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Review Article

A Review of Phytoconstuents, Pharmacological Activity Along with its Traditional and Medicinal Use of The Plant Ricinus Communis

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ABSTRACT

The plant Ricinus communis is a medicinal herb which is belong to the family of Euphorbiaceae. In order to maintain a healthy human life, medicinal plants are essential. There are over 300 genera and 7,500 species in the broad family Euphorbiaceae. The castor bean plant, Ricinus communis L., provides the most traditional and medical benefits for a population free from disease. The plant is locally known as castor oil plant by the local people and it is found in South Africa, India, Brazil and Russia. The plant has various phytoconstuents alkaloids, flavonoids, terpenoids, phenols etc. which further help to find out its pharmacological activity. Activity like antioxidant, anti-inflammatory, analgesic, Anti-microbial and anti-fungal. The purpose of review article is to document the latest data like medicinal use traditional use Phytoconstuents, pharmacological activity.

INTRODUCTION

Herbal plants used from ancient time for the treatment of various diseases and used them for different type of therapy. In the modern days this herb is also use as various source of phytoconstuents like alkaloids, flavonoids, terpenoids, phenols, etc. Ricinus communis is one of the herbal plants which belong to the family Euphorbiaceous is also known as Castor oil plant in English and as Arand, Erand, Andi, and Rend in Hindi. Sans: Gandharvahasta. Vatari, Rubu, Urubu, Pancangula, Citra: Assam: Eda, Era; Bengali: bherenda; Gujarati: erandio, erando. Kanada: haralu, oudala, gida; Kashmiri: Aran. Banangir.; Malyalam: Avanakku; Marathi: Errand. Ricinus communis is a tropical plant. Castor bean, which is extensively distributed throughout the world.[1] The plant is native to India and cultivated. Throughout the country in gardens and fields Also grows wild in waste areas. Ricinus Communis is a little wooden tree that grows to around 6 meters tall and located in South Africa, India, Brazil and Russia. stems of Ricinus

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communis have anticancer, antidiabetic, and antiprotozoal. activity.[2] India has a rich diversity of medicinal as well as aromatic plants and holds a unique place in the world in the traditional system of medicine. Socioeconomic uses of plants, i.e. medicinal and, other than medicines have been reported in many studies6-9. Plant based traditional knowledge has become a recognized tool in search of drugs and neutraceuticals10. Today, according to World Health Organization as many as 80% of the world's people depend on traditional medicine for primary health care needs. The herbal medicines are comparatively safer than synthetic drugs [3,4].

Taxonomical Classification [5]

Kingdom	**Plantae**
Order	Malpighiales
Family	Euphorbiaceae
Subfamily	Acalyphoideae
Genus	Ricinus
Species	*R. communis*
Tribe	*Acalypheae*
Sub Tribe	*Ricininae*

Figure 1: - Picture Of Ricinus Communis L. Plant.

Ricinus Communis is a little wooden tree that grows to around 6 meters tall and the leaves are alternate and purplish in colour. Flowers are monoecious, large, arranged on the thick rachis of an oblong. Seeds are ovoid, flattened and 5/3 inch long [6,7].

Botanical Distribution

The plant is native to India and cultivated. Throughout the country in gardens and fields Also grows wild in waste areas. Ricinus Communis is a little wooden tree that grows to around 6 meters tall and located in South Africa, India, Brazil and Russia. stems of Ricinus communis have anticancer, antidiabetic, and antiprotozoal activity [8].

Medicinal Use

- The plant is helpful to kill cancer cells.
- The castor oil is use to treating constipation.
- Castor oil was used for medicinal purposes like treating eye irritation and inducing labor in pregnancy.
- The plant has antimicrobial activity and has been used to treat several ailments.
- Its leaf, root, and seed oil are used in inflammation treatment, liver disorders, hypoglycemic, and as a laxative.
- The plant is also used in African folk medicine in the treatment of warts, cold tumors, and indurations of mammary glands, corns, and moles [9,10,11].

Traditional Use –

Local people used this plant as to treat constipation and it also help to treat eye irritation. It is also helpful to treat fever, cold and also help in inflammation.

Phytochemicals-

Alkaloids-

They have used to treat various disorders which includes inflammation, allergies, cancer, diabetes, and many others [12].

Tannins-

Tannins are used in the clarification of wine and beer, as a constituent to reduce viscosity of drilling mud for oil wells, and in boiler water to prevent scale formation.

Glycosides-

Cardiac glycosides improve cardiac output in people who have heart failure.

Flavonoids-

including anticancer, antioxidant, anti-inflammatory, and antiviral properties. (13)

8 Villela A., van Vuuren M.S., Willemsen H.M., Derksen G.C., van Beek T.A. Photo-stability of a flavonoid dye in presence of aluminium ions. *Dyes Pigment.* 2019; 162:222–231.

Terpenoids-

Terpenoids have been found to be useful in the prevention and therapy of several diseases, including cancer, and also to have antimicrobial, antifungal, antiparasitic, antiviral, anti-allergenic, antispasmodic, antihyperglycemic, anti-inflammatory, and immunomodulatory properties (14)(15).

Pharmacological activities -

Anti-diabetic activity

Ethanolic extract of root of plant significantly decreased the fasting blood glucose of the diabetic rats from an initial level of 386 ± 41 mg/dl to 358 ± 33, 293 ± 28, 191 ± 25, 133 ± 29, 96 ± 20 and 79 ± 16 mg/dl on 2nd, 5th, 7th, 10th, 15th and 20th day, respectively. The fasting blood glucose became normal by 20th day. Ethanolic extract of root also reduces the glucose level in normal as well as diabetic rats in a dose dependent manner up to 500mg/kg body weight. But the higher doses up to 2000 mg/kg do not show the dose dependent effect [16].

Anti-Microbial and Anti-Fungal

The secondary infections in the immunocompromised oral cancer cases were due to bacterial and fungal species. The co-administration Ricinus communis with the immunosuppressant drugs for the prevention of infection against oral cancer treatment patient show significant result [17].

Insecticidal activity: - The insecticidal value of the castor oil plant (Ricinus communis) in controlling the termites which damage the wood of Mangifera indica and Pinus longifolia was examined. All treatments significantly reduced weight loss in wood pieces exposed to termites [18]

Antioxidant activity:

The DPPH (1,1-diphenyl-2- picrylhydrazyl)-mediated in vitro study reveals that gallic acid, quercetin, gentisic acid, rutin, epicatechin and ellagic acid are the major phenolic compounds responsible for the antioxidant activity of the dry leaves of Ricinus communis Linn [19].

Anti-Implantation activity

The ether soluble portion of the methanol extract of Ricinus communis var. minor possesses anti-implantation, ant conceptive and estrogenic activity in adult female rats and rabbits when administered subcutaneously at a dose up to 1.2g/kg and 600mg/kg respectively in divided doses [20].

Anti-Inflammatory and Free Radical Scavenging Activity

Anti-inflammatory and free radical scavenging activities of the methanolic extract of root of Ricinus communis (Euphorbiaceous) Linn. was studied in Wistar albino rats. The methanolic extract at doses 250 and 500 mg/kg p.o. exhibited significant ($P < 0.001$) anti-inflammatory activity in carrageenin induced hind paw edema model. The extract at the dose of 500 mg/kg p.o. also exhibited significant ($P < 0.001$) anti-inflammatory activity in cotton pellet granuloma model [21].

Central Analgesic Activity

The crude extract of root bark of R. communis possesses central analgesic activity in tail flick response model to radiant heat at a dose of 250mg/kg [22 23].

Antitumor Activity

Ricin A, a lectin isolated from R. communis possess antitumor activity, it was more toxic to tumor cells than to nontrans formed cells, judged from the ED50 of the lectin towards tumor cells and non-transformed cells. 21 Larvicidal and Adult emergence inhibition activity: The R. communis seed extract exhibited larvicidal effects with 100 % killing activities at concentrations 32-64 µg/mL, and with LC50 values 7.10, 11.64 and 16.84 µg/mL for Culex quinquefasciatus, Anopheles stephensi and Aedes albopictus larvae respectively [24].

Antiasthmatic Activity:

The ethanol extract of R. communis roots possess antiasthmatic activity, it significantly decreases milk induced leucocytosis and eosinophilia and protect degranulation of mast cells in mice [25,26].

Wound Healing Activity

The R. communis possess wound healing activity due to the active constituent of castor oil, which produces antioxidant activity by inhibiting lipid peroxidation. The study of wound healing activity of castor oil was in terms of the scar area, percentage closure of scar areas and epithelization in the excision wound model. Due to the astringent and antimicrobial property the tannins, flavonoids, triterpenoids and sesquiterpenes present in the castor oil, promote the wound healing process, which are responsible for wound contraction and increased rate of epithelialisation. The study resulted that the castor oil showed wound healing activity by reducing the scar area and also the epithelialisation time in the excision wound model [27,]

Lipolytic Activity

The ricin produces the lipolytic activity by using the various substrates: (i) one analogue of triacylglycerol, BAL-TC; (ii) various chromogenic substrates such as pNP esters of a liphatic short to medium chain acids, and (iii) monomolecular films of a pure natural diacylglycerol, DC 10 in emulsion and in a Membrane-like model. It reveals that ricin from R. communis act as a lipase and has the capability of hydrolyzing different lipid classes. The action of ricin on membrane phospholipids could occur through a phospholipase activity which is very often as a minor activity of lipases. [28]

Central Analgesic Activity

The crude root bark extract of R. communis possesses central analgesic activity in tail flick response model to radiant heat at a dose of 250 mg/kg body weight. The ethanol pericarp fruit extract of R. communis possesses typical central nervous system stimulant and neuroleptic

effects17. The stimulant effects, such as exophthamus, hyperreactivity, memory improvement, and clonic seizures, seem to be due to the presence of alkaloid ricinine. The main toxic compound of the extract also seems to be ricinine, because animals that died after administration of the extract or ricinine showed similar signs: they all died after the occurrence of clonic seizures followed by an apparent breathing arrest. On the other hand, compounds other than ricinine may be responsible for the neuroleptic-like effects of the extract, because ricinine did not cause a reduction of locomotor activity or catalepsy in the mice [29]

Antiulcer activity

The R. communis seeds oil possesses significant antiulcer properties at a dose of 500 mg/kg body weight and 1000 mg/kg body weight (below the toxic level), but at the dose 1000 mg/kg body weight was more potent against the ulceration caused by pylorus ligation, aspirin and ethanol in rats. The result showed that the antiulcer activity is due to the cytoprotective action of the drug or strengthening of gastric mucosa and thus enhancing the mucosal defense [30]

Hepatoprotective activity

Prince et al. studied the hepatoprotective effect of ethanol leaves extract of R. communis at different doses, the presence of flavonoids and tannins exhibited an inhibitory effect on the activities of serum transaminases, liver lipid peroxidation level and the activities of acid and alkaline phosphatase in liver induced by carbon tetrachloride29. Ndemethyl ricinine showed anticholestatic and hepatoprotective potential in paracetamol-induced hepatic damage [31,32]

Bone Regeneration Activity

Ricinus communis polyurethane (RCP) has been studied for its biocompatibility and its ability to stimulate the bone regeneration. Results showed that RCP blended with calcium carbonate or calcium phosphate could promote matrix mineralization and are biocompatible materials38. Incorporating alkaline phosphatase to RCP with subsequent incubation in synthetic body fluid could improve the biological properties of the RCP21. The advantage seen in RCP as compared to demineralized bone is that the former has a slower reabsorption process [33]

CONCLUSION-

The castor plant Ricinus communis is a Indian plant the plant has many pharmacological activity. It has various pharmacological actions, some of them are reviewed here, but still this plant has much novel potential which is yet to explore. The pharmacological activities reported in the present review confirm that the therapeutic value of R. communis is very high having a leading capacity for the development of a new, safe, effective and cheaper drug in future The plant has various phytoconstuents alkaloids flavonoids 7which have various pharmacological activity. this plant has more potential need to be explore in future to get more of its medicinal property in this review article be search various other research article and review to get latest data gather by the various researcher.

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