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A Comprehensive Review on Abrus precatorius (L.): Ethnobotany, Phytochemistry, and Pharmacological Application

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ABSTRACT: Abrus precatorius, commonly known as Gunja or Jequirity, belongs to the Fabaceae family and is widely distributed across India from the Himalayas to the southern regions and Sri Lanka. It holds a significant place in traditional and Ayurvedic medicine, being mentioned in classical texts like the Samhitas. Various parts of the plantseeds, roots, and leaves are used to treat ailments such as cough, mouth ulcers, tuberculosis, skin disorders, bronchitis, migraines, and eye diseases. The plant is a rich source of bioactive compounds with promising pharmacological activities including antibacterial, anticancer, antidiabetic, and anti-inflammatory properties. Despite its known toxicity, ethanolic extracts have shown safety at higher doses (200–400 mg/kg). The presence of unique phytochemicals makes Abrus precatorius a valuable candidate for modern drug discovery and therapeutic use.

Keywords: Toxicology, Chemical composition, Pharmacological activity, Toxic effect, Phytochemical analysis, Analytical techniques

I. INTRODUCTION:

Abrus precatorius (L.) is a famous plant to the family (Leguminosae) the chickpea family. (1) It is native to tropical and subtropical India. tropical area, outside at an altitude of 1200 m Indian Himalayas. It is beautiful, multi branched, slender, perennial, deciduous, woody, and deciduous or climbs a mountain. Stem cylindrical, purple, bark soft, brown. The leaves are pinnate and oblong, many leaflets (12 or more) arranged pair of oval leaves,

Figure 1: Abrus precatorius (L.)

2.5 cm long and a width of 1.5 centimetres. (2) Flowers are abundant and visible in it leaf blades along the petioles, shorter than the leaves; This happens in groups 1 to 1,admiring the point of swelling 3 inches long, usually reddish-purple or sometimes red white The plant produces short and short brown retracts when opened to reveal the pendant red and black seeds, 4-6 peas per pot. (3) Fruit a legume (pea shaped pod) 3 cm long hard ovoid seeds 1 cm long

Medicinal plants are part of human society to fight disease dawn of civilization [4].Medicinal plants can be an important resource previously unknown chemicals with potential therapeutic effects. The medicinal use of plants is an ancient tradition, older than modern times. Medicine, pharmacology and chemistry. Global health organization estimated that more than 75% of the world's population is still dependent in herbs usually obtained from traditional healers basic health needs [5]. Herbal medicines are in great demand for development. It is chosen with developing countries for primary health care because of its breadth biological and pharmaceutical agents, higher safety margins and lower costs [6]. The current effort is to review and

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compile various updated data aspect of Abrus precatorius Linn. It is a plant that is used all over the world. This is a plant commonly known as 'Gunja' or 'Jequirity' and available everywhere- In the plains of India. In the absence of modern medicine, people rely on herbal medicines derived from herbs and To reduce swelling in wounds and other skin injuries, and to treat indigestion and stomach pain. A lot Molecules have emerged from the medical field, for example, rauwolfia alkaloids in amoeba. Guggulsteones as a hypolipidemic agent, mucuna pruriens for Parkinson's disease. India is one of the largest It is known as the botanical garden of the world because it produces medicinal plants and sits on top of gold Documented and traditional herbal medicinal practices. About 17,000 species About 7,500 Indian plants have been reported to have high medicinal value and in other countries estimated between 7°/o and 13% (7). In this regard, India has a unique position in the world A recognized indigenous system of medicine is available for public health.

TAXONOMICAL CLASSIFICATION:
Kingdom Plantae **Division:** Magnoliophyte
Family: Facaceae
Subfamily: Facoideae
Tribe: Abreae
Genus: Abrus
Species: Abrus predator jus (8).
THREE TYPE OF GUNJA:

1. **Red**
2 **black**
3 **white**

Figure 2: Types of Gunja

REDGUNJA

It helps to solve digestive problems and improves appetite and taste It also has some beneficial effect on vision Wound healing improves with use Gunja helps in improving the texture of the skin and hair. Gunja also helps strengthen immunity and provides bodily strength working as a general body

BLACK GUNJA: Black Gunja Seed / Chirmi Seed (black Gunja): These naturally cultivated beads are found in the forests of the Aravali Mountains in Rajasthan, India and are believed to be hundreds of years old. It brings good luck and ward off evil and protects the party from physical damage. It is said that the necklace itself will choose its owner and will not stay with an unfortunate person. They help reduce obstacles in Leather beads have been considered very lucky since ancient times. Stored in cabinets, money boxes or purses (9).

Macroscopically Evaluations:

Abrus seeds precatorius L. very different, bright crimson red with large black spots on a hill that is sunken and elliptical. These are dense, ovo id-ellipsoid-globose It is 5-7 mm long and 4-5 mm wide. These are bitter taste and characteristic odour.

Figure 3: Mature seed of Abrus precatoriu

Transverse Section:

Transverse section of a seed its shape is almost circular. Transit Unit The seed shows the outer testa differentiated into the epidermis and endodermis. Epidermis consists of adults is part of the test and is generated randomly long palisade radicals arranged like cells. The thin inner part of the testis is formed cells that form a hyaline layer. Endodermis consists of large thick walls isodiametric parenchyma cells on the inside cells with thin walls on the outside. Cotyledons broad radially elongated q mesophyll cells. Starch seeds (10).

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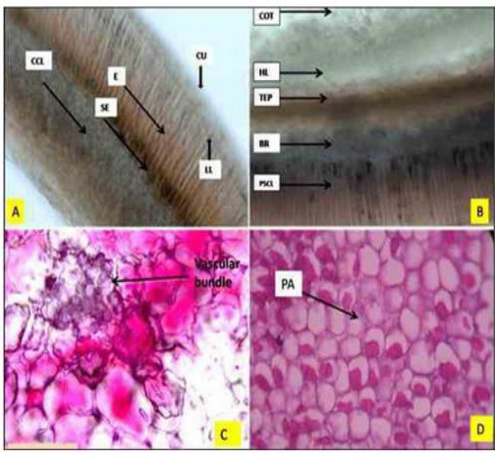

Figure 4: a: t. s cellular of testa showing epidermis (e), sub-epidermis (se) and collapsed cell layer (ccl); b: t. s cellular of seed showing palisade like sclereids of epidermis (pscl), bearer cells (br), tangentially elongated parenchymatous testa cells (tep), hyaline layer (hl) and cotyledon (cot); c: t. s cellular of seed showing vascular bundle; d:t.s cellularof seed showing parenchymatous cotyledons (pa).

Seed powder:

Diagnostic characters of the seed powder showed cotyledonary cells with aleurone grains group of beare cells with parenchyma, fragments of hyaline layer and group of palisade like cell of testa.

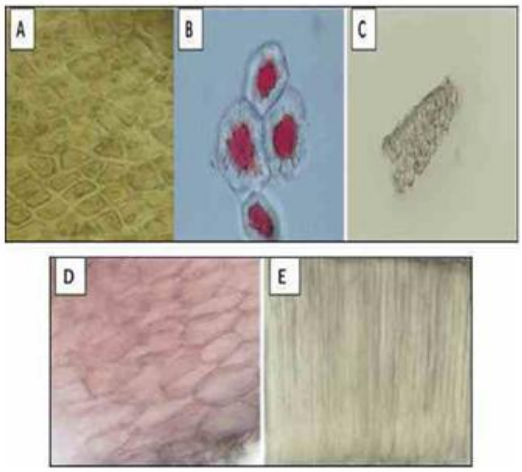

Figure 5: cotyledonary and a, b: sirian aluron; c: group of bearer cells by order; d: chap hyaline layer; d: palisade location

CHEMICAL COMPOSITION:

For the Abrus precatorius plant, different parts of it could be used and they have different sources of chemical constituents which have different medicinal effects on the body. Such as root, leaf and the seed of There are several types of fruit from the Abrus plant chemical compounds that help us study its variations biological effects for the treatment of various diseases.

For example:

Leaves: Abrine, Abruslactone, Abrusoside A, B C, D, Inositol et al.
Root: Abrol, Abrazine, Prekasin, Precol, etc.Seeds: Abrine, Abrin A, B, C, I, II, Ill, Abrus agglutinin, Saponin, Flavonoid, Abrectorin, Precatorin, Lectin, campestanol etc.

Materials

A collection of plant material Abrus precatorius seeds were collected District Rangareddy Phytochemical evaluation Various chemical tests were carried outextract profiling for chemical agents composition; Chemical tests below for all kinds phytoconstituents in different extracts are carried out as shown below.

- **Alkaloid test**

1. **Wagner's test:** 2 ml of Wagner for extract reagent is added; reddish brown formation sediment indicates the presence of alkaloids.
2. **Mayer's test:** Transfer, 2 ml Mayer's reagent is added, and a dark white precipitate appears the presence of alkaloids.
3. **Hager test:** Transfer, 2 ml Hager reagent is added; yellow formation sediment confirmed the presence of alkaloids.
4. **Dragendroff test**

A few drops of 1ml of extract in a test tube
Dragendroff reagent and colour added developed. Orange colour indicating the presence of alkaloids.

- **Test for terpenoids**

1. **Salkowski test:** 1 ml extract, tin (one bit) and thionyl chloride is added. Pink colour indicates the presence of terpenoids.
2. **Hirshon reaction:** When a substance is heated with trichloroacetic acid it is red-purple observed.

- **Test for steroids**

1. **Lieberman Burchard test:**

1 ml extract, 1 ml glacial acetic acid and 1ml of

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acetic anhydride and two drops of concentrated sulphuric acid are added. The solution turns red, then blue, and finally blue indicating the presence of green steroids.

- **Test for coumarin**

1 ml extract, 1 ml 10°/o sodium hydroxide added presence of indicated coumarins with the formation of yellow colour.

- **annin test**

A. Ferric chloride added to a few mg of extract,dark blue or greenish black formation indicating that tannins are present.
B. This extract is mixed with basic tin acetate solution; indicating the formation of a white precipitate the presence of tannins.
C. Saponin filter

5 ml of water is added to 1 ml of extract and the tube shakes a lot. Imitation leather formation indicates the presence of saponins.

- **Screening for flavones**

A. Shinoda test: Some magnesium per extract twist with 2 drops of concentrated hydrochloric acid is added, a red color is formed the presence of flavones.
B. 10°/o sodium hydroxide or ammonia for extraction added; dark yellow color indicates its presence flavon.

- **Quinone test**

1 ml of concentrated sulfur per 1 ml of extract acid is added. The formation is red presence of the queen.

a) Test for flavanones

The extract was 10% sodium hydroxide added and the color changed from yellow orange to indicate its presence flavanones. added sulfuric acid for extraction, it changes color to orange-purple red indicates the presence of flavanones.

- **Screening for anthocyanins**

(i) The extract was 10% sodium hydroxide
Added and the blue colour indicates its presence anthocyanins.
ii) Added sulphuric acid for extraction, and the yellow- orange colour confirms it presence of anthocyanins.

- **Anthraquinone test**

The Borntrager test is performed by Transplantation of ether and, after filtration, aqueous ammonia or added caustic soda. Pinkish red or purple colour showing the existence of a layer of water after shaking Anthraquinone.

- **Filter for phenol**

Iron chloride test: 10% less drop for extract water iron chloride is added. Appearance blue or green color indicates the presence of phenol.

- **Protein filter**

a. Biuret test: 1 ml sodium 40% per extract hydroxide solution and one drop of two percent copper sulphate solution is added. Formation Dark color indicates the presence of protein.
b. Xanthoprotein Test: For 1 ml extract concentrated nitric acid is added. White sediment is formed which is then boiled cool down. Then 20% sodium hydroxide or ammonia added Orange color indicates presence aromatic amino acids.
c. Tannie acid test: 10% tannic for extract acid is added. Forms a white precipitate indicating the presence of protein.

(0) Amino acid test

Ninhydrin Test: Two drops of ninhydrin solution added to the extract, characteristic purple color indicates the presence of amino acids (11).

Procedure for extraction:

The dried seeds of Abrus precatorius are ground Powder is obtained in various forms solvents such as isopropyl alcohol and ethyl acetate 6 hours of soxhlation for various preparations copies and accepted copies are submitted antibacterial test.

Microorganism

The test organism introduced for study is gram positive Bacteria such as Staphylococcus aureus, Bacillus subtilis, Gram Negative bacteria such as Escherichia coli, Klebsiella lung disease. All bacterial strains were purchased Osmania University, Hyderabad, Telangana. Bacterium 370 cultivated in nutrient broth C and supported in 40 on fiber for nutrition C.

Bacterial agents

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Muller Hinton Media is mixed with distilled water and then sterilized in an autoclave under 151 pressure minutes. The sterilized media was poured into petri dishes crates and bracing are allowed. hard plate A 5 mm diameter hole is bored with boron. Dish used with wells for antibacterial studies.Antibacterial activity of plant extracts Various seed extracts of Abrus precatorius a the concentration is 500µg/ml, 750µg/ml, 1000µg/ml tested against gram positive bacteria such as Staphylococcus aureus, Bacillus subtilis, gram negative Bacteria such as Escherichia coli, Klebsiella pneumonia

Good diffusion method

The antibacterial activity of plant extracts was tested using Good diffusion method. Culture plates are prepared Inoculation with different selected strains of bacteria used strip plate method. The well is made in wood With 6 mm thick boron. Dry extract It is soluble in 95°/o ethanol for various preparations,Transfer injected into the well using a sterile syringe. Dish incubation 37 0 C ± 20 24 hours C for bacterial activity. The plate is observed to clear the zone around it well The extract of the whole dry leaf is used for training.

Pharmacological activities:

Antidiabetic activity

The antidiabetic effect of chloroform methanol extract of Abrus precatorius seeds (50mg/kg) was investigated. Aloksan candy bunnies. The percentage decrease in blood glucose was found after treatment with chloroform - methanol extract at several intervals, which represents the methanol extract of chloroform - Abrus precatorium The seeds have anti-diabetic properties and trigonelline similar to chlorpropamide (12 .13). VariousThis observation was found in another study in a mouse model after treatment with ethanol / water (1:1) extract from the air. Abrus precatorius extract has been shown to lower blood sugar by only 30% at a dose of 250 mg/kg (14).

Anticancer activity

Ethanol (95%) extract of dried leaves [15]. administered intraperitoneally to mice and observation Inactive in Sarcoma 180 **(ASC)** AP07452. At the same time The aqueous extract of the seeds is administered intravenously Mice found active in sarcoma (Yoshida's hard and **ASC)** [16]. But again when running found to be inactive in sarcoma through the subcutaneous route (Yoshida ASC) AP01254.

Anti-inflammatory activity

Triterpenoid saponins 1 and 2 were isolated from air Parts of Abrus precatorius and its acetate products, 3 and 4 tested for anti-inflammatory activity using croton oil ear model. All compounds are anti-inflammatory swelling activity, but acetate showed greater inhibition relative to the parent compound. (17)

Antibacterial activity

Plant root extracts were tested for antibacterial activity. Chloroform extractable phytochemicals promising molecule with antibiotic activity. Horse Different extract concentrations (512 µg/ml - 4 µg/ml), Staphylococcus aureus is the most sensitive organism with MIC of 8 µg/ml for leaf extract. Extracts from the stem and seed oil are potent Gram-positive bacteria and Candida albicans but not S anginosus, E. faecalis and Gram-negative bacteria tested (18. 19)

Traditional use

Internally, the seeds are said to be poisonous and beneficial for the nervous system in systemic and external skin diseases, wounds, hair loss. The seeds are reduced It is recommended to use topically in cases of low sciatica, stiffness of the shoulder joints, epilepsy and other neurological diseases. A paste made of white flour, seeds and plumbago root is used as a dressing Stimulant. In alopecia, there is a seed paste It is recommended to rub on the bare scale. The seeds are used as a purgative, but they are plentiful Dose based on symptoms of cholera, acid poison. Sifted Internally, by women, the seeds disturb the uterus and prevent pregnancy. When reduced to a paste, they are used for contusions and swelling (20) the root is also used diuretics, diarrhea, gastritis, heart disease, kidney disease, insomnia, cancer and CNS sedative (21)

II. CONCLUSION

Herbal medicine is the use of plants (plants) to heal promotion of health and well-being. Herbal medicine is used to treat various diseases such as anxiety, rheumatism, depression, high blood pressure, insomnia, hormonal skin problems like acne, migraine, eczema and other disturbances. Herbs can transfer to the body As strong as a

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pharmaceutical drug, they should be carefully treated. The plant is taken care of by the mediciner or herbal therapy.This review article is based on A. precatorius is an extraordinary source of many vital resources phytochemicals that make this plant unique and versatile for many pharmaceutical manufacturers properties, namely antidiabetic, neuroprotective, anti antimicrobial, analgesic, etc. Therefore Comprehensive studies are urgently needed It is a plant of high medicinal quality material. It's time to use the benefits of therapy Abrus precatorius to combat various diseases (22).

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