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Review on Ethnobotany and phytochemistry of *Cassytha filiformis*

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ABSTRACT

Traditional medicine has a lot to give towards the world's health, especially now that limits to conventional pharmacology has occurred. New scientific methodologies may spark a rebirth in global health research and development if rich and developing countries pooled their research capacities with inequitable collaborations. The Cassytha Filiformis has many medicinal uses. It is a parasite plant that has been used for medicinal purposes and other ornamental purposes in many parts of the world, and has found employment in Siddha, European, Ayurveda and Chinese folk medicine. In this review, the ethnobotany, phytochemistry and pharmacological benefits of Cassytha filiformis are discussed.

INTRODUCTION

Cassytha filiformis is commonly called Love Vine in English and is a parasite plant that is distributed in many parts of the world, including Central and South America, Africa, Asia and the Pacific islands, mostly in coastal regions [1]. The plant belongs to the Lauraceae family, and the genus Cassytha has 20 species. This parasitic plant's main host trees are Mango, Citrus, Avocado, Nutmeg, Clove, etc. It has a minimum amount of chlorophyll. It clings to woody plants for food, water and nutrition. In Latin, one who 'draws, drinks and drains from others' is called a 'Haustor'; so, these parasitic plant roots are called 'haustoria'. This haustorium will penetrate the host plant epidermis, entering into the xylem and phloem to absorb water and nutrition. The seeds can be spread between continents by ocean currents, as well as by birds and wind [2].

Cassytha filiformis has many medicinal uses in folk medicine. There are many studies done for phytochemical screening and the found phytochemicals include alkaloids, flavonoids, etc., as well as a number of aporphines. Many pharmacological activities of this plant have been identified so far, i.e. Vasorelaxant, Anti-Diabetic, Anti-piratic, Anti-inflammatory, Anti-typomania, etc. [3]. In this review, ethnobotanical, phytochemical and pharmacological information has been gathered from the investigations conducted so far and subsequently discussed so as to generate a good understanding of the plant and its pharmacological potential.

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Literature survey methods

The data collected for this review were obtained from various sources, including: research articles, review articles, text books, botanical website sources. The articles were obtained from PubMed, Google Scholar, Research Gate and botanical drug repository websites. This survey has been considered the works carried out till 31 Dec 2021 by using the keywords, *Cassytha filfiormis*", "Phytochemicals present in *Cassytha filiformis*", "Isolation of alkaloids from *Cassytha filiformis*", "Biological properties of *Cassytha filiformis*".

Taxonomy

Domain: Eukaryota
Kingdom: Plantae
Subkingdom: Tracheobionta (vascular plants)
Phylum: Spermatophyta (seed plants)
Subphylum: Angiospermae
Division: Magnoliophyta (Flowering plants)
Class: Magnoliopsode (Dicotyledonae)
Subclass: Magnolilidae
Order: Laurales
Family: Lauraceae
Genus: Cassytha
Species: *Cassytha filiformis*

Figure 1. *Cassytha filiformis*

Morphology

Cassytha filiformis is generally considered a parasite plant belonging to the Lauraceae family, although, sometimes, this plant was ascribed in its own family: Cassythacea. The Lauraceae Family is the sole family for the parasitic genus. *Cassytha filiformis* is a climbing, vine-like, twinning auto parasitic plant.

Stems

Stems are green to orange color, filiform and its glabrous are long and threadlike, measuring 3-8 m in length, growing in a triangle-like on hosts.

Leaves

Leaves modified to minute scale.

Flowers

Flowers are Bisexual flowers, small, sessile and spicate.

Fruit

The fruit is smooth and fleshy, spherical and 7 mm diameter with a single seed.

Germination

Germination will happen on the ground only. After germination, many small adventitious roots will grow since a main root will not. With the help of these adventitious roots, the plant can grow up to 30-meter length and survive for 2 months without a host.

Host plants

Its hosts are a wide range of vegetative plants, including trees and shrubs (Neem, citrus, avocado, etc).

Development and spreading

Once the host contact is established, the base will dry up and the plant will lose the connection with the ground and will be further dependent on the host plant for water, food and nutrition. The haustoria will penetrate the host plant part (either stem or leave) and start absorbing water and nutrients. The host plant will eventually be suppressed and sometimes killed. With time, the haustoria will flower and seed – the seed being spread by the wind, by water or by birds [2,4,5].

Worldwide distribution

The worldwide distribution of the plant is shown in Figure 2. As per this map, the plant is available on the majority of the continents, barring Europe and Antarctica.

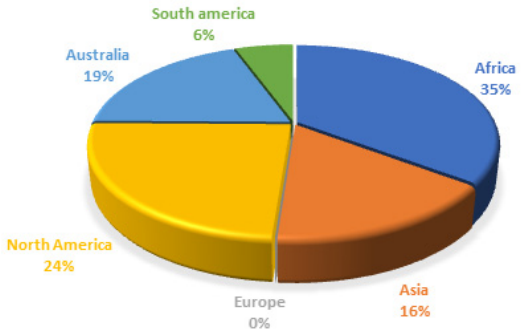


Figure 2. Worldwide distribution

The 35% of Africa includes the following countries: Benin, Botswana, Burkina Faso, Burundi, Cameroon, Chad, Comoros, Congo, Democratic Republic of the Congo, Republic of the Congo, Côte d'Ivoire, Egypt, Equatorial Guinea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mali, Mauritius, Rodrigues, Mayotte, Morocco, Mozambique, Namibia, Niger, Nigeria, Réunion, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Tanzania, Togo, Uganda, Zambia, Zimbabwe.

The 16% of Asia includes the following countries: Bangladesh, Borneo, British Indian Ocean Territory, Brunei, Cambodia, China, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam, Yemen.

The 24% of North America (and possessions) includes the following countries: Anguilla, Antigua and Barbuda, Bahamas, Barbados, Belize, British Virgin Islands, Cayman Islands, Costa Rica, Cuba, Curaçao, Dominican, Republic, Grenada, Guadeloupe, Guatemala, Haiti, Honduras, Jamaica, Martinique, Mexico, Netherlands Antilles, Nicaragua, Panama, Puerto Rico, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, Turks and Caicos Islands, U.S. Virgin Islands, United States, American Samoa.

The 19% of Australia includes Oceania: Australia, Christmas Island, Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Nauru, New Caledonia, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Pitcairn, Samoa, Solomon Islands, Timor-Leste, Tokelau, Tonga, Tuvalu, Vanuatu, Wallis and Futuna.

The 6% of South America includes the following countries: Bolivia, Brazil, Colombia, French Guiana, Guyana, Suriname, Venezuela.

This data is captured from the CABI-Invasive Species compendium.

Ethnobotany

Traditional use in Africa

In Africa, this plant is called Luangaiala, Omoniginigin, Nooienshaar. This plant is in use for treating cancer and African trypanosomiasis. In southern Africa, it is employed

for washing the hair to promote hair growth and to destroy vermin. In Benin, it is applied to treat hemorrhages treatment. In southeastern Nigeria, the aqueous extract of the *Cassytha filiform* is used to treat diabetes and liver disorders [6-8].

Traditional use in America

In English, it is named as Love-Vine, Laurel Dodder, Devils Gut. In South America, it is called Cipo de Chumbo Liane Amite, Corde a Viaion. In USA Hawaii, this plant is named Kauna'oa Malolo and used for making garlands for decoration, human ornaments for ceremonies and for thatched roof construction [6].

Traditional use in Asia

In India, it is called Aavali and Amarbeli. In Ayurveda, *Cassytha filiformis* is used as a substitute for Cuscuta. In Sanskrit, this plant powder was prescribed to increase semen secretion, and the stems are used to treat epilepsy. The plant powder is also mixed with sesame oil for strengthening hair, and the whole plant is still used for treating piles and bilious disorders. The aerial roots and pendulous branches are, in addition, used for treating snakebite in Maharashtra, by the Thakar tribes [3].

Traditional use in Australia

In Australia, this plant is named Toddler Laurel, False Doddler, Bush-Doddler, and in Fiji, it is called Boa Lawa-Lawa. It is used to treat jellyfish stings [3].

Multiple applications in world

The whole plant paste can be used for paper making, however, the plant is considered an invasive pest since it kills the host and can transmit plant pathogens [9]. The juice of these vines was also used anciently to reduce labor pain and to quicken labor time, and was employed to lubricate the birth canal [7].

Table 1. Phytochemicals screened by Qualitative analysis

Phytoconstituents name	Test Method	Result criteria	Results observed				
			Pet. Ether	Ethyl acetate	Chloroform	Methanol	Aqueous
Alkaloid	Dragendoff's reagent Test	Formation of Orange red precipitate	+	+	+	+	+
	Mayer's Reagent Test	Formation of Creamy white precipitate	+	+	+	+	+
	Wagner's Reagent Test	Formation of Brown precipitate	+	+	+	+	+
Flavonoids	NaOH Test	Formation of Yellow colouration and turns colourless while adding HCl	+	+	+	+	+
	Shinoda Test	Formation of Pink colour	+	+	+	+	+
	Amyl alcohol Test	Formation of Yellow colour	+	+	NA	+	+
Tannins	Lead acetate Test	Formation of Buff precipitate	+	+	-	+	+
	Bromine water Test	Formation of Blue colour	+	+	-	+	+
	Borntrager's reagent Test	Formation of Green colour	+	+	-	+	+
Saponins	Frothing Test	Formation of Persistent froth	+	+	+	+	-
	Haemolysis Test	Formation of Haemolysis	+	+	NA	+	-
Terpenoids	Salkowski's Test	Formation of Brown colour at interface	+	+	-	+	-
Steroids	Liebermann-Burchard's reagent	No green colour formation	+	+	+	+	-
Phenolic Compound	$FeCl_3$ Test	Formation of Greenish colour	+	+	+	+	-

+ Present, - Absent, NA – not applicable

Physiochemical properties

The physiochemical properties of the plant have been studied and evaluated by a number of researchers.

Qualitative analysis for Phytochemicals

In [4,10], various solvent extracts of *Cassytha filiformis* were screened for the presence of alkaloids, flavonoids, saponins, tannins, carbohydrates, phenols, etc., by using qualitative measurement methods. The results are listed in Table 1.

Quantitative analysis of Phytochemicals

Quantitative analysis of *Cassytha filiformis* was undertaken in [1], and the results are listed in Table 2.

Table 2. Phytochemicals screened by Quantitative analysis

Phytochemical presence	Quantity resulted
Alkaloid	3.18%
Flavonoid	3.70%
Saponin	3.48%
Tannin	10.47%
Phenol	5.233 mg/l

Physical content

Physical content (ash value, moisture content, acid insoluble ash value, swelling index, bitterness value, crude fiber, fixed oil) was assessed in [11], and are listed in Table 3.

Table 3. Physical content

Name of the Physical content	Quantity resulted
Moisture Content	5.5%
Ash Value	17%
Acid insoluble ash value	1%
Swelling index	165%
Bitterness value	0.23%
Crude fiber	22.4%
Fixed oil	1.60%

Phytochemistry

Phytochemical identification and isolation from *Cassytha filiformis* is subject to ongoing research. Aporphine alkaloids such as Cassythine, Neolistine, dicentrine, etc. have been identified in [6,12]. These are listed in Table 4.

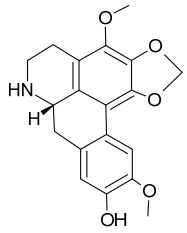
Chemical structure

The chemical structure of the Aporphine alkaloids are as follows:

Cassyfiline

IUPAC Name: (12S)-7,17-dimethoxy-3,5-dioxa-11 aza-pentacyclo[10.7.1.02,6.08,20.014,19]icosa-1,6,8(20),14,16,18-hexaen-16-ol.

Structure



Ocoteine

IUPAC Name: (12S)-7,16,17-trimethoxy-11-methyl-3,5-dioxa-11-azapentacyclo[10.7.1.02,6.08,20.014,19]icosa-1,6,8(20),14,16,18-hexaene.

Structure

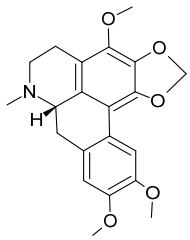


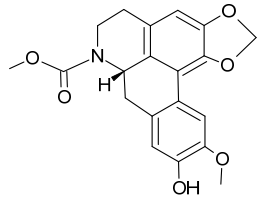
Table 4. Phytoconstituents

Name of the Phytochemical	Type of Phytochemical	Molecular formula	Molecular weight	Biological use reported for this phytochemical
Cathafiline	Aporphine alkaloid	$C_{20}H_{19}NO_6$	369.4	Anti-platelet action, Vaso relaxing
Cathaformine	Aporphine alkaloid	$C_{21}H_{21}NO_7$	399.4	Anti-platelet action, Vaso relaxing
Actinodaphine	Aporphine alkaloid	$C_{18}H_{17}NO_4$	311.3	Cytotoxic, Anti-trypanosomal, Anti-platelet action, Vaso relaxing
Predicentrine	Aporphine alkaloid	$C_{20}H_{23}NO_4$	341.4	Anti-platelet action, Vaso relaxing
Ocoteine	Aporphine alkaloid	$C_{21}H_{23}NO_5$	369.4	Anti-platelet action, Vaso relaxing, α1-adrenoceptor antagonist
Cassyfiline	Aporphine alkaloid	$C_{19}H_{19}O_5$	341.4	Cytotoxic, Anti-trypanosomal
Neolistine	Aporphine alkaloid	$C_{19}H_{17}NO_4$	323.3	Cytotoxic, Vaso relaxing
Dicentrine	Aporphine alkaloid	$C_{20}H_{21}NO_4$	339.4	Cytotoxic, Anti-trypanosomal, Vaso relaxing
Quercetin 3-O-robinobiside	flavonoid	$C_{27}H_{30}O_{16}$	610.5	Anti-oxidant
Quercetin 3-O-rutinoside	flavonoid	$C_{27}H_{30}O_{16}$	610.5	Anti-oxidant
Quercetin 3-O-galactoside	Phenolic compound	$C_{21}H_{20}O_{12}$	464.4	Anti-Oxidant
Kaempferol 3-O-robinobiside (Biorobin)	Flavonoid	$C_{27}H_{30}O_{15}$	594.5	Anti-cancer
Isohamnetin 3-O-rutinoside (Narcissin)	Flavanol glycoside	$C_{28}H_{32}O_{16}$	624.5	Anti-Oxidant
Isohamnetin 3-O-robinobioside	Flavanol	$C_{28}H_{32}O_{16}$	624.5	Anti-oxidant
9,12-Octadecadie-noic acid (Z,Z)-2,3 -dihydroxypropyl ester, acid (Z,Z)-2,3 -dihydroxypropyl ester	Ester	$C_{21}H_{38}O_4$	354.5	antipyretic, anticonvulsant, antiseptic and analgesic [10]
Didodecyl phthalate	hydrocarbon	$C_{32}H_{54}O_4$	502.8	Anti-microbial, anti-fungal
5-Stigmastan-3,6-dione	Steroidal Saponin	$C_{29}H_{48}O_2$	428.7	Inhibition of cholesterol absorption
Hexatriacontane	Steroidal Saponin	$C_{36}H_{74}$	507	Reducing cholesterol levels
Campesterol	Steroidal Saponin	$C_{28}H_{48}O$	400.7	Reducing cholesterol levels

Cathafiline

IUPAC Name: methyl (12S)-16-hydroxy-17-methoxy-3,5-dioxa-11-azapentacyclo[10.7.1.02,6.08,20.014,19]icosa-1(20),2(6),7,14,16,18-hexaene-11-carboxylate.

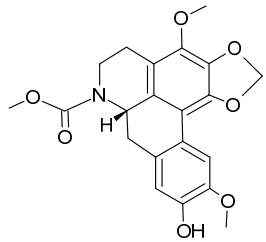
Structure



Cathaformine

IUPAC Name: methyl (12S)-16-hydroxy-7,17-dimethoxy-3,5-dioxa-11-azapentacyclo [10.7.1.02,6.08,20.014,19]icosa-1,6,8(20),14,16,18-hexaene-11-carboxylate.

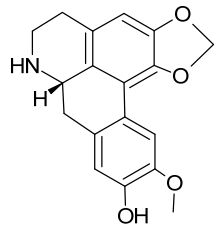
Structure



Actinodaphine

IUPAC Name: (12S)-17-methoxy-3,5-dioxa-11-azapentacyclo[10.7.1.02,6.08,20.014,19]icosa-1(20),2(6),7,14,16,18-hexaen-16-ol.

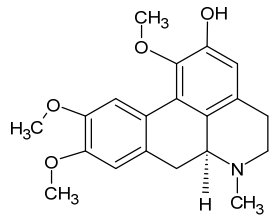
Structure



Predicentrine

IUPAC Name: (6aS)-1,9,10-trimethoxy-6-methyl-5,6,6a,7-tetrahydro-4H-dibenzo[de,g]quinolin-2-ol.

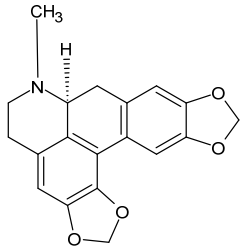
Structure



Neolistine

IUPAC Name: (12S)-13-methyl-5,7,19,21-tetraoxa-13-azahexacyclo[10.10.1.02,10.04,8.016,23.018,22] tricosa-1(23),2,4(8),9,16,18(22)-hexaene.

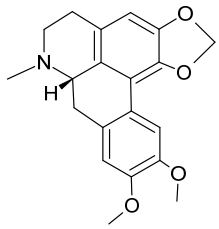
Structure



Dicentrine

IUPAC Name: (12S)-16,17-dimethoxy-11-methyl-3,5-dioxa-11-azapentacyclo[10.7.1.02,6.08,20.014,19] icosa-1(20),2(6),7,14,16,18-hexaene.

Structure



The displayed and described chemical structures are derived from the website: https://pubchem.ncbi.nlm.nih.gov.

Pharmacology

Various solvent extracts of the *Cassytha filiformis* have been tested for biological activity using both *in vivo* and *in vitro* methods. Identified biological activities are listed below.

Bioactivities reported by the application of *in vitro* methods

Anti-oxidant activity

Antioxidant activity was determined for methanol, ethyl acetate and hexane extracts, using DPPH assay against Butylated hydroxytoluene as standard. The methanolic extract of *Cassytha filiformis* showed more anti-oxidant activity [6]. The study [13] evaluated methanol extracts of *Cassytha filiformis* via DPPH and FRAP assays, with ascorbic acid as standard. Maximum anti-oxidant activity was evident at 400 µg/mL concentration.

Anti-cancer properties-cytotoxic assay

In [14,15], cytotoxicity was evaluated for the crude extract and the isolated compounds: neolistine, dicentrine, cassythine, actinodaphine and camptothecin, using colorimetric assays, i.e. tetrazolium salt MMT and WST-1, with HL-60, mouse 3T3 fibroblasts, human HeLa and the melanoma Mel5 cell line. The crude extract and actinodaphine, casythine, dicentrine and neolistine compounds were found to display cytotoxic properties on Hela, Mel-5 and HL 60 cancer cells and 3T3-non-cancer cell lines.

Anti-Trypanosoma activity

In [14,15], anti-Trypanosomal activity was evaluated for the crude extract and the major isolated compounds: dicentrine, cassythine, actinodaphine, suramin, diminazene aceturate, by application of the Alamar blue test, using *Trypanosoma brucei* bloodstream. The researchers found that the crude is very active on *Trypanosoma brucei*, while the isolated compounds: actinodaphine, dicentrine and cassythine are active.

Anti-Candidal potential

Anti-Candidal activity was evaluated in [16] for aqueous, methanol, and n-hexane extracts of *Cassytha filiformis* on *Candida albicans* by applying the Agar dilution technique. The investigators noted that the aqueous and methanol extracts had significant anti-Candidal properties.

Larval cytotoxic study

A larval cytotoxic study was undertaken in [17] for a hydroethanolic extract of *Cassytha filiformis,* using brine shrimp larvae, the extract was found to be nontoxic.

Bioactivities reported by *in vivo* studies

Reversible hepatotoxicity

In [12], reversible hepatotoxicity was assessed for ethanol extracts of *Cassytha filiformis,* using mice. Herein, the sleeping pattern is based on the liver function, and the sleep onset time, and duration of sleep were evaluated against Propofol as standard. The researchers found that *Cassytha filiformis* extracts influenced the sleeping time. Moreover, increasing levels (within ranges) of Alanine Transferase and Alkaline Phosphate levels were observed with *Cassytha filiformis* administration, indicating liver cell damage. Such levels decreased to normal when *Cassytha filiformis* administration (2.5 mg/kg to 10 mg/kg) ceased. This study revealed reversible *hepatotoxicity activity.*

Anti-hypertension

The effects of ethanol extracts of *Cassytha filiformis* on hypertension-induced rats were evaluated in [18]. Two types of hypertension: endocrine hypertension and oxidative-stress hypertension were the subjects of the experiment. Accordingly, endocrine hypertension was induced by a prednisone-salt combination, while oxidative stress hypertension was induced by prednisone-salt combination and L-Nitro Arginine Methyl Ester. In the work, a *Cassytha filiformis* ethanol extract of 5 mg/kg dose was discovered to be have an antihypertension effect according to SBP, DBP and MAP (Systolic blood pressure diastolic blood pressure and mean arterial pressure) results.

Analgesic, anti-pyretic, anti-inflammatory activities

In [10], analgesic, anti-pyretic and anti-inflammatory activities of chloroform and methanol extracts were assessed using rats. For the analgesic activity, the tail immersion

method and Haffner's tail clip method were applied, and dichlofenac sodium and extract were found to be equally effective. As to anti-Pyretic Activity, extract administration brought about increased reaction in elevated temperature in paracetamol studies. Regarding anti-inflammatory activity, Paw edema was induced by carrageenan, and diclofenac sodium and extract administration were seen to decrease the inflammation and odema [10].

Anti-microbial study

An anti-microbial study was undertaken in [1,7] for methanol, ethyl acetate and n-hexane extracts, using 24 hour broth cultures of *Escherichia coli, Staphylococcus aureus* and *Salmonella spp.* The outcome of the work was that the methanol extract displayed anti-microbial effects on *Staphylococcus aureus* and *Salmonella spp.* [1]. Moreover, *Cassytha filiformis* Linn has anti-microbial activity against *Candida albicans, Staph. aureus, E. coli*, and *Ps. Aeruginosa* [1,7].

Anti-diabetic activity

An anti-diabetic study using an 80% methanolic extract of *Cassytha filiformis* on albino mice was done by the researchers of [13]. This induced diabetes with alloxan monohydrate against Glibenclamide as standard. The *Cassytha filiformis* extract dose at 600 mg/kg was shown to reduce the fasting blood sugar levels in mice. In addition, it has a tolerance range of 2000 mg/Kg orally.

Effect of pregnancy and fetal development

The study of [7] with regard to pregnancy and fetal development was conducted for a butanol fraction of *Cassytha filiformis,* using fertilized mice. The mice were treated in the first, second, and third trimesters with less (2.5 mg/kg) to higher (10 mg/kg) doses. The researchers observed that the butanol fraction of *Cassytha filiformis* produced infertility and slowed pregnancy development, and generated fetal defect [7].

Hepatoprotective activity

In [19], researchers investigated the hepatoprotective activity of a methanol fraction of *Cassytha filiformis* on CCl_4 induced hepatotoxicity on rats against Silymarin as standard. The results indicated that the methanol extract-treated group showed significantly reduced levels of plasma enzyme including SGOT, SGPT, ALT and bilirubin, hence confirming the hepatoprotective effect of methanol extract of *Cassytha filiformis*.

Anti-malarial

The Anti-malarial study of [20] involved an ethanolic extract of *Cassytha filiformis,* and used mice that were infected by *plasmodium berghei*. The parasite load was measured in this study through RBC, WBC counts, PCV and Hb concentration. Herein, *Cassytha filiformis* administration (especially higher dose 400 mg/kg) in the standard form p-Alaxine recovered the anemic condition caused by the malarial infection, by improving the RBC, WBC counts, Hb and PCV concentration.

Acute and delayed toxicity

The study laid out in [17] evaluated the acute and delayed toxicity of defatted ethanolic extracts of *Cassytha filiformis* using mice. The acute toxicity was measured by LD_{50} from parameters such as motoric activity decrease, diarrhea and respiratory alteration after the administration of a single dose of the extract. According to the derived data, *Cassytha filiformis* is toxic. Delayed toxicity was measured by food and water intake alteration and decrease in body weight. In this case, again *Cassytha filiformis* is toxic.

To assess the sub-chronic toxicity, another study using rats, employed an aqueous extract of *Cassytha filiformis*. The organ toxicity was checked by measuring the body weight, organ weight, hematological and plasma biochemical parameters. The researchers found that normal dose levels of aqueous extract do not produce severe toxicological effects. However, there are some elevations found in cholesterol levels, heart, and lungs weight in some animals reported in the same study [17].

Subacute toxicity

Subacute toxicity was evaluated for a hydroethanolic extract of *Cassytha filiformis* using rats, in [17], and the researchers saw no liver and kidney structural alterations, but some disorders were evident in the hematological and biochemical parameters that indicate high doses (800 mg/kg) might moderately affect some of the functions [17].

Diuretic activity

In [21], a comparative study evaluated *Cassytha filiformis* and *Cuscuta reflexa* regarding diuretic activity. Alcoholic and aqueous extracts were used, and the study was conducted in Wistar rats. In it, heightened sodium and potassium excretion were noted, with *Cassytha filiformis* extract showing greater diuretic activity.

Vaso relaxing activity

Vasorelaxation activity was evaluated using IC_{50} activity and the excised aortas of Sprague-Dawley rats. Therein, extracts of *Cassytha filiformis* were assessed as inhibiting phenylephrine-induced contraction [22].

Green synthesis using *Cassytha filiformis*

An aqueous extract of *Cassytha filiformis* was used to generate silver nanoparticles in [23], as well as Cu nanoparticles. The experiment was considered to be successful. The CUNps were then treated with Mgo to create a degenerated CU/Mgo composite.

DISCUSSION

Multiple botanical, phytochemical, pharmacological studies have been conducted on *Cassytha filiformis* and indicate that it has both positive and negative pharmacological attributes. In research work, many phytochemicals have been identified and isolated. Currently, the plant is the source of a cancer treatment in Africa, and cytotoxic studies are proving its anti-cancer behavior through the presence of aporphines.

CONCLUSION

Many studies have been undertaken on crude extracts and some isolated compounds of *Cassytha Filiformis* so as to establish its pharmacological activities. Such work has indicated that the plant holds anti-platelet, diuretic, anti-diabetic, anti-Trypanosome, anti-microbial and vaso relaxing properties. Still, further studies need to be conducted using different models to extend understanding of its pharmacological benefits.

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