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MEDICINAL PROPERTIES OF *RICINUS COMMUNIS*: A REVIEW

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ABSTRACT: The medicinal plant *Ricinus communis* is one of the effective plants which offer a solution to several kinds of diseases. Owing to this, the present research aims to review the medicinal properties of one of such common herbal plants, *Ricinus communis*, its possible role as herbal medicine, and assessment for pharma-covigilance. Related research articles were collected from Google Scholar, Pub Med, Science direct, Scientific information Database, and Scopus. For the present study purpose, using the term *Ricinus communis*, the castor bean, and castor oil plant in the title of all articles published to 2021 were observed. Phytochemical constituents of R. *communis* like saponins, flavonoids, alkaloids, steroids, and glucosides. Leaves of the plant have shown the presence of major phenolic compounds. Whereas roots test has presented the Indole-3-acetic. The findings reflect that the plant contains high medicinal benefits, which offer a solution for several kinds of diseases like cancer, diabetes, ulcer and anthelmintic, etc. Also, the plant is anti-inflammatory property of the plant facilitates therapeutic use. Therefore, all parts of the medicinal plant *R. communis* are considered highly beneficial in the medicinal field.

INTRODUCTION: Herbal plants have always been a viable source of medicine since prehistoric ages. Some of the isolated rural areas of developing and underdeveloped countries are still unable to get synthetic drugs easily. Traditional medicinal plants being easily available are used by many people to treat numerous illnesses. In India, 65-70% of the rural population rely on medicinal plants in the form of various indigenous ethnic systems like Ayurveda, Siddha, Unani, etc.

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Not only in India, but the margin of herbal medicine utilization has become quite fascinating worldwide. The estimated global herbal market was 63.05 billion US$ in 2014, which became 71.9 billion US$ in 2016 [1]. Herbal components are considered more effective and less risky than conventional chemical derivatives. Still, the absolute absence of any adverse effect might not be possible [2].

Countless no. of plants have been reported for their medicinal effects. Current research work aims to consolidate the medicinal properties of one of such common herbal plants *Ricinus communis*, its possible role as herbal medicine, and assessment for pharmaco-vigilance. *Ricinus communisis* an evergreen, fast-growing small tree (shrub) belonging to the Euphorbiaceous family. The genus

Ricinus L. is comprised of sole type species *i.e*., *R. communis*. It is included in the subfamily Acalyphoideae which consists of approx 99 genera and 1865 species [3]. The pharmacological property of the plant is very high [4]; thus, it was decided to review some of its major medicinal properties in this article.

Methods: The present review was conducted in 2021 by reviewing from international and national search web sides of Google Scholar, Pub Med and Science Direct, scientific information database, and Scopus and collected all full-text research papers published in English language medicinal properties of *Ricinus communis*. The medicinal plant *Ricinus communis* was collected from Udaipur (Rajasthan). The plant was identified and authenticated by Dr. Asha Arora, Associate Professor, Department of Botany, Bhupal Nobels' University, Udaipur (Rajasthan). The herbarium sheet was prepared and deposited in the department for future reference **Fig. A, B, C,** and **D**.

RESULTS:

Morphology: *Ricinus communis* is a perennial soft-wooded shrub that can attain a height of about 1-5 m and has remarkable lateral roots and sturdy tap roots. Leaves of the shrub are spirally arranged, green in color or acquire dark green color when getting older, 1-3 cm long united stipules to a sheathing bud that are deciduous.

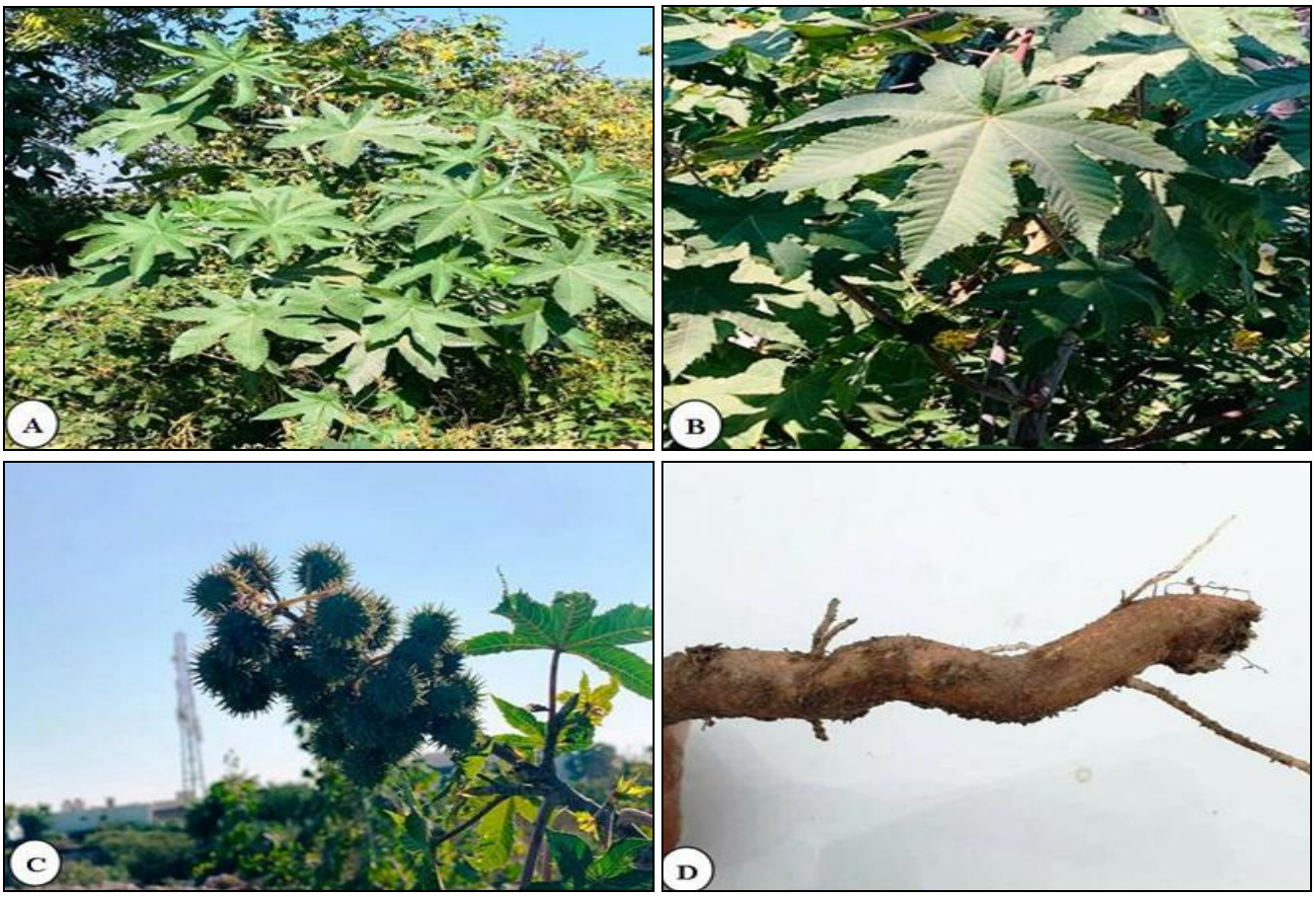

FIG. 1: MEDICINAL PLANT *RICINUS COMMUNIS* A - PLANT (WHOLE), B - LEAF, C - FRUIT, AND D- ROOT

Classification of *Ricinus Communis*:

Kingdom:	Plantae
Phylum:	Spermatophyta
Subphylum:	Angiospermae
Class:	Dicotyledonae:
Order:	Euphorbiales
Family:	Euphorbiaceae
Genus:	*Ricinus*
Species:	communis

Distribution: The species is drought resistant, very well adaptable to diverse climatic conditions, highly prolific, and hence widely distributed throughout tropics and warm temperate areas. Although it is considered native to northeast Africa

(probably Somalia), it is widely naturalized across Asia, (sub) tropical America, and temperate Europe. The plant is quite common in the jungles of India and cultivated primarily for castor oil production throughout India. There is 2 known variety of plant one bushy perennial shrub with large red seeds and large fruits, seeds yielding about 40% oil; another comparatively much shorter annual shrub having grey-white seeds with brown spots over them which yield about 37% of oil [5].

Photochemical Constituents: The medicinal properties of the plant are due to the presence of key phytochemical constituents like saponins, flavonoids, alkaloids, steroids, and glucosides. Leaves of the plant have shown the presence of major phenolic compounds such as monoterpenoids (1, 8-cineole), camphor, and α sesquiterpenoid (β-caryophyllene), gallic acid, quercetin, gentilic acid, rutin, epicatechin, and ellagic acid. Whereas roots test has presented the Indole-3-acetic and the several forms of ester have been identified in the form of palmitic, stearic, arachidic-hexadecenoic, oleic, linoleic (3.4) ricinoleic, and dihydroxy stearic acids through the study of castor oil. Moreover, the α-thujone and 30-Norlupan-3β-of-20-one are beans have been identified [6, 7].

Medicinal Properties:

Anticancer: The fruit extract of *Ricinus communis* is a potent contender for the treatment of breast cancer. *Ricinus communis* fruit extract has high efficacy on estrogens-positive MCF-7 and extremely aggressive, triple-negative breast cancer cells (MDA-MB-231 cell line). The extract has anti-metastatic property; it remarkably inhibits the adhesion, invasion, migration, and expression of a metalloproteinase from the matrix of both cell lines. Further, the extract induces apoptosis in such cells.

The four detected compounds of *Ricinus communis* fruit extract- Ricinine, Epigallocatechin, p-Coumaric acid, and Ricinoleic acid individually have migration-inhibitory and cytotoxic properties [8]. The Zinc oxide characterizes the anti-cancer feature of *R. Communis* that has been demonstrated by the crystalline hexagonal stage of the plant extracts. Here, the syntheses of the nano-particles create the high surface zone for the evaluation of anticancer activity. In regards to this, the hexagonal Wurtzite type of zinc oxide has been confirmed by The HRTEM that is the core reason behind the extensive use of the *Ricinus communis* against cancer treatment. Further, the antioxidant activity and free radical scavenging promot tehe anti-cancer feature of the *Ricinus communis* [9].

Reversible Anti-fertility Property: When treated with 50% of ethanol extracts of *Ricinus communis*, male rats showed a heavy reduction in the epididymal sperm count. There was an alteration in the morphology, motility, and mode of motion of sperm cells. It was suggested by the author that the reproductive ability of rats was reduced as there was a reduction in the fructose and testosterone levels. This anti-fertility effect of *Ricinus communis* was entirely reversible on the removal of the drug, and it doesn't cause any hepatotoxicity as it was found that GPT and GOT levels were unchanged. In another study, three different seed varieties of *Ricinus communis* exhibited an anti-implantation effect on white albino mice and were found to be potential oral contraceptives [10, 11].

Anti-diabetic: The 50% ethanol extract of roots of *Ricinus communis* 500 mg per kg body weight has shown a significant lowering of blood glucose level both in Type 1 diabetic and normal animals. An effective dose of root extract of *Ricinus communis* also showed a favorable response on total lipid profile, kidney, and liver functions when given for ten to twenty days. Root extract was found to be unharmed as there was no statistically notable difference in serum bilirubin, alkaline phosphatase, creatinine, serum glutamate pyruvate transaminase, serum glutamate oxaloacetate transaminase, and no mortality was observed.

In another study antidiabetic property of aqueous-ethanolic and ethanolic extract of *Ricinus communis* leaves on streptozotocin-induced diabetic rats was investigated. For 14 days, diabetic rats were given both aqueous-ethanolic and ethanolic extracts at doses of 300 mg/kg/bodyweight & 600 mg/kg/body weight, and good results were observed. The doses of 300 mg/kg/BW of both the extracts showed remarkable reverse body weight loss property. The ethanol extract at 600 mg/kg/BW significantly leads to a reduction in blood glucose levels. Oral administration of the extract at 600 mg/kg/BW

inhibited any alteration in total proteins, total bilirubin, albumin, urea, and creatinine levels, thus proved to be a good alternative for managing Diabetes mellitus. The author validates the traditional usage of *Ricinus communis* in treating Diabetes in the kingdom of Saudi Arabia [12, 13].

Leishamicidial: The extracts of *Ricinus communis* have significant antileishmanial properties. The combination of *Ricinus communis* and *Azadirachta indica* extracts has synergistic effects in the therapy of leishmaniasis. The optimal antiparasitic efficacy of *Ricinus communis* and A. indica is 59.5% and 72%, respectively, while the combination of both mixtures has 88% efficacy. The inhibitory concentration *i.e*., IC_{50} of *Ricinus communis* and A. indica is 16.5 μgmL^{-1} and 11.5 $\mu gmL^{-1,}$ respectively, while a mixture of both has IC_{50} of 9.0 μgmL^{-1}. The combination treatment of both plant extract can be used for isolation of bioactive compounds, their fortification and bioassay-guided fractionation, and this could serve as new medicinal lead structures [14].

Hepatoprotective: Methanolic extracts of *Ricinus communis* were studied for their hepatoprotective role against D-galactosamine-induced acute hepatitis in albino rats. A single intra peritoneal dose of D-galactosamine (800 mg/kg.BW) was given to induce hepatitis in rats. It was found that serum markers viz, Aspartate amino transferase (AST), Alanine amino transferase (ALT), Malondialdehyde (MDA) and Alkaline phosphatase (ALP) were notably increased and the effect of antioxidant enzymes Catalase (CAT), Superoxide dismutase (SOD), Glutathione Peroxidase (GPx), Glutathione Reductase (GR), non-enzymatic Glutathione (GSH) levels were reduced in the liver of rat model.

Histopathological results also showed curative and protective properties of Methanolic extracts of *Ricinus communis* leaves against D-galactosamine intoxication. This observation suggests that methanolic extract of castor plant remarkably protected the liver from hepatitis, enhance the curative reaction in the liver and thus can be used as a potential hepatoprotective medicine in future [15]. The hepatoprotective activity of the *Ricinus communis* is due to the membrane-stabilizing and antiperoxidative effect of flavonoids that increase the regenerative and reparative capacity of the liver. Further, the hepatoprotective activity of *Ricinus communis* is protective against the necrosis of the liver along with the fatty changes [16].

Antioxidant: The antioxidant property of *Ricinus communis* varies significantly depending upon extraction method and plant part. Leaves and seeds showed higher antioxidant activity than other plant parts. Among different extracts of acetone n-hexane, methanol, and dichloromethane (quantified by ABST+ method), methanol solvent extract has the highest free radical scavenging activity of about 95%, followed by acetone, dichloromethane, and n-hexane having free radical property of 91%, 62%, and 50% respectively [17]. The stems of *Ricinus communis* have flavonoids present in their extracts. Flavanoids is beneficial against carcinogenesis as it inhibits oxidative damage. The untargeted metabolomic profiling and polyphenol showed the excess of phytoconstituents such as (+) catechin and ellagic acid, both of which are associated with antioxidant mechanism [18, 19].

Insecticidal: The Crude methanols (Coleoptera: Brauchidae) extract from *Ricinus communis* has a notable insecticidal effect against Callosobruchus maculatus adult. The methanol extracts of *Ricinus communis* remarkably affect the survival rate of adult insect Callosobruchus maculatus (Coleoptera: Brauchidae) at 100%.

The relation between treatment and exposure period is very significant, *i.e*., $p < 0.05$. The methanol extracts have 31 active phytoconstituents, which perform the following pharmacological actions- Anti-inflammatory, antimicrobial, antioxidant, analgesic, antitumor, ant-diabetic and anti-asthmatic, antipyretic, antibacterial. The wild species of *Ricinus communis* have shown insecticidal properties due to the existence of the flavonoids, quercetin, and kaempferol that have been scanned in the ultraviolet region that has been further confirmed by the HPLC, IR, and UV spectrometry.

Here, the hydrolyzed aqueous leaves have high shown the majority of the flavonoids; however, the seeds of castor oils are poisonous for people, mammals, and insects due to the presence of the toxic proteins.

The chemical treatment of the extracts of the *Ricinus communis* plant parts for the medicinal properties under consideration to the philosophy of medical science. In regards to this, flavonoids are the major components of the *Ricinus communis* that supported the exerting of toxic effects against the insects and reported the biogenesis response of the *Ricinus communis* plants [20, 21].

Acaricidal: Acaricidal properties of *Ricinus communis* leaf extracts along with other medicinal plants were tested against Rhipicephalus decoloratus and Rhipicephalus pulchelus for the eco-friendly herbal control of ticks. It was concluded that with an increase in exposure time, more and more ticks were killed. At this juncture, the cardiac activity of the *Ricinus communis* is promoting sustainable development for the immunological and biological control of vector and vector-borne disease that create the threat for the manufacturing of the leather; the *Ricinus communis* has shown the presence of the quercetin, Gallic acid, flo-von and kaempferol which have been evaluated to have synergetic acardinal action [22, 23].

Lipolytic Activity: The lipolytic activity of ricin from *Ricinus sanguineous* and *Ricinus communis* was conducted on neutral lipids. Lipolytic activity experimented on various subtracts such as-analog of triacylglycerol BAL-TC-4, chromogenic subtract p-NP esters of aliphatic chain acids, and pure natural diacylglycerol in the membrane-like model. The study concluded that *Ricinus communis* act as lipase that has the capabilities for the hydrolyzing of several lipid classes. The maximum lipolytic activity was shown at pH 7.0 in the presence of the 0.2 M galactose at the surface of the leaves. And also, the lipolytic step might be involved in the poisoning of the cell by ricin [24].

Anthelmintic: Helminthiasis is a major prevalent worm disease in the world due to poor management practices. The anthelmintic activity of *Ricinus communis* leaves was observed by using a different type of solvent. In an attempt to prepare a cost-effective anthelmintic drug, three concentrations (50, 75, and 100 mg/ml) of aqueous, ethanol, ethyl acetate, methanol, and chloroform extracts from leaves of *Ricinus communis* were studied on Pheretimaposthuma. All the extracts showed a significant death rate of the worm.

The paralysis and mortality of worms were found to be significantly increased with an increase in concentration. Methanol, aqueous, and ethanol extract were found to be most effective and took the least time in both killing and paralyzing worms at higher concentrations (100 mg/ml) [25].

Toxicological Property: Studies were observed on the medicinal and toxicological properties of Cajanuscajan, *Ricinus communis,* and Thymus vulgaris leaf extracts. Leaves of *Ricinus communis* contain tannins, flavonoids, cardiac glycosides, steroids, saponins, phlorotannis, and terpenoids that are considered the essential bioactive constituents of any medicinal plants. Methanolic extract of leaves from *Ricinus communis*, when studied on the rat (100 mg and 200 mg/kg b.w.), showed that the extract was non-toxic and did not cause any damage to vital organs. It can be concluded that the leaves of the plant were safe to ingest and also have anti-bacterial properties when consumed in a limited amount. Unlike leaves and other parts of plants, seeds are highly toxic when inhaled or ingested orally. Seeds of *Ricinus communis* have Ricin toxin that is a Type-II ribosome-inactivating agent and well-reported bioterrorism agent [26-28].

Larvicidal and Mosquitocidal Activity: Larvicidal activity of *Ricinus communis* extract was found against different mosquito larvae. Studies were carried out on different species of mosquitoes such as Anopheles gambiae, Anopheles stephens, Anaphole salbopictus, and Culexquin quefasciatus, with a fatality rate of 100%. The poisonous concentration of seed extracts of *R. communis* is shown on different larval species [29]. Malaria is one of the life-threatening diseases which are caused by bites of certain species of infected Anopheles mosquitoes, which transmit parasites to the human body. Malaria is considered being a worldwide contagious disease which is resulting in hundreds of thousands of death annually.

Plasmodium falciparum is commonly known to show resistance to different available anti-malarial medications. Among all, *Ricinus Communis* is found to have the maximum activity against the Anopheles gambiae which is a route to malaria. Male and female larvae of Anopheles gambiae are persuadable to *Ricinus Communis* extracts.

With the increase in Larvae exposure, it was found that the larvicidal activity of the different extracts was also increasing. The extraction from Ricinus was found to be useful against Anopheles arabiensis and Culex quinquefasciatus [30]. An important study based on *Ricinus Communis* suggests that the leaves and stems of *Ricinus Communis* were mainly used to reduce the infection and fever caused by mosquito bites in European countries.

The juice extracted and stored after neutralization is highly beneficial in treating body rashes and redness caused due to mosquito bites. *Ricinus communis* is useful in treating malaria caused due to any species of the female anopheles mosquito. The Indian community is well aware of the medicinal properties associated with *Ricinus communis*. Since 1900, *Ricinus communis* is one of the most widely used medicine in treating bacterial infections, fever, and skin problems [31].

Anticonvulsant Activity: Researchers were Screened for *Ricinus Communis* leaves for anticonvulsant and Analgesic activity. Epilepsy is a pervading disorder that results in seizure formation because of neuronal discharges of the brain. Various secluded compounds of *Ricinus Communis* have shown positive results for anticonvulsant activity and proved to be upright epileptic after the tests were conducted.

All the animals showed convulsions after receiving electric shock treatment. Dosage of 60 mg/kg of a compound from *Ricinus Communis* seeds was given to the animals, which showed inhibition of seizure to about 80% as compared to the normal drug, which showed 8.89% seizure inhibition. Researchers reveal that epilepsy is a neurological disorder that is commonly seen in the UK, United States, India, and Africa. Until 1940, it was not known that *Ricinus Communis* can be used to treat seizures caused in different parts of the brain. Exclusive research on *Ricinus Communis* suggested that it contained an enormous level of anticonvulsant properties that can easily reduce the after-effects of seizures. Though many people do not consider the anticonvulsant properties of *Ricinus Communis* as beneficial, doctors and other medical professionals widely use this drug to treat multiple epilepsy cases. *Ricinus Communis* is not only considered effective in treating seizures and epileptic attacks but is also used to treat other neurological problems such as headaches due to sinusitis and migraine. Indian researchers claim that consuming castor oil mixed with lukewarm treats headaches and a state of confusion. It is advisable to drink castor oil with warm water to treat headaches, watery eyes, and epilepsy [32, 33].

Laxative and Uterine Contracting: With changing lifestyle and eating habits, constipation has become a common abdominal issue which every 3 out 5 individual faces in the world. Consumption of unhealthy food and irregular meal times are some common reasons that affect the digestion activity of the body. *Ricinus Communis* acts as a magical drug in increasing bowel movement. Proper bowel movements help in easing constipation issues. Constipation issues are more common in developing countries due to less exposure to medical assistance and knowledge. Castor oil activates uterus contraction and laxation by combining ricinoleic acid, which activating prostaglandin receptors [2].

Castor oil and ricinoleic acid bring contraction of the intestinal smooth muscle, which affects gut and uterus motility. Prostaglandin receptors 2 are proved to be effective drugs that help in inducing laxation. *Ricinus Communis* not only acts as a laxative but is also a well-known purgative used to treat severe abdominal pain and constipation problems. Doctors usually advise patients with constipation to consume a glass full of lukewarm water mixed with a small quantity of *Ricinus Communis* juice extract.

The juice of *Ricinus Communis* is also available in the form of castor oil available in a chemist shop. The leaf extract of *Ricinus Communis* contains remarkable contraction properties, which allow the uterine movements to takes place normally. Due to the contraction properties of *Ricinus Communis*, it is also used in radio diagnosis and sonography of males and females before surgical procedures.

The drug also plays an important role in inducing labor pains in pregnant ladies. The uterine contraction property of *Ricinus Communis* is the same as that of oxytocin drug that helps in inducing labor pains [34, 35].

Anti-asthmatic Activity: *Ricinus communis* L. roots showed anti-asthmatic activity. *Ricinus Communis* displayed the mast cell regulating effect due to saponin content which is present in the roots. Flavonoids play a major role in Bronchodilation and smooth muscle relaxant activity. The ethanolic extract was helpful in the reduction of the milk-induced leucocytosis and eosinophilia which is present because of flavonoids and saponins. The drug extracted from *Ricinus Communis* to treat asthmatic and respiratory issues was not discovered until 1930. Many researchers struggled to develop a successful; study related to *Ricinus Communis* and its antiasthmatic properties. But late in 1930, in the UK, the university discovered that *Ricinus Communis* can regulate the effect of asthma with the help of flavonoids present on the roots.

Before the discovery of other bronchodilators, the flavonoids on *Ricinus Communis* were the most common anti-asthmatic treatment used in patients with severe bronchial asthma. Asthma is a common breathing problem that is associated with improper contraction and activity of bronchioles present alongside the lungs. Flavonoids on *Ricinus Communis* proved immensely beneficial in reversing the asthmatic condition. This drug is more commonly used in developing countries such as Myanmar, India, Pakistan, and Burma. *Ricinus Communis* exhibit anti-asthmatic properties but it is also used to treat other respiratory issues such as frequent chest pain (angina pectoris), increase in heart rate, and sweating due to irregular heartbeat [36].

Bone Regeneration: Ohio State University depicted that bone regeneration and bone repairs required adequate time to heal and shape the bone normally. In the early years, when there was no effective treatment was used to address bone-related issues, the ancient people used the extracted oil of *Ricinus Communis* to repair the bone deformities. Oil of *Ricinus Communis* was known to be used in treating different bone-related diseases in ancient times as herbal and mythic medicine. Bone deformities, acute osteomyelitis, articular pains and afflicted limbs are some bone-related diseases that were treated by *R. communis*. *Ricinus Communis* has the unique property of bone regeneration without leaving any scar following its damage.

Polyurethane resin formation promotes fibroblastic neoformation which effectively replaces the bone from inside and around the porosities of the biomaterial in which delayed inflammatory reaction is absent. Due to this absence, no signs of systematic toxic effects were observed both in rabbit skulls and rat alveolus. Subsequently, incubating in synthetic body fluids can improve the biological properties of *Ricinus Communis* polythene.

Calcium phosphate, when mixed with *R. communis* polyurethane could be helpful in matrix mineralization and can be of immense interest while preparing biocompatible material in comparison to the demineralized bone. The slower re-absorption process is one of the benefits of *Ricinus Communis* polythene. *Ricinus Communis* oil does not contain a lot of medicinal properties such as anticonvulsant, anti-inflammatory, anti-asthmatic, laxative, purgative, antibacterial, and bone regeneration; hence it is widely used across the world [37-39].

Antimicrobial and Anti-inflammatory Properties: Inflammatory action due to any drug reaction or injury needs to be treated to stop the spread of bacterial infections. Increased bacterial infection caused due to inflammation can lead to gangrene in the affected part. Anti-inflammatory and free radical scavenging activity were observed from the root extract of *Ricinus communis*. Different divisions like ethanolic, methanolic, or hexane have been used to measure the anti-inflammatory potential of *Ricinus Communis* In one of the studies, hexane acetone and methanol fractions were tested to study the anti-inflammatory action of *Ricinus Communis* extract. Significant anti-inflammatory activity was shown by the methanolic extract, which may be because of the presence of flavonoids. In another study anti-inflammatory and pro-inflammatory activity after reapplication and was found to be intervened by ricinolein. Due to the cost-effective drug, it is more commonly used to reduce inflammation as compared to any other anti-inflammatory drug. Compared to any other medicine, *Ricinus Communis* is reported to show a faster therapeutic effect on inflammation. It also reduces burning, rashes, itching, and swelling associated with inflammation.

A good amount of extracted *Ricinus Communis* oil is advisable to rub on parts that have inflammation. The application of *Ricinus Communis* on the injured part not only reduces rashes and inflammation but also inhibits the bacterial growth on the infected area [40-44].

Ophthalmic Properties: The eyes are one of the most sensitive organs in a body that needs to be taken care of. Irritation, burning, redness, and swelling are some of the issues that can cause various reasons. As eyes make our world look colorful, it is important to maintain the ophthalmic properties of eyes. *Ricinus Communis* was studied for more than 50 years to identify its medicinal properties. Researchers suggest that *Ricinus Communis* contains oil that can be used as a lubricant to treat dry eyes. The lubrication property not only maintains the hydration level in the eyes but also reduces muscle strain in them. Proper eye muscle contraction and expansion lead to better vision in an individual. *Ricinus Communis* oil is also used to remove foreign body particles present in the eye due to accidental reasons. The oil not only soothes eye muscles but also cleans the eyes for better visualization. Usually, ophthalmic solutions are very costly and need regular doses if a person is dealing with an eye infection or retinal trauma. But due to the low cost of oil of *Ricinus Communis*, people prefer this drug against other lubricants available on the market. An eye drop containing the oil of *Ricinus Communis* is generally used to cure dry eyes, inflammation, redness, swelling, and watery eyes. Various allopathic drugs such as carboxymethyl cellulose, sodium hyaluronate, polyethylene glycol 400 are some common eye lubricants that can treat eye ailments and dryness [45, 46].

Antiulcer: The antiulcer property of castor oil was evaluated in rats by administration of aspirin or ethanol or pyloric ligation. It was reported that *Ricinus communis* possess noticeable antiulcer properties at a dose of 500 mg/kg & 1000 mg/kg. This might be due to either enhancing mucosal defense by strengthening gastric mucosa or cytoprotective action of drug [47].

DISCUSSION: The *Ricinus communis* (castor plant) is a widely used and potent medicinal plant among thousands of herbal plants which are commonly used in the treatment of various diseases. The medicinal properties of the plant are due to the presence of key phytochemical constituents like saponins, flavonoids, alkaloids, steroids, and glucosides [6, 7]. Medicinal plants have been performed the following pharmacological actions-Anti-inflammatory, antimicrobial, anti-oxidant, analgesic, antitumor, anti-diabetic and anti-asthmatic, antipyretic, antibacterial activity [20, 21, 28].

The fruit extract of *Ricinus communis* is a potent contender for the treatment of breast cancer [8]. Leaves of *Ricinus communis* contain tannins, flavonoids, cardiac glycosides, steroids, saponins, phlorotannis, and terpenoids that are considered as the essential bioactive constituents of any medicinal plants [19, 26, 29]. *Ricinus communis* leaves were screened for anthelmintic, anticonvulsant, and analgesic activity by many scientists [22, 23, 25]. The stem, leaves, and seed extracts of *R. communis* showed significant mortality against larvicidal and mosquitocidal activity [31]. Antiasthmatic, anti-inflammatory, and free radical scavenging activity were observed from the root extract of *Ricinus communis* [36, 42, 43]. Plant-based medicines such as *R. communis* have been used as an efficient treatment of various diseases [48-58].

Medicinal plants are safer, cheaper, and eco-friendly than costly medicines for the treatment of different infections. The present study will be helpful for the documentation of the ethno botanical library for using various diseases and infections by herbal drugs prepared by *Ricinus communis*. The current research will be helpful to initiate the pharmacological aspect of herbal plants *Ricinus communis* extracts to prepare less costly eco-friendly drugs.

CONCLUSION: The medicinal properties were examined in the present review confirm that the therapeutic importance of the medicinal plant *Ricinus communis* is much higher. The *R. communis* is significant medical have a potential impact on cancer and ulcer herbs that cells, micro-organism, bacteria, insects and other parasites that create the breeding environment inside the living organism body and affect the health and immunity. Based on the above literature, it may conclude that the disease prevention and recurring characteristic

of the *Ricinus communis* made this plant highly noticeable which provides many alternatives solutions in medical areas. It extends the solutions in the biological environment by covering several fields such as agriculture, pharmacy, economic, social by offering a solution to several health issues which are possible to be treated through which plant. In regards to this, the pharmacological activities shown by the *Ricinus communis* have supported the traditional use of this herb as a medicinal plant and creating the source for sustainable synthetic drugs. The efficient capabilities of the plant are leading a good future in the medical world and have built opportunities for further investigation to find the new compounds of *Ricinus communis* that would be effective against life-threatening diseases. Nonetheless, the seeds of this plant are highly dangerous for both animals and humans due to their toxic properties. It may result in fever, central nervous system depression, and other health issues among living beings. The seeds are the only toxic property of *Ricinus communis*; otherwise, the overall plant and its other elements are advantageous in many ways.

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