International Journal of Current Research in Medicines & Medical Science
Vol. 4, Issue 1 – 2021
ISSN: 2582-1628

Medicinal Value of the Eranda (*Ricinus communis* Linn): A Brief Review

Manoj Kumar Singh[1], Abhijeet Kumar[2], Ajay Kumar[2], Ambrish Kumar Singh[2]

[1]*Associate Professor, Kriya Sharir, Faculty of Ayurveda, I.M.S. Banaras Hindu University, Varanasi.*

[2]*Pharmacy Ayurveda, Faculty of Ayurveda, Institute of Medical Sciences, Rajiv Gandhi South Campus, Banaras Hindu University, Mirzapur, Uttar Pradesh, India.*

Abstract

Botanical name of well familiar Ayurvedic drug Eranda is *Ricinus communis* Linn. This belongs to the family Euphorbiaceae. In the last few decades, there has been an exponential growth in the field of herbal medicine. It is a small tree which is found all over India. All plant parts are important such as root bark, leaves, flowers, seeds, oil, roots, etc. This activity of the plant possesses due to the important phytochemical constituents like glycosides, flavonoids alkaloids, steroids, etc. Castor oil contains ricin oleicacid; it is used for all types of rheumatic activity additional and medicinal value for maintaining a disease-free life. Traditionally the plant is used as a laxative, purgative, fertilizer, fungicide, etc. The plant is reported to possess antioxidant, anti-inflammatory, anti-diabetic, central analgesic, antitumor, larvicidal & adult emergence inhibition, antinociceptive, antiasthmatic activity, etc.

Keywords: *Ricinus communis* Linn, Phytochemical, Purgative, Analgesic.

Introduction

R. communis Linn., an annual or perennial bush or infrequently a soft wooded small tree up to of6-meters height or more. It is grown nearly throughout India, mostly up to the height of 2000 meter of seashore. It is widely cultivated in the tropical and warm regions for its seeds, to yield the familiar castor oil. *Ricinus communis* Linn and belongs to the family Euphorbiaceae. It is described in almost all the classics of Ayurveda as an ingredient of compound formulation. Some important synonyms are given in classics according to the morphology like based on leaf *Gandharva hasta, Hastiparnaka, Panchangul, Dhirghdanda, Uttana patra*. A few synonyms are given in classics based on flowers like *Aamanda, Vyadambaka,* and *Vyaghrapuchha*. Others like based on seeds like Chitraseed and the few synonyms are action-based like *urubaka, vatari*. The castor plant is delineated as an important drug. In castor plants, very useful chemical compounds are present that make it useful for medicinal purposes. It is known by different name in different regions and languages like in Hindi, it is known as Eranda, in Kannada asharalu, in Malayalam it is recognized as Chittamanakku and in Marathi, it is identified as Erendietc.[1]

Taxonomical classification

Table 1

Kingdom	Plantae
Division	Magnoliophyta
Class	Dicotyledons
Order	Euphorbiales
Family	Euphorbiaceae
Genus	*Ricinus*
Species	*Communis*
Latin Name	*Ricinus Communis* Linn.

Ayurvedic Classification

Table 2

Charaka Samhita	Madhura skanda,Angamarda prasamana, Bhedaniya, Swedopaga
Susruta Samhita	Vidarigandhadi, Adhobhaghara, Vatasanshamana
Bhava Prakash Nighantu	Guduchyadi varga
Raja Nighantu	Salmalyadi varga
Priya Nighantu	Shatapushpadi varga
Kaiyadeva Nighantu	Oshadhiya varga
Madanpala Nighantu	Panneya varga

Habitat

It is considered, probably, a native of tropical Africa. It is found throughout the hotter parts of India, from sea level to about1000–2000-meter altitude, in the scrubby jungles of outer Himalayas, cultivated in the fields and gardens, and also frequently found running wild near habitations by roadsides and wasteland, together with the undoubted antiquity of the knowledge of its use as a drug, as revealed by Sanskrit literature, are held to point to its being a native of India as well as Africa. It is said to be under cultivation from ancient time in both these areas[2,3].

Cultivation

- Castor seed is a crop of the tropics, though it is cultivated in the subtropics to some extent.
- Castor can withstand dry arid climates but can't in water log contrition.
- Generally, it is grown on sandy /clayey deep red loams and good light alluvial loams.
- It can be grown economically even on gravelly and poor oils.
- The sowing time of castor is June –July or September - October.
- The seed is usually sown in lines 1 – 2 m apart, depending upon whether it is a pure or mixed crop.

- Soaking the seed for about 12 hrs. before sowing, is said to improve germination.
- The application of organic measures is beneficial.
- The harvested spikes are stacked in agglomeration till the capsule blackens and they are spread out in the sun to dry.

Method of collection of seed

- when the seeds are ripe and they have dehisced on their own, the seed & roots are collected
- The oil is expressed from the seeds with the following two methods-
  - Traditional method
  - Commercial extraction

Shodhana

First, the Eranda seed is crushed then remove the internal part of the seed and soaked with milk or boil it 2-3 times with milk. Second method of shodhan of Eranda seed is where fomentation is done in coconut water for 3 hours and washed it out with water and dried under sunshine[4].

Morphological Characteristics

The morphological characteristics of eranda are described below in Table no 3.[5]

Table 3

Habit	It is an evergreen, glabrous shrub, 2-4.5 m in height
Leaves	Leaves are palmately, 7- many lobed, lobes oblong to linear, acute, or acuminate.
Flowers	Flowers are enlarge terminal subpaneled racemes; in a dense globose head of branched filaments and anthers; yellowish.
Fruits	Fruits are capsules, globosely oblong, smooth or echinate.
Seeds	Seeds are oblong, smooth, and mottled.

Varieties

According to *Dhanwantari Nighantu, Bhavaprakash Nighantu, Shodhala Nighantu, Kaiyadeva* Nighantu, Eranda has two varieties such as

- Sweta Eranda
- Ratka Eranda

According to Raj Nighantu

- Sweta Eranda
- Rakta Eranda
- Sthula Eranda

The stem and leaves of the red variety is red in color and oil of red seeds is mostly used. Two types of white variety are mentioned such as; small and big, and leaves, seeds, roots, etc. of small type are pondered to be useful in medicine.

Phytochemical Constituents

Leaves: Gentisicacid, disaccharide glycoside rutin, quercetin, and gallic acid are detected in the dried leaves of *R. communis* Linn. By using capillary electrophoresis with amperometric detection, Flavonoids (kaempferol-3-O-beta-drutinoside, kaempferol-3-O-beta-d-xylopyranoid) and tannins have been isolated from the leaves.

Seeds; Seeds contain three toxic proteins ricin A, B, and C, and one ricinus agglutinin. From the roots, indole-3-acetic acidhas been extracted.

Fruit; The pericarp of fruits of *R. communis* contain the alkaloid, ricinine. Cell-free extract of seedling of castor bean produces a mixture of five diterpene hydrocarbons ent-kaur-ene, ent-beyerene [(+)-stachene], ent-trachylobane, entsandaracopimaradiene, casbene (anti-fungal)[6].

Pharmacological Properties of Erand as per Ayurveda

The ayurvedic properties, dosa karma, karma, rogaghanata, part used, dose, and specific formulation of eranda are described below[7].

- Rasa- Madhur, Anurasa - Katu, Kashaya
- Guna- Snigdh,Tikshna, Sukshma.
- Vipaka- Madhura
- Virya-Ushna.

Dosa Karma; Kapha Vatashaman

Karma: Vatahara, sulahara, vedanasthapan, shothahara, rechana, vrushya, twachya, kaphaghna, kusthaghna, sukrashodhana, visaghna, vayahsthapan, jwarahara, etc.

Rogaghanata: Vatavyadhi(joint pain), Pakshaghata(paralysis), shoth(inflammation), gulma (abdominal lump), arsha (hemorrhoid), jwara(fever), shula(pain), krimi(worm), amavat (rheumatoid arthritis), katishulaa(lumber pain), yakritpleehavruddhi (hepatospleenomegaly), sirashula (head ache), bastishula(pain in urinary bladder), kasa(cough), swasa (asthama), kustha (skin disease), vriddhi (enlargement of scrotum), sukravikara (disorders of semen), mutrakriccha (dysuria), etc.

Part used; Root, Seed, Leaves, Oil

Dose: Mula kalka ; 10-20 g

Bija ; 2-6 Dane

Taila : 4-16 ml

Specific formulation

- Erandapaka
- Erandamuladi kwatha
- Erandasaptaka kwatha
- Maharasanadi kashyam
- Chaturmukha Rasa
- Gandharhastadi kashyam

Eranda oil is an herbal product that is prescribed as medicinal and purificatory therapy. Eranda oil is established as a good vata controller drug by different ayurvedic Texts. Vata is the regulator of our body movements and neurological function. Vata imbalance may cause various neurological problems like Pakshaghat or Hemiplegia, joint pain etc. and other diseases in our body. So, it is important to balance the vata in our body. The oil of the eranda has a good role to control the vata. So Eranda is mainly used in vata disorders[8,9].

Ethnobotanical uses of Eranda

Dutt in 1877, who for the first time described, in his book material medica of the Hindus that the root of *Ricinus communis* and the oil obtained from the seeds have been used in medicine. From this assertion, it can be presumed that the use of castor oil was known Indians and the plant may probably be cultivated in India since many centuries before the Christian era[2].

Seeds: A poultice of crushed seeds is used to reduce rheumatic swellings, gouty, and inflammation of women's breasts during lactation[2,3].

Root bark: The root bark is used as a purgative and alternative in chronic enlargements and skin diseases[2,3].

Root: Roots are administered in the form of a decoction and the form of a paste for toothache[2,3].

Leaves: Leaves are also used in the form of a poultice or fomentations on sores, boils, and swellings. To give relief in flatulence in children, while of leaves coated with oil and warmed are commonly applied over the abdomen. Fresh juice leaves are used as an emetic in poisoning by narcotics like opium. Leaves are considered lactogogue and are applied as a poultice over the breasts / taken internally in the form of juice. For the eye, an infusion of the leaves is used as a lotion. It is said to crush leaves to give relief to caries and is applied over guinea worms[2,3].

Castor oil: Castor oil is used in medicine as a cathartic in the treatment of acute diarrhea caused by any form of food poisoning. Castor oil is often given orally. It is also used as an abortifacient and ricinoleic acid present is used in contraceptive jellies and creams. It is also applied externally as emollient in seborrheic dermatitis and other cutaneous infections[2,3].

Pharmacological properties

Anti-inflammatory activity

The anti-inflammatory effect of the leaves and root extract was studied in wistar albino rats paw edema by administration of sub-plantar carragennan, which characterizes the cellular events of acute inflammation. During the edema formation and in all the stages of acute inflammation, the 250 and 500mg/kg dose of methanolic leaf extract possess protective effects in the prevention of cellular events. The anti-inflammatory activity of methanolic extract was due to the presence of flavonoids. The effect of petroleum ether extract of the root of *R. Communis* (150 mg/kg p.o) has been investigated against Carrageenan, 5-Hydroxy tryptamin, Dextran, Bradykinin and Prostaglandin E, induced rat's hind paw edema. Except for PGE, the extract exhibited significant anti-inflammatory activity against all the phlogistic agents. The anti-inflammatory activity was compared with standard drugs such as phenylbutazone and betamethasone, both in acute and chronic experimental models of inflammation in albino rats[6,10,11,12].

Analgesic activity

Aqueous extract of the plant showed the presence of secondary metabolites such as flavonoids, alkaloids, saponin, terpenoid, tannin, carbohydrates, and glycoside in the root of both cultivated and wild varieties. For both analgesic and anti-inflammatory actions, in some natural products, alkaloids are responsible. In the late phase of acute inflammation and pain perception, flavonoids are known to target prostaglandins. To inhibit histamine release in vitro, saponin and terpenoids have also been reported. To evaluate the analgesic property of aqueous root extract of cultivated and wild varieties of *R. communis* using the tail-flick method of rats by oral pre-treatment with a cultivated variety of *R. communis* caused moderate analgesia in the treated rats and wild variety of plant caused profound significant analgesia in the treated rats[6,12,13].

Antioxidant activity

In wistar albino rat's liver and kidney homogenates, the methanolic extract showed significant free radical scavenging activity by inhibiting lipid peroxidation initiated by carbon tetrachloride and ferrous sulphate. The extract enhanced free radical scavenging activity of stable radical 2,2-diphenyl-1- picryl-hydrazyl (DPPH radical hot), nitric oxide and hydroxyl radical in vitro assay methods. *R. communis* seed extracts produced the antioxidant activity by using lipid peroxidation by ferric thiocyanate method and free radical scavenging effect on 2,2-diphenyl-1-picrylhydragyl radical (DPPH) and hydroxyl radical generated from hydrogen peroxide. The high antioxidant activity of the seed which produces antioxidant activity are ricinoleic acid, methyl ricinoleate, 12-octadecadienoic acid, and methyl ester, and leaves and stem extracts also produce antioxidant activity due to the presence of flavonoids in their extract[6,12,13].

Antitumor activity

In recent years, a very potent poison ricin has been shown to possess antitumor qualities and has been used in cancer research and chemotherapy, where the protein ricin is joined to monoclonal antibodies, one of the most promising uses of ricin is in the production of immunotoxins. In a test tube (in vitro) and protein receptor sites that recognize the specific target cells of a tumor, the antibodies are produced. An immunotoxin known as the resulting ricin antibody conjugate the deadly toxin can be carried directly to the site of the tumor in a cancer patient by arming these antibodies with ricin. Thus without damaging other cells in the patient ricin can destroy the tumor cells[14].

Antidiabetic activity

The effective dose of *R. communis* administration to the diabetic rats for 20 days showed suited effects not only on fasting blood glucose (FBG) but also on total lipid profile (TLP). Even after the administration of the extract at a dose of 10g/kg body weight, *R. communis* seemed to have a high margin of safety as no mortality and no statistically significant difference in alkaline phosphatase, creatinine, serum glutamate pyruvate transaminase, serum bilirubin, serum glutamate oxaloacetate transaminase, and total protein was observed. Thus, *Ricinus communis* seems to have a promising value for the development of a phytomedicine potent for diabetes[15].

Purgative activity

Castor oil was one of the old-fashioned remedies for everything from constipation to heartburn widely used since ancient times and is still in use. It is the most valuable laxative talk about in ayurveda. It starts to manifest its pharmacodynamics action in 3 -5 hours. It is considered to be fast, safe and gentle, prompting a bowel movement and affecting the entire length of the bowel, but not increasing the flow of bile, except in very large doses. It is also used to clear the digestive tract in cases of poisoning. It should not be used in cases of chronic constipation[16].

Conclusion

Eranda has been cited having remedial effects in indigenous traditional literatures. Castoroil is most popular derivate of Eranda, it has good therapeutic results in so many conditions. Various parts of Eranda have variegated types of chemical constituents. Now a day's Eranda plant is known as bio digital plants. *R. communis* is a natural plant of India. It is utilized for the preparation of varied herbal formulations such as anti-inflammatory, analgesic, anti-asthmatic, nervine tonic, pugative, appetizer and antipyretic, etc. Some of them are reported above, it has varied pharmacological actions. So it may be concluded that *R.communis* is a very important indigenous medicinal plant that required more exploration to utilize its medicinal property.

References

1. Lal R, Harini A; The castor plant; A review, International Journal of Ayurvedic & Herbal Medicine, 7(1): 2017, 2449-2452.
2. Gupta N, Singh AK; A review on Ricinus Communis Linn, International Ayurvedic Medicinal Journal. 3(2): 2015.
3. Pharmacognosy of Indigenous drugs, central council for research in Ayurveda and Siddha India,1:2005.
4. Mishra B, Bhavprakash First Part, Commentary by Shri Brahmasankara Misra and ShriRuplalaji Vaisya,11th edn (Chaukhambha Sanskrit Bhawan,Varanasi),2007.
5. Morya GCK; Ayurvedic Approach of Eranda (Ricinus communis Linn.) on Vata Vyadhi for GreenPharmacology, International Journal of Theoretical & Applied Sciences, 8(2): 2016, 33-35.
6. Jena J, Ricinus *communis*Linn: A phytopharmacological review,International Journal of Pharmacy and Pharmaceutical Sciences, 4(4): 2012.
7. Dravyaguna- Vijnana, Vol –2 by Prof P.V.Sharma, Chaukhambha Bharati academy Varanasi, 2: 2021; 58-61.
8. https://www.easyayurveda.com/2014/12/12/castor-benefits-use-research-side-effects/
9. Das AJ & Goswami K; A conceptual study on castor oil (Eranda oil) with special reference to modern & Ayurvedic Classics, JETIR, 7(8): 2020.
10. Morya, G.C.K., Kumari, G. and Kumar, G. (2016). Indigenous knowledge on medicinal plants of siwan district of bihar, India, National Conference on Science for Rural India, 2016. 11.
11. Morya, G.C.K., Pandey, A. and Mishra, H.S. (2014).Therapeutic efficacy of Erand (Ricinus communis Linn.) on Vata vyadhi, National Seminar on Vata Vyadhi, 2014.
12. Morya GC, Ayurvedic Approach of Eranda (Ricinus communis Linn.) on Vata Vyadhi for Green Pharmacology, International Journal of Theoretical & Applied Sciences, 8(2): 2016, 33-35.
13. Banarjee S, Bandhopadhyay SK, Mukharji PK,Mukharjee, A. and Sikdar, S. Further study onanti-inflammatory effect of Ricinus communis L in albinorat. Indian Journal of Pharmacology, 23: 1991; 149-152.
14. Pandey,K.N.& Chaturvedi G.N.(Ed.) (2009). Charak samhita of agnivesh-vidyotani hindi commentary (CS.Su.12.8). Chaukhamba Bharati Academy, Varanasi,India, 246
15. Sharma, P.V. (2006). Dravyaguna vigyana vol-2 (vegetative drugs). Chaukhambha Bharati Academy, Varanasi, India, 60
16. Shokeen P, Anand P, Murali YK and Tandon V; Anti diabetic activity of 50% ethanolic extract ofRicinus cummunis and its purified fractions. Food and Chemical Toxicology, 46: 2008, 3458-3466.

