The Medicinal Effect of Different Parts of Abrus Precatorius Plant Extract – A Review

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Abstract

The Abrus Precatorius plant is considered as a valuable source of unique natural products for development of medicines against various diseases. Various parts of this plant are used to treat bacterial infections and for the development of industrial products. The roots, leaves, and seeds of this Abrus Precatorius plant are used for different medicinal purpose. Herbal medicines are in great demand for preliminary health care because of their wide medicinal values without any side effects. Abrus Precatorius is the native plant of this Indian subcontinent and used in many ways in traditional system of medicine considered as the Ayurveda treatment. It is reported that the plant has broad range of therapeutic potentials, like anti-bacterial, anti-ulcer, anti-fungal, anti-tumor, analgesic, anti-spasmodic, anti-diabetic, anti-serotonergic, anti-migraine, including treatment of hair, inflammation, wounds, throat scratches and sores. It is now considered as valuable source of unique natural products for development of medicines against several diseases and for development of industrial products, but still additional information needs to be updated. Therefore, the present review is desired to compile up the updated data and highlighting the special features on its pharmacological activities in various diseases. The plant is used for therapeutic purpose since Vedic period.

KEYWORDS: Herbal medicine, Ayurveda treatment, Traditional system.

Introduction:

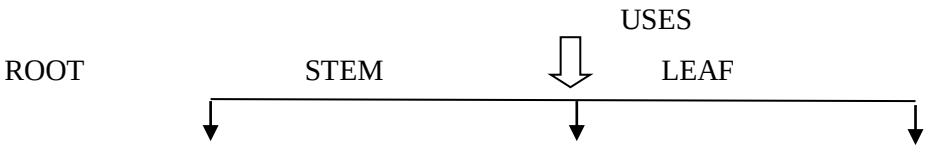
Abrus Precatorius is the one of the important herbs which commonly known as Indian liquorice belonging to family Fabaceae. This plant is considered as the valuable source of unique natural products for development of medicines against various diseases. As this plant has few potential medicinal values, it has some toxic effect too. Various parts of this plant are used to treat bacterial infections and acts as Anti-fertility, Anti-diabetic, Anti-Alzheimer's, Anti-epileptic, Anti-helminthic, abortifacient etc. The roots, leaves and seeds of this plant are used for medicinal purpose in different ways. Herbal medicines are in demand for preliminary health care due to their huge medicinal values without any side effects. The plant is considered as unique natural products for development of

medicines against various diseases. Various parts of this plant are used to treat bacterial infections and for the development of industrial products. This plant is having medicinal potential to cure several diseases. Abrus Precatorius is the native plant of this Indian subcontinent and used in many ways in traditional system of medicine considered as the Ayurveda treatment. It is reported that the plant has broad range of therapeutic potentials, like anti-bacterial, ulcers, antifungal, anti-tumour, analgesic, anti-spasmodic, anti-diabetic, anti-serotonergic, anti-migraine, including treatment of inflammation, wounds, throat scratches and sores. The seeds of this plant are slightly smaller than an ordinary pea. The root of the plant is woody with a sweet taste rather like liquorice Antioxidant Activity 99.9 percent of ethanol was used to extract the raw, dry seed powder. The phytochemical test suggests that there is a higher degree of overall phenol and flavonoids in the extract using tests such as hydroxyl radical scavenging activity power, hydrogen peroxide scavenging activities, and the extract was screened for possible antioxidant activities. The antibacterial Activity Seven strains of bacteria called as Escherichia coli, Pseudomonas aeruginosa, and Salmonella typhi Salmonella Para typhi A, Salmonella Para typhi B, Klebsiella pneumonia and Staphylococcus aureus have been isolated from the soil. Against all the above bacterial strains, antimicrobial activity of different sections of Abrus Precatorius such as roots, seeds, and leaves were examined. The roots extract of Abrus Precatorius was found to be active against Staphylococcus aureus a gram-positive organism. Root extracts, particularly against Staphylococcus aureus, possess good antibacterial potential Anti-diabetic Activity.

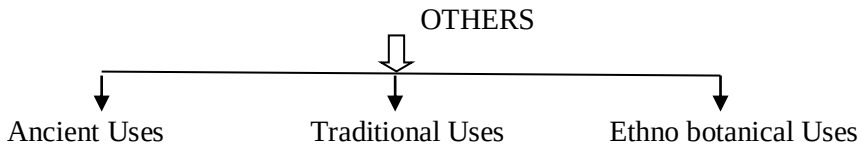
A. Chemical composition:

- Leaf: Abrin, trigonelline, abruslacton A, hemiphloin, abrusoside A, abrusoside B, abrusoside C, abrusoside D, arabinose, galactose, xylose, choline, hypaphorine, precatorine, glycyrrhizin, montanyl alcohol, inositol, D monomethyl ether, pinitol.
- Root: PROTEIN- abraline, abricin, abrusgenic acid-methyl-ester, abruslactone, abrussic calcium, campesterol, cycloartenol, delphinidin, gallic trigonelline, hypaphorine, choline n,ndimethyl-tryptophan-metho coumaroyl galloyl glucodelphinidin, pectin, pentosans, phosphorus, delphinidin, gallic acid, picatorine, polygalacturonic-acids, precatorine, polysaccharide, isoflavonoids and quinones-abruquinones a, b, c, d, e, f, o abruslactone a, abrusgenic acid arabinose, galactose, xylose are present in leaf. Triterpenoids and saponins, glycyrrhizin found in the root and abrusoside a, b, c, d.
- Seed: It contain poisonous and contain principal compound abrine, abrin A, abrin B, abrin C, abrin I, abrin II, abrin III, Abrus agglutinin APA 1, Abrus agglutinin APA-II, Abrus-saponins I and II, abrisapogenol, β-amyrin, arachidyl alcohol, brassica sterol, decan-1-ol, de docos-13-enoic acid, docosane, n, dodecan-1 -ol, dotriacontane, n, eicos-11-enoic.

B. Uses:



1) Anti- Alzheimer's	1) Anti- bacterial	1) Anti- fertility
2) Anti- fertility	2) Anti- cancer	2) Anti- migraine
3) Anti- diabetic	3) Anti- tumor	3) Anti-malarial
4) Anti- tumor	4) Anti-microbial.	4) Anti- microbial
5) Anti- serotonergic	5) Anti- viral	5) Anti- inflammatory
6) Anti- migraine	6) Anti- fertility	6) Anti- arthritic
7) Anti-microbial	7) Anti- spermatogenic	7) Anti- diabetic
8) Anti- malarial	8) Anti- helminthic	8) Anti- tumor
	9) Anti- allergic	9) Anti- serotonergic
	10) Anti- malarial	
	11) Anti- migraine	
	12) Anti- serotonergic	
	13) Anti- diabetic	



1. Ancient uses: The bright red seeds of Abrus Precatorius are strung as Jewellery.

- Jewellery: The seeds of Abrus Precatorius are much valued in native Jewellery for their bright coloration. Maximum beans are black and red, reminiscent of a ladybug, though other colours exist.
- There are persistent reports that the workers who pierce the seeds to thread them can suffer poisoning or even death from a pinprick, but there seems to be little evidence.
- In Trinidad in the West Indies the coloured seeds are strung into bracelets and worn around the wrist or ankle to ward off jumbies or evil spirits and "malyeux"—the evil eye.

2. Traditional Uses:

- Abrus Precatorius, called "Gulaganji" in Kannada, Kundu mani in Tamil, Guruvinda ginja in Telugu and 'Kunni kuru' in Malayalam, has been used in Siddha medicine for centuries
- The white mixture is used to prepare oil that is claimed to be an aphrodisiac
- A tea is made through the leaves and used for fevers, coughs, and colds. Seeds are poisonous and therefore only taken after heat treatment.

- This plant roots are used in India as a substitute for liquorice, though they are little bitter. In Java the roots are examined demulcent.
- The plant is used in Ayurveda and to promote hair growth. It is used as an ingredient in Indian hair products.
- The aqueous extract of Abrus Precatorius showed a very good hair growth promoting activity at a dose of 300 mg/kg which was comparable to that of 2% minoxidil.
- A. Precatorius is traditionally used to cure tetanus, and rabies.

3. Ethno botanical uses:

- The plant is used as a traditional medicine to cure scratches and sores and wounds caused by dogs, cats, and mice, and are used with other ingredients to treat leukoderma.
- The herb leaves are used to treat fever, cough and cold. The roots are used to cure jaundice and haemoglobin uric bile.
- Hot water extract of root is an anti-malarial and anti-convulsant.
- Paste of roots is used to treat abdominal pains, Tumours and for abortion.
- Root is consumed as a snake bite remedy.
- Dried root of decoction is used to cure bronchitis and hepatitis. For hair greying, a paste of leaves and seeds is enforced.
- Dry seeds of Abrus Precatorius are used to cure worm infection.
- In veterinary medicine, it is used to cure of fractures.
- Seeds have the potential of good insecticide with antimicrobial activity.
- A lot of African tribes use powdered seeds as oral contraceptives.
- Abrus seeds are taken for painful swelling and tuberculosis.
- Seeds are purgative, emetic, tonic, anti-Phlogistic, aphrodisiac and anti-ophthalmic.
- Leaves and seeds are nutritious as boiled seeds are consumed in certain parts of India.

3) Risk factors:

- Abrus Precatorius seeds, which are used as beads and in percussion instruments, and which are toxic Because of the presence of abrin.
- Ingestion of one seed, well chewed, can be fatal to both adults and children.
- Abrus Precatorius is native to Asia, Australia.
- This plant has tendency to become weedy and invasive where it has been introduced.

Insufficient Evidence for: Quickening labour, causing an abortion, Preventing pregnancy, Pain in terminally ill patients, Eye inflammation, Asthma, Bronchial tube swelling, Fever, Hepatitis, Malaria Seizures, Snakebites, Sore throat, Stomach pain.

4) Cultural Significance: In Rajasthan, India, Chirm song is associated with this Abrus Precatorius plant. There is also evidence that this plant has significant economic value to traditional Zulu people, since it is informed of income for Zulu people that to make and sell crafts that were made from the seeds of this Abrus Precatorius Plant.
5) Ecology and invasiveness: Abrus Precatorius are a severely invasive plant in hot temperate to tropical regions, very much so that it has become effectively tropical in distribution. It had been widely introduced by Humans, and the hard-shelled brightly coloured seeds have been spread by birds. By the end of this 20th century, it had been proclaimed as an invasive weed in many regions including some in Belize, Caribbean Islands, Hawaii, Polynesia, and parts of the mainland United States. In Florida particular, this plant has invaded undisturbed pinelands and hammocks, including Vulnerable pine Rockland's. Once Abrus Precatorius plants have grown to maturity under the favourable conditions, their deep roots are highly difficult to remove, and the plants aggressive growth, hard-shelled seeds, and ability to sucker, renders an infestation highly difficult to eliminate and makes it very difficult to prevent re-infestation. Herbicides such as Glyphosate it is effective but needs skilled application if they are not to do more harm than good.

Review of literature

S.NO	AUTHOR & YEAR	PLANT PART	METHOD OF EXTRACTION	ACTIVITY
		Seed	Methanolic crude extract	Anti-bacterial activity on Klebsilla Pneumonia
		Raw dry seed powders	Ethanol	Antioxidant
		Leaf	Methanol	Anti-bacterial activity against almost all bacteria
		Roots	Petroleum ether	Anti-bacterial activity
		Seed	Methanol extract	Inactive against HLTV-11 Virus
		Dried seeds Leaves	Chloroform-methanol extract	Anti-diabetic

		White (APW)	raditional healers	Treatment of inflammatory disease conditions
		seed	Croton oil	Antti arthritic activity
2.	DJ Taur[1*,] RY Patil2, etal	Leaves	Ethanol	Asthma
		Seed	Chloroform-methanol	Anti-diabetic
		Seed	Methanol	Anti-bacterial towards all bacterial micro- organism
4.	Rajini A*[1], K. Hema malini[2], S.K. Arifa Begum[1], KVLD.Spandana[3], Parvathal u[3], Gowtham3, etal	Red seeds	Ethanolic	Anthelmintic
		Leaves	Methanol	Bronchodilator
		Seed	Ethanol	Antioxidant
		Dried leaf	Ethanol	Antispasmodic

Methodology

- **Antiviral:** The Ethanol/water (1:1) extract of the aerial parts of this plant at a concentration of 50 mcg/ml in cell culture was Inactive on the Ranikhet virus and Vaccinia virus reported by the researcher and similar results was found using the Cell culture Method by administered water and methanol extracts of dried seeds of Abrus Precatorius plant were Inactive against virus-HLTV-1.
- **Anti-diabetic:** The anti-diabetic effects of chloroform–methanol extract of this Abrus Precatorius seed (50mg/kg) was studied in Alloxan diabetic rabbits. The percentage reduction of glucose in blood was found after Treatment with the chloroform – Methanol extract at different intervals was shows that the chloroform –Methanol extract of Abrus Precatorius Seed having anti-diabetic properties having Trigonelline similar as that of chlorpropamide. Different Observations were found in another study on rat model treated after with Ethanol/water (1:1) extract of the aerial Parts of the Abrus Precatorius plant at dose of 250 mg/kg which is shown to reduce only 30% sugar level in blood.
- **Anti-fertility (a):** The extraction of Abrus Precatorius seeds by using the methanol and deteriorated the motility of washed human Spermatozoa with the EC 50 of 2.29 mg/ml, was irreversible. The highest concentration which was tested was20.0.mg/ml, which results the onset of motility almost immediately. In contrary, this and other Effects was not evident at the lower concentration than 5 mg/ml. Scientists of University of Colombo, Sri Lanka approved these results. The Male albino rats were treated with 50% methanol extract 250 mg/kg for 30 and 60 days became infertile.

This was reversible. This treatment met the energy Metabolism of the cauda epididymitis. Levels of acid succinic hydrogenase and phosphatase was Significantly reduced, while protein and sialic acid was appeared normal.

- **Anti-fertility (b):** Chloroform/methanol extract of seeds of Abrus Precatorius administered subcutaneously to female rats at a dose of 50.0 mg Was Active. Similar results were obtained in the experiment done on male rats when the ethanol extract of seeds was administered by Intra-gastric ally with the dose of 100.0 mg/kg and 250.0 mg/kg for 60 days. No pregnancies Was reported for 20 Females paired with 10 males. Opposite findings were shown to ethanol (80%) extract of seeds. Administered orally and subcutaneously to female rats at a dose of 1.0 mg/animal and same results were found with ethanol (95%), water extracts of seeds to mice but pet ether Showed active with pet ether. The anti-Fertility activity remains inactive when ethanol (95%), water and Petroleum ether extracts of the Abrus Precatorius leaves Administered orally to female mice.
- **Antifertility (c):** Anti-Fertility activity of Ethanolic extract of A. Precatorius seed was evaluated for its effect on sperm Production and DNA integrity of the spermatozoa in intraperitoneally administered adult male of albino mice of BALB/c strain. The daily production of sperm was measured by counting testicular spermatids in Harwell Chamber while DNA damage in the epidermal spermatozoa was determined by come at assay in 20 days of Experimental procedure. The intraperitoneal administration of the 20 and 60 mg/kg of ethanolic seed Extract of A. Precatorius caused a highly significant ($p<0.001$) decrease in daily sperm production. The reversibility in sperm production was observed in all the treated animals after 20 days of withdrawal of treatment. Similarly, a highly significant increase ($p<0.001$) in DNA damage was observed in all of the Treated animals and no significant reversibility in DNA damage was observed during this treatment period. This study suggests that the role of seed extract of Abrus Precatorius as an antifertility agent or contraceptive with the risk of DNA damage in spermatozoa and may lead to the teratogenic effects.
- **Anti-allergic:** Abruquinones A, B, D, F shows strong anti-allergic effects. Inhibition of superoxide formation was Less Than 0.3 µg/ml from the rat neutrophils and less than 1 µg/ml for the histamine from mast cells. Polymyxin B-induced Hind paw edema was suppressed by abruquinones A, in normal as well in adrenalectomized Mice. Histamine, Serotonin, bradykinin, and substance P-induced plasma extravasation in ear edema was Also suppressed to the Greater extent than that with diphenhydramine and methysergide with these chemical Constituents. The wound healing activity of red and black colored seed of and methanol insoluble Fractions of white colored form Resulted in early wound healing activity which is due to presence of Gums, tannins, mucilage's, or Phenolic compounds in the A. Precatorius seeds. This will support the effectiveness of the seed Extracts and fraction in controlling the infection in vivo. The anti- serotonergic activity was done by invitro studied on albino rat and frog Fundus muscle preparations. Petroleum ether extracts showed Smooth muscle contraction at the different Concentrations, as the dose increases immediately the response also increased, while the ethyl acetate extract shows only the Base line elevation and was compared with Sumatriptan at different doses. The body temperature is observed by the ethanol/water extract (500mg/kg) of the aerial parts and was found as inactive.

- **Anti-malarial:** An isoflavanquinone, abruquinones, was isolated from the extract of aerial parts and exhibited antimalarial Activity. The Ant plasmodial activity and cytotoxicity in the assessment of the antimalarial activity was Evaluated and the Abrus Precatorius extract presented on the IC 50 value below 20 g/ml.
- **Antioxidant:** The ethanol extract of Abrus Precatorius seeds was evaluated using in-vitro method to determine the Antioxidant Activity. Total phenolic compound in the ethanol seeds extract of Abrus Precatorius were found to be 95 mg/g of Extract calculated as the gallic acid equivalent (r2=0.9976) and total flavonoids compounds was Found to be 21 mg/g of extract calculated as the rutin equivalent (r2=0.9985). Abrus Precatorius seeds Ethanol extract possesses potent Antioxidant activity in the various enzymes levels when compared with Reference compound butylated Hydroxytoluene (BHT).
- **Anthelmintic Activity:** Aqueous extract of stem and root of Abrus Precatorius was evaluated for its Anthelmintic activity using in the vitro experiments with cestodes and schistosomula. Lethal concentration against the cestodes was 103 mg/ml for the extract of root. However, the extraction of root (0.6 mg/ml) and stem (1.5 mg/ml) of Abrus Precatorius shows best results against the statistics. Indole alkaloids (abrine) Amino acids, terpenes, tannins, steroids, and flavonoids have been detected in Abrus Precatorius. A high Concentration for one of these constituents or a combination of these may be responsible for Anthelmintic effect, and without doubt makes A. Precatorius was a potent plant in the vernacular treatment of schistosomiasis.

Plant profile

Abrus Precatorius, generally known as jequirity bean or rosary pea, is an herbaceous flowering factory in the bean family Fabaceae. It's a slender, imperishable rambler with long, pinnate- leafleted leaves that twines around trees, shrubs, and walls.

A. Scientific Names:

Family	Fabaceae
Sub family	Faboideae
Genus	Abrus

B. **Common Names:** Abrus Precatorius is generally known as jequirity, Grouser's eye, or rosary pea, paternoster pea, love pea, precatory pea or bean, prayer blob, John Crow Bead, coral blob, red- blob vine, country licorice, Indian licorice, wild licorice, Jamaica wild licorice, Aker Saga, coondrimany, gidee, Jumbie blob, ratti/ rettee/ retty, goonjaa/ gunja/ goonja/ gunjaa, or rainfall shops. Abrus maculatus Noronha/ Abrus sparciflorus desv/ glycine Abrus L. / Oro bus americanus Raf/ Zaga parviflora Raf.

C. **Uses:** Anti-fertility, anti-diabetic, antitumor, anti-malarial, anti-microbial, antioxidant, anti-helminthic, anti-inflammatory, anti-allergic, anti-Alzheimer's, anti-serotonergic, anti-viral, anti-epileptic.

D. **Unit of measure:** The seeds of Abrus Precatorius are veritably harmonious in weight, indeed under different humidity conditions due to the water-impermeable seed- fleece.

E. Earlier works done:

- A variety of pharmacological action have been observed in rodents, but haven't been demonstrated clinically in humans, including. An ethanolic excerpt of Abrus Precatorius was plant to have antioxidant, anti-inflammatory and analgesic eventuality in rodents.
- A methanolic excerpt of A. Precatorius seeds causes reversible differences in the estrous cycle pattern and fully blocked ovulation in Sprague-Dawley rats.
- Studies on waterless, methanolic and chloroform excerpts of Abrus Precatorius showed lesser inhibitory exertion against several complaint-causing bacteria similar as Bacillus subtilis, Pseudomonas aeruginosa, Staphylococcus aureus, Salmonella typhimurium, and Escherichia coli.

F. Qualitative phytochemical analysis: Qualitative chemical tests were carried out for hydro alcoholic excerpt of Abrus Pectoris root (APRE), to identify different Phyto- ingredients.

1. **Alkaloids:** The APRE was dissolved in 2N HCl. Admixture was filtered, and the filtrate was separated into 3 equal portions. The disunited corridor was treated with many drops of Mayer's reagent; Dragendroff's reagent and Wagner's reagent. The cream-colored precipitate, orange multi-coloured and brown multi-coloured precipitate indicate the presence of separate alkaloids.

2. **Flavonoids:**

- **Shinoda test:** Shinoda test was used for the detection of presence of flavonoids.t. The APRE was treated with many drops of concentrated HCl and magnesium strip. The appearance of pink or tomato red colour within many twinkles indicated the presence of flavonoids.
- **Alkaline reagent test:** The APRE was treated with a many drops of adulterated sodium hydroxide (NaOH) independently. Conformation of violent unheroic colour which turned colourless on addition of a many drops of adulterated HCl indicated the presence of flavonoids.
- **Cardiac glycosides:** Cardiac glycosides specific test can be done. The APRE was treated with 1 ml admixture of 5 FeCl3 and glacial acetic acid (199 v/ v). To this result, many drops of concentrated H2SO4 were added. Colour change to greenish blue colour denotes the presence of cardiac glycosides.
- **Phlobatanins:** The APRE was boiled with 1 waterless HCl. Deposit of red precipitate was taken as substantiation for the presence of Phlobatanins.
- **Saponins:** The presence of saponins was determined by Salivating test. The APRE was roundly shaken with distilled water and was allowed to stand for 10 min and classified for saponin content as follows no head indicates absence of saponins and stable head of further than1.5 cm indicated the presence of saponins.
- **Steroids:** Liebermann-Burchard response was performed for checking the presence of steroids. A chloroformed result of APRE was treated with acetic anhydride and many drops of concentrated H2SO4 were added down the sides of test tube. A blue green coloured ring shows the actuality of steroids.
- **Tannins:** The APRE was treated with alcoholic ferric chloride (FeCl3) reagent and the presence of blue colour indicated the presence of tannins.

- **Triterpenes:** APRE was treated with concentrated sulphuric acid (H2SO4). Presence of sanguine brown ring indicates the presence of triterpenes.

Conclusion

Flavouring medication is that the use of plants (herbs) to treat malady and enhance prosperity. Flavouring medication is employed to treat a spread of disorders as well as anxiety, arthritis, depression, high vital sign, insomnia, secretion imbalances, migraines, skin issues like skin disease and different disorders. Herbs will act on the body as powerfully as pharmaceutical medication and wish to be treated with care. Herbs area unit administered by an healer or flavouring healer. Whereas some individuals might dismiss flavouring remedies as quackery, the employment of botanicals is well frozen in practice. Ancient doctors methodically collected info concerning herbs and developed well-defined pharmacopoeias to treat a spread of ailments. Within the recent times quite 1 / 4 of all medication of the commercially offered artificial medicines contain active ingredients that area unit derived from the plants that were offered since the traditional time. Within the gift study, we've found that the plant is wealthy in phenoplast, flavonoids and organic compound compounds, and so, has provided some organic chemistry basis for the ethno medicative use of the sample extract from A. Precatorius L. As a promising supply of bioactive compounds, it will be a superb supply of helpful medication. Moreover, it may also be terminated that hydro-methanolic seed of A. Precatorius L. extract may also function abundant potent antioxidant agent than the ethyl alcohol seed extract that was rumoured earlier to own inhibitor potential. it'll clearly flow from to high contents of the photograph chemicals within the hydro-methanolic extract. This criticism exposes that A. Precatorius is associate degree exclusive supply of the many very important Phytochemicals that makes this plant terribly distinctive and versatile for its sizable number of pharmaceutical properties i.e., medicament, neuro-protective, anti-microbial, analgesic and a few others. Hence comprehensive research area unit in demand of the recent times with this extremely medicative quality contained plant material. it's time to use the therapeutic utility of Abrus Precatorius to combat against numerous diseases. It is often all over by analysing the on top of collected literature that Abrus Precatorius may be a promising candidate as a useful medicative agent because of it possesses a high potential pharmacognostical and pharmacological applications.

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