

# RICINUS COMMUNIS LINN: PHYTOCHEMICAL AND PHARMACOLOGICAL ACTIVITIES

Komal Radhakrushna Pansare<sup>1</sup>, Sunil Narayanlal Deora<sup>2</sup>

*Nandkumar Shinde college of pharmacy, Vaijapur. Dr. Babasaheb Ambedkar Technological University, Lonere, Maharashtra, India*

## ABSTRACT

*In the last few decades there has been an exponential growth in the field of Herbal medicine. One such medicinal plant is Ricinus communis, family Euphorbiaceae, which is commonly known as castor plant. It is a small tree which is found all over the India. All parts of plants are important viz Root bark, leaves, flowers, seeds, root, oil etc. The Ricinus communis has high traditional and medicinal value for maintain the disease free life. Traditionally the plant is used as laxative, purgative, fertilizer and fungicide etc. The plant is reported to possess antioxidant, antiimplantation, anti-inflammatory, antidiabetic, central analgesic, antitumor, larvicidal & adult emergence inhibition, antinociceptive and antiasthmatic activity. This activity of the plant possesses due to the important phytochemical constituents like flavonoids, glycosides, alkaloids and steroids etc. R. communis as anti-inflammatory, analgesic, antioxidant, antitumor pharmacological properties.*

**Keywords :-** *Ricinus Communis Linn, Physiological Activities, Anti Oxidant, Anti Asthmatic etc.....*

## 1. INTRODUCTION

Eranda ( Ricinus communis Linn.), of Euphorbiaceae family is an important medicine mentioned in Ayurveda classics from Vedic period itself. It's used veritably generally in rheumatic conditions, injuries, hydrocele etc. [1- 2] The factory considered presumably anative of Africa, is set up throughout the hotter corridor of India and tolerates a wide range of climatic conditions [3] While describing agryadravyas, Charaka considered Erandamoola as vrshya and vatahara [4] Susrutha mentioned Erandataila as stylish among oil painting purgatives. [5]

The root and oil painting attained from seeds are extensively used in different phrasings, but the leaves are used infrequently. But the use of tender leaves and old leaves are mentioned in textbooks like Bhavaprakasa for some conditions like yakruthvikaras and medovridhi [6] But the phytochemical and atomic evaluation of Ricinus communis leaves wasn't at each mentioned in API. So there's a need of standardized data for the establishment of a unique identification data. Currently Ayurveda gets further acceptance and fashionability among the public due to its holistic approach. The medicines should be formalized by establishing quality parameters for the safe and effective use in clinical practice.

Pharmacognosy is an objective study of crude medicines from natural sources treated scientifically and it encompasses the knowledge of the history, distribution, civilization, collection, processing for request and preservation, the study of sensitive, physical, and structural characters and uses of crude drugs [7] It includes macroscopic, bitsy, phytochemical and pharmacological evaluation. Macroscopic evaluation refers to evaluation of medicines by size, shape, nature of external and inner shells, type of fracture and organoleptic characteristics like colour, odour, taste, and thickness etc. [8] primary physicochemical evaluation is a step towards the genuinity and bchastity of the drug.

## 2. MORPHOLOGY OF RICINUS COMMUNIS LINN

The castor oil plant is a fast-growing, suckering imperishable shrub or sometimes a soft wooded small tree up to 6 m or further, but it's not hardy in nature. This plant was cultivated for wood and flower colors and for oil production. Leaves are green or sanguine in colour and about 30- 60 cm in periphery. The leaves contain 5- 12 deep lobes with coarsely toothed parts which are alternate and palmate. The stems are varying in saturation. The flowers are monoecious and about 30- 60 cm long [9]. The fruit is a three-celled thorny capsule. The capsule of fruit covered with soft spine like processes and dehiscing in to three 2-valved cocci. The seeds are considerable differences in size and colour. They're round, kindly compressed, 8- 18 mm long and- 12 mm broad. The testa is veritably smooth, thin and brittle. Castor seeds have a warty accessory called the caruncle, which present generally at one end from which runs the raphe to terminate in a slightly raised chalaza at the contrary end of the seed. [10]



## 3. TAXONOMICAL CLASSIFICATION

- Kingdom : Plantae
- Order : Malpighiales
- Family : Euphorbiaceae
- Sub Family : Acalyphoideae
- Tribe : Acalypheae
- Sub Tribe : Ricininae
- Genus : Ricinus
- Species : R. Communis

## 4. PHYTOCHEMICAL CONSTITUENTS

The medicinal parcels of the plant are due to the presence of crucial phytochemical ingredients like saponins, flavonoids, alkaloids, steroids, and glucosides. Leaves of the plant have shown the presence of major phenolic compounds similar as monoterpenoids (1, 8- cineole), camphor, and  $\alpha$  sesquiterpenoid ( $\beta$ - 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 linked in the form of palmitic, stearic, arachidic- hexadecenoic, oleic, linoleic(3.4) ricinoleic, and dihydroxy stearic acids through the study of castor oil production. also, the  $\alpha$ - thujone and 30- Norlupan-  $\beta$ - of-- one are sap have been linked [11,12]

## 5. PHYSIOLOGICAL ACTIVITIES OF RICINUS COMMUNIS LINN

*R. communis* is a multipurpose folkloric medicinal factory with some medicinal parcels; these parcels are associated with either direct operation of crude factory excerpt as a remedial agent in colorful conditions or by inhibition of dangerous pathogens, which are known to beget colorful infections and conditions. Among the colorful reported conditioning of *R. communis*, a large number of them are attributed to its excerpt in crude form followed by colorful fragments which could be ethanolic, methanolic or chloroform, ethyl acetate, toluene, benzene, and butanol detergents.

### 5.1 ANTIBACTERIAL ACTIVITY

Due to the increase in the prevalence of infections in mortal beings with colorful clinical strains of bacteria and relinquishment of resistance against the antibiotics, there's a great need to find the dependable indispensable sources to combat this so-called life-hanging issue of antibiotic resistance [13]. *R. communis* and its phytochemicals have been set up to have antimicrobial parcels against colorful microorganisms. Some of the reported antimicrobial exertion of the crude excerpt includes inhibition of colorful bacteria similar as *Staphylococcus aureus*, *Escherichia coli*, *Streptococcus mutans*, *Enterococcus faecalis* and methicillin-resistant *Staphylococcus aureus*. [14]

### 5.2 ANTIFUNGAL ACTIVITY

Various parts of *R. communis* including root, leaf and stems are known to have antifungal activity. Both methanolic and aqueous extracts of *R. communis* are found to be active against many fungal species. A study was carried out for testing the antifungal activity of *R. communis* extract against various fungal species, the maximum antifungal activity was shown against *Candida albicans*, and lowest activity was detected against *Alternaria solani* [15]. One of the studies, showed that the methanolic extract has prominent inhibitory activity against *Aspergillus niger* and *Aspergillus fumigatus* and less activity against *Aspergillus flavus* [16]. Another study, carried out with aqueous *R. communis* leaf extract have shown lowest activity against *Aspergillus fumigatus* and *Aspergillus flavus* [17]. The above-mentioned studies confirm the antifungal activity of *R. communis* extract, and it may be a good source for identifying a new drug candidate for inhibiting the fungi.

### 5.3 ANTI DIABETIC ACTIVITY

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

### 5.4 ANTI ASTHMATIC ACTIVITY

*Ricinus communis* L. roots showed anti-asthmatic exertion. *Ricinus Communis* displayed the mast cell regulating effect due to saponin content which is present in the roots. Flavonoids play a major part in Bronchodilation and smooth muscle relaxant exertion. The ethanolic excerpt was helpful in the reduction of the milk convinced leucocytosis and eosinophilia which is present because of flavonoids and saponins. The medicine uprooted from *Ricinus Communis* to treat asthmatic and respiratory issues wasn't discovered until 1930. numerous experimenters plodded to develop a successful; study related to *Ricinus Communis* and its antiasthmatic parcels. 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 cases with severe bronchial asthma. Asthma is a common breathing problem that's associated with indecorous compression and exertion of bronchioles present

alongside the lungs. Flavonoids on *Ricinus Communis* proved immensely salutary in reversing the asthmatic condition. This medicine is more generally used in developing countries similar as Myanmar, India, Pakistan, and Burma. *Ricinus Communis* parade anti-asthmatic parcels but it's also used to treat

other respiratory issues similar as frequent chest pain (angina pectoris), increase in heart rate, and sweating due to irregular twinkle.[18]

### 5.5 ANTI OXIDANT ACTIVITY

*R. communis* seed extracts produce the antioxidant activity by using lipid peroxidation via ferric thiocyanate method and free radical scavenging effect on 2,2-diphenyl-1-picrylhydrazyl radical (DPPH) and hydroxyl radical generated from hydrogen peroxide. The high antioxidant activity of the seed of *R. communis* at low concentration shows that it could be very useful for the treatment of disease resulting from oxidative stress. The responsible chemical constituent of *R. communis* which produces antioxidant activity is Methyl ricinoleate, Ricinoleic acid, 12-octadecadienoic acid and Methyl ester. The *Ricinus communis* stem and leaf extracts also produce antioxidant activity due to the presence of flavonoids in their extracts [19,20]. Some studies revealed that gallic acid, quercetin, gallic acid, rutin, epicatechin and ellagic acid are the major phenolic compounds responsible for the antioxidant activity of the dry leaves of *Ricinus communis* [21]

## 6. CONCLUSION

*Ricinus communis* is an extensively traditionally used and potent medicinal factory between all the thousands of medicinal shops. The pharmacological conditioning reported in the present review confirms that the remedial value of *Ricinus communis* is much further. It is an important source of compounds with their chemical structures as well as pharmacological parcels. The presence of phytochemical ingredients and pharmacological conditioning proved that the factory has a commanding capacity for the development of new good efficacy medicines in future.

The seeds, other parts of castor bean plant and by products of its' oil are widely used for different purposes in various fields as discussed. However, the technology required to produce innumerable no. of derivatives from castor oil is lacking in India due to which the country is relying on other countries in spite of being a global leader in area, production and productivity. Further, market rate for castor seed has to be enhanced in tune with the other crops keeping in view the ever increasing global demand for seed and oil.

## 7. REFERENCE

1. V K Singh, J N Govil, Shamima Hashimi, Gurdip Singh, Recent progress in medicinal plants vol 7 Ethnomedicine and pharmacognosy, Reprint ed. Houston USA: Studium press LLC;2003. P.136
2. V K Singh, J N Govil, Shamima Hashimi, Gurdip Singh, Recent progress in medicinal plants vol 7 Ethnomedicine and pharmacognosy, Reprint ed. Houston USA: Studium press LLC;2003. P.385
3. Prof. Narayana Aiyer K, Prof. Kolammal M, Pharmacognosy of Ayurvedic drugs kerala Series 1 Number 9, Trivandrum: Department of Pharmacognosy University of kerala; 1966. P.18-22
4. Prof. P V Sharma, Charakasamhitha vol 1, 25th chapter Yajjapurusheeyam. Revised ed. Varanasi: Chaukhambha Orientalia; 2014. P.168
5. Prof. K R Srikanthamoorthy, Susruthasamhitha vol 1, 44<sup>th</sup> chapter Virechanadravyavikalpavijnaneeya. Reprint ed. Varanasi: Chaukhambha Orientalia; 2014. P.309
6. Brahmasankaramisra, Bhavaprakasa Madhyamakhanda part 1, 39th chapter Sthoulyadhikara. 11th ed. Varanasi: Chaukhambha Sanskrit series; 2012
7. Dr. C. K. Kokate, A. P. Purohit, S. B. Gokhale, Pharmacognosy, 50th ed. Pune: Nirali prakashan; 2014. P. 1.13.
8. Dr. C. K. Kokate, A. P. Purohit, S. B. Gokhale, Pharmacognosy, 50th ed. Pune: Nirali prakashan; 2014. P. 1.15.
9. The Wealth of India. A Dictionary of Indian Raw Material and Industrial Products, Vol-IX, 1972, 26-47.
10. Trease, G.F and Evans, W.C. 2002. Pharmacognosy, 15th Ed. Saunders
11. Jena J and Gupta A: *Ricinus communis* Linn: A phytopharmacological review. International Journal of Pharmacy and Pharmaceutical Sciences 2012; 4(4): 25-29.
12. Thompson MJ and Bowers WS: Lupeol and 30-norlupan-3 $\beta$ -ol-20-one from the coating of the castor bean (*Ricinus communis* L.). Phytochemistry 1968; 7(5): 845-47.

13. Friedman M, Rasooly R. Review of the inhibition of biological activities of food-related selected toxins by natural compounds. *Toxins* 2013; 5(4): 743-775.
14. Abew B, Sahile S, Moges F. In vitro antibacterial activity of leaf extracts of *Zehneria scabra* and *Ricinus communis* against *Escherichia coli* and methicillin resistance *Staphylococcus aureus*. *Asian Pac J Trop Biomed* 2014; 4(10): 816-820.
15. Vandita P, Amin N, Khyati P, Monisha K. Effect of phytochemical constituents of *Ricinus communis*, *Pterocarpus santalinus*, *Terminalia bellerica* on antibacterial, antifungal and cytotoxic activity. *Int J Toxicol Pharmacol Res* 2013; 5(2): 47-54.
16. Jeyaseelan EC, Jashothan PTJ. In vitro control of *Staphylococcus aureus* (NCTC 6571) and *Escherichia coli* (ATCC 25922) by *Ricinus communis* L. *Asian Pac J Trop Biomed* 2012; 2(9): 717-721.
17. Abd-Ulgadir KS, Suliman SI, Zakria IA, Hassan NEA. Antimicrobial potential of methanolic extracts *Hibiscus sabdariffa* and *Ricinus communis*. *Adv Med Plant Res* 2015; 3: 18-22
18. Taur DJ and Patil RY: Antiasthmatic activity of *Ricinus communis* L. roots. *Asian Pacific Journal of Tropical Biomedicine* 2011; 1(1): 13-16.
19. Gupta M K, Sharma P K, Ansari S H, (2006). In-vitro antioxidant activity of the successive extracts of *Ricinus communis* leaves. *International Journal of Plant Sciences*, 1 (2): 229–231
20. Singh Ramesh Kumar, Gupta M K, Katiyar Deepti, Srivastava Anshul, Singh Parul, (2010). In-vitro antioxidant activity of the successive extracts of *Ricinus communis* stems; *International Journal of Pharmacological science and research*, 1(8), (Suppl.)
21. Singh P P, Ambika Chauhan S M S, (2009). Activity guided isolation of antioxidants from the leaves of *Ricinus communis* L. *Food Chem*, 114(3): 1069–1072.

