibitory efficacy against collagen-induced rabbit platelet aggregation. Additionally, compound 1a demonstrated inhibitory efficacy against AA-induced rabbit platelet aggregation. (21)

Following chemical analyses of the Cuscuta reflexa stem, several compounds were isolated, including 3', 4'-dimethoxy-1-phenyl-1α, 2-ethanediol, tridecanyl palmitate, palmitic acid, n-pentatriacontane, n-triacont-21, 27-dien-1-ol, kaempherol, chlorogenic acid, 5, 7-dimethoxyapigenin, and quercitin. Using spectroscopic, chemical, and physical techniques, the chemical structures were determined. The 3', 4'-dimethoxy-1-phenyl-1α, 2-ethanediol's antibacterial activity was assessed against Candida albicans, Candida kefyr, Escherichia coli, Pseudomonas aeruginosa, and Staphylococcus aureus. Significant activity was also found using the zone of growth inhibition (mm) and the microdilution broth assay. (22)

This study examined the impact of Cuscuta reflexa on rats with streptozotocin-induced diabetes and hypertension that was experimentally produced in healthy rats. In rats, angiotensin II (150 ug/kg, i.p.) caused hypertension. Rats were given 50 mg/kg of streptozotocin to induce diabetes. The animals were split up into different groups, and the effects of ethanolic extracts of Cuscuta reflexa were examined in rats with streptozotocin-induced diabetes and rats with Ang-II-induced hypertension. Noninvasive blood pressure (NIBP) was measured with an AD device. The impact of extracts on oxidative indices such as SOD, CAT, LOP, and NO was investigated. Cuscuta reflexa extract exhibits strong antihypertensive and antidiabetic effects in rats with streptozotocin-induced diabetes and in rats with experimentally generated hypertension. (23)

bioactive chemical substances, including n-hexadecanoic acid, phytol, vitamin E, phenol, 2,4-bis (1,1)-dimethyl ethyl, 2,3 dihydro benzofuran, 9,12,15-octadecatrienoic acid (Z, Z), stigmasterol, benzofuran, and others, were found in the plant's GC MS profile. Antioxidant, antibacterial, anti-inflammatory, antidiabetic, antipyretic, anticancer, hepatoprotective, anti-cancerous, antihypertensive, antihair loss, and anti-arthritis activities are among the documented benefits of the identified bioactive components. (24)

After being hydro-distilled from dried seeds, the essential oil was examined for anti-inflammatory and chemical profiling properties. Mice that were given TPA were used for in-vivo activity. Mice ear pinna homogenate was used to study biochemical parameters and oxidative stress. GC and GC-MS studies were used for chemical analysis, and the main components were b-Bisabolene and Hexahydro Farnesyl Acetone, as well as cis-chrysanthenyl acetate, caryophyllene oxide, and carotol. RAW 264.7 macrophages were used to measure the in-vitro activity of cell viability, which revealed no decrease in viable cells in the treated culture. Through the inhibition of pro-inflammatory cytokines (IL-1b, IL-6, and TNF-a), it dramatically lowers inflammation in vivo. By coming into contact with the inflammatory mediators (cytokines), Cuscuta reflexa seed essential oil was discovered to be useful in the treatment of inflammation. (25)

bioactive substances, such as (2S)(β-D-galactopyranosyloxy) -3--2-propyl nonanoate (hexanoyloxy), Isorhamnetin-3-O-glucoside, 4-O-β-D-glucosyl-4-coumaric acid, and 7-(α-D-glucopyranosyloxy)Astragaloside derivative, salicylic acid, oleanolic acid, citric acid, pinellic acid, quinic acid, 13S-hydroxyoctadecadienoic acid, -2,3,4,5,6-pentahydroxyheptanoic acid, and caffeic acidIn the 80% hydroethanolic (HE) extract, -3-glucoside was found. The 80% HE extract had the highest TPC (186.19 ± 2.15 mg GAE/g DE) and TFC (106.50 ± 1.68 mg RE/g DE) among the various extracts (aqueous, 20–80% HE, and pure ethanolic). TPC, TFC, DPPH radical scavenging (IC = 60.64 ± 1.74 µg/mL), and TAP activity (235.96 ± 1.33 mg AAE/g DE) of 80% HE extract were shown to be strongly correlated. An IC of 71.84 ± 1.06 and 57.25 ± 1.40 µg/mL, respectively, indicated the highest levels of α-amylase and α-glucosidase enzyme inhibition in the same extract. To investigate the potential function of the discovered phytochemicals, molecular docking was used. The detected bioactives may interact with α-glucosidase and α-amylase, according to binding affinity data and interaction patterns. Additionally, the energies of the FMOs, HOMO-LUMO-E gaps, IP, MEP, and intramolecular charge transfer were described. These results supported the use of C. reflexa in the development of functional foods and nutra-pharmaceuticals. (26)

to assess the biodynamic qualities of the extracts of "Amarbel" (Cuscuta reflexa, or "CRA") and "Cocculus hirsutus, or "CHP" An estimate of the total phenolic content (TPC) was made. The extracts' different polyphenol components were eluted using UHPLC. Spleenocyte proliferation assay for Th1/Th2 immunomodulatory capacity by flow-cytometer, intracellular ROS scavenging activity in RAW 264.7 cell line, and free radical scavenging (FRS-DPPH and ABTS) were evaluated. TPC was measured in CHP (35–48 mg GAE/mg) and CRA (105–159 mg GAE/mg). The presence of polyphenols in the CRA and CHP extracts was verified by the chromatographic peaks. To the greatest extent feasible, the extracts' UV spectra have been linked to specific polyphenols. CRA-K (DPPH ¼22.7; ABTS ¼12.0 mg/ml) had a much lower FRS (IC50) than CHP-K (DPPH ¼70.4; ABTS ¼ 50.2 mg/ml). (27)

III. CONCLUSION

The parasitic plant Cuscuta reflexa, also known as dodder plant, amarbel, or akashabela, is a member of the Convolvulaceae family. It is a rootless, perennial, leafless climbing parasitic twining herb that uses a special organ called the haustorium to take food from its host plant. This review article compiles a detailed habitat, ethno-medicinal uses, chemical constituents, and pharmacological uses of Cuscuta reflexa from various classical Ayurvedic literature as well as contemporary research journals. It covers the plant's antihypertensive, antidiabetic, antioxidant, hair growth-promoting, antimicrobial, spasmolytic, antitumor, anti-arthritic, nephroprotective, antiviral, anti-inflammatory, and antipyretic effects.

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