



## A Phytopharmacological review of Potential drug *Gunja* - *Abrous precatorious* Linn

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**ABSTRACT:** Ayurvedic medicines mostly referred to as a plant medicine or phytomedicine are demarcated to be used as whole plant or part of plant to prevent or treat the various diseases. *Abrus precatorius* Linn. Linn. Linn, belonging to the family of fabaceae is one of the potential herbal plants to be used as natural medicine. *Abrus precatorius* Linn. Linn. Linn is capable of growing in tropical and subtropical region of the world. Hence, an attempt has been made to collect information related to therapeutic uses of Gunja from samhita granthas, nighantus and other published web articles and its updated data and highlighting the special feature's view mainly on its morphology, microscopy, phytochemical and pharmacological activities of different parts of *Gunja* (*Abrus Precatorious* Linn) in various diseases.

**KEY WORDS:** *Abrous precatorious*, Anti-diabetic activity, Anti-inflammatory activity, Neuroprotective effect, Antitumor activity, Carcinogenic activity.

### INTRODUCTION

Ayurveda deals with drugs of plant, animal, metal and mineral in origine. *Gunja* is one of the classic drugs of plant origine, botanically identified as *Abrous precatorious* Linn, is a perrinial climber, native to india and found throughtout the tropical regions of the world. It is commonly called as *Gunja* in Sanskrit, liquorice in English, *gunchi* or *Gunja* in Hindi. *Abrus* is belong to a genus of 13-18 species belonging to the family Fabaceae has been described in various *Samhita granthas* and also used as ayurvedic herbal medicine in the management of different deseases<sup>1</sup>. Besides with the efficacy of the *A. precatorious* as a medicinal plant, this review offers a comprehensive insight into the phytochemical, pharmacological, therapeutic activities and demonstrates that it can be used as s reliable source for the preparation of new drugs.

### AIM

To review important characteristics features of the plant *Gunja* (*Abrous precatorious* Linn).

### OBJECTIVES-

- To study the Ayurvedic and Modern texts of Botany, Pharmacognocny, Ayurvedic lexicons and other related texts.
- To study the references of *Gunja* (*Abrus Precatorious* Linn) from various sources on web portals.
- To prepare a thorough review as per the obtained data about *Gunja* (*Abrus Precatorious* Linn).

## **TAXONOMICAL classification**

Kingdom- Plantae

Divison- Magnoliophyta

Class- Magnoliophyta

Order- Fabales

Family- Fabaceae

Genus- Abrus

Species- Abrus Precatorious Linn.<sup>2</sup>

## **Morphological Characteristics of Gunja ( Abrous Precatorious Linn)-** <sup>3,4,5</sup>

### 1. **Habitate** –

It is a beautiful much branched, slender, perennial, deciduous, woody, prickly twinning or climber herb. It grows in all tropical and subtropical regions.

### 2. **Leaves** –

Are pinnately compound and glabrous, with many leaflets 7-24 pairs, turbid oblong, measuring 2.5 cm long and 1.5 cm wide, they are alternate with very paripinnate leaflets arranged in pairs.

### 3. **Stem** -

Cylindrical, wrinkled, bark smooth- textured, brown.

### 4. **Flowers** -

In axillary racemes, shorter than leaves, fascicled on the swollen nodes. Calyx- lobes short, appressed hairy and occur in clusters 1 to 3 inch long usually red to purple, or occasionally white.

### 5. **Fruit** -

Is a legume (pea shaped pod) about 3 cm long containing hard ovoid seeds about 1 cm long.

### 6. **Seed** -

The plant produces short brownish pods, which curl back on opening to reveal pendulous red and black seeds. 4 to 6 peas in a pod. The seeds elliptic to sub-globose, 0.5cm in diameter, smooth, glossy, shining red with black blotch around the hilum.

### 7. **Root**-

The roots and leaves are sweetish in taste.

## **Types of Gunja (Abrous Precatorious Linn)-<sup>6</sup>**

Rakta (Red colour Seeds with black spot)

Shweta (White colour Seeds)

Krushna (Black colour seeds)

## **Phenology- <sup>4</sup>**

Fruits are ripened in summer and Flowers in winter.

## **Part Used-**

The roots, seeds and leaves of the plant are used<sup>3,7</sup>

## **Species**

Abrus aureus (Madagascar)

Abrus baladensis (Somalia)

Abrus bottae (Arabia Sauditã) (Yemen)

Abrus canescens (Africa)

Abrus diversifolius (Madagascar)

Abrus fruticosus (India)

Abrus gawenensis (Somalia)  
Abrus laevigatus (Africa de Sud)  
Abrus longibracteatus (Laos Vietnam)  
Abrus madagascariensis (Madagascar)  
Abrus parvifolius (Madagascar)  
Abrus pulchellus (Africa)  
Abrus sambiranensis (Madagascar)  
Abrus schimperi (Africa)  
Abrus somalensis(Somalia)  
Abrus wittei (Zair)

**Figure-**



**Phytochemical study of plant Gunja (Abrus precatorius Linn)-**

**Chemical constituents-**

Several groups of secondary compounds have been isolated from this species, including alkaloids, steroids and other triterpenoids, isoflavanoquinones, anthocyanins, starch tannin, protein flavonoids, phenolic compound, fixed oil, amino acid

**Chemical Constituents According to Part of Plant-<sup>8</sup>**

**Leaf**

Abrine, Trigone, Abrus Lactone A, Choline, Hemiphloin, Abrusoside B, Abrusoside C, Abrusoside D, Arabinose, Galactose, Glycyrrhizin RE

**Root**

Abrol, Abrasine, Precol, Precasine, Isoflavinoids and Quinones- Abruquinones -A,B,C,O,E, And G, Triterpinoids,

**Seed**

Serine, Alanine, Valine, Choline and Methyl Ester. The Seeds Are Poisonous and Contain Abrine, Abraline, Abrasine, Abricin, Abrin, Abrusgenic-Acid, Anthocyanins, Calcium, and Choline.

## MATERIALS AND METHODS

In ayurvedic texts various available *samhitas* (classical texts), *nighantus* (lexicons), *samgraha granthas* (compendia), and some other texts related to *prayoga* (pharmacological/therapeutic uses) were referred, the synonyms, properties action and various formulations with their *adhikara* (prime indication) were compiled, critically analysed and arranged in systematic manner.

### Synonyms attributed to *Gunja* in different *Nighantus* (Lexicon) name as-<sup>9-15</sup>

Sr No	Name	Meaning
1	<i>Shweta Gunja</i>	White coloured variety of Gunja
2	<i>Rakta Gunja</i>	Red coloured variety of Gunja
3	<i>Uchhata</i>	It can easily reach to the heightened place
4	<i>Krishnala</i>	Seeds have black eye
5	<i>Kakachincha</i>	Seeds of Gunja resemble to tamarind seeds in producing sound
6	<i>Kakananti</i>	Fruits of Gunja making rattling sound when ripen
7	<i>Raktika</i>	Seeds are red in colour of red variety
8	<i>Shikhandika</i>	Looks cresty when flowering
9	<i>Sheetpaki</i>	Seeds ripen in winter
10	<i>Sughata</i>	Having good shape
11	<i>Rati</i>	Weigh of seed is particular one rati (125 mg) and it is used in weighting of jewelry.
12	<i>Krishna</i>	Raktika Its one variety has black and red colour seeds
13	<i>Gunja</i>	Resemble tamarind fruit making Rattling sound when ripen
14	<i>Ghunghuchi</i>	It is found in the group
15	<i>Bhilabhushan</i>	Used as ornaments of tribals.
16	<i>Chhontali</i>	It is a climber
17	<i>Kakatikta</i>	Black coloured seeds having tikta rasa
18	<i>Kakatundika</i>	Resemble tamarind fruit making Rattling sound when ripen
19	<i>Kaka</i>	Having sectarial mark
20	<i>Sauma</i>	Its white variety called saumya
21	<i>Shikhandi</i>	Looking cresty
22	<i>Aruna</i>	Due to somewhat orange red colour
23	<i>Krishnachudika</i>	Its black coloured seeds are good for health
24	<i>Raktakamboji</i>	Due to red colour seeds of red variety
25	<i>Vanya</i>	It is easily found in wild forest
26	<i>Shyamalchuda</i>	Fruits are developed in groups
27	<i>Kakashimbi</i>	Legumes become dark after ripening
28	<i>Raktala</i>	It has red colour seeds of red variety
29	<i>Durmoha</i>	Causing loss of consciousness in high doses.
30	<i>Shwetakamboji</i>	Due to white colour seeds of white variety
31	<i>Vanavasini</i>	It is a wild plant
32	<i>Chakrashalya</i>	When flowering and climbing in a circular way

33	<i>Bahuphala</i>	Numerous legumes
34	<i>Bahuveerya</i>	It is a potent drug
35	<i>Dhvankshi</i>	It's a wild climber
36	<i>Vakrashalya</i>	It climbs in curved manner

**Classification-**17, 18,19,11,10,9,16

Classic texts of ayurveda mention *Gunja* under different categories by keeping the drug under various *vargas* (group of drugs). Like *shushruta* mentioned under *mulavisha*, *bhavaprakash* mentioned under *Upavisha* as shown in the table.

Sr No	Reference	Adhyaya	Rogaghanata	Yoga/ Formulation
1	Cha Su 24/21, 22	Vidhishonitiya Adhyaya	Shudhdha Rakta Lakshana	-
2	Cha chi	Vajikaran Adhyaya		-
3	Cha chi 7/111-116	Kushtha Chikitsa	Kushtha Kandu Krimi	Kanakshiri Tail (Gunja seed used)
4	Cha chi 18/71-72	Kasa Adhyaya	Kasa	Prapaundarikadi dhuma varti (Gunja seed used)
5	Cha chi 27/30	Urustambha Adhyaya	Urustambha	Shargeshtadi Churna (Gunja seed used)
6	Cha chi 30/226	Yonivyapad Chikitsa	Shudhdha Artava Lakashana	-
7	Su Su 11/111	Ksharapakvidhi Adhyaya	Kushtha,kitibha, Dadru mandal, kilas, bhagandar, Arbuda, Arsha, Dushtavrana, Naadi, Charmakil,tilkalak, nyachha, vyanga, mashak, bahya vidradhi, krumi, visha, upajivha, adhijivha, upkuksha,dantavaidarbha, rohini	Pratisaraniya Kshara
8	Su.chi.6/9-11	Arsha chikitsa adhyaya	Adh-arshas (piles)	Alepa
9	Su Chi 17/15	Visarpa Nadi stanarog chikitsa	Kaphaj visarp	Visrpahar Yog, Lepa (Gunja seed used)
10	Su Chi 20/25	Kshudrarog chikitsa	Indralupta	Gunja Lepa (Gunja seed used)
11	Su ka 2/5	Sthavarvish vigyana Adhyaya	Visha	Mool Visha
12	Su U 11/101-102	Shleshma abhishyanda pratishedh	Apavahuka, viswachi, griddhrasi (lepa)	Apavahukadi lepa
13	Su U 32/8	Putanapratishedh Adhyaya	Putana Bala grahabadha	Making maala (Aushadhidhara)

14	Su U 34/7	Sheetputana pratishedh adhyay	Sheetputana Bala grahabadha	Making maala (Aushadhidhara)
15	A.H.Chi 8/21	Arsha Chikitsa	Arsha	Arshanashak Lepa
16	A.H.Chi 15/78	Udara Chikitsa	Tridoshaja Udaroga	Kalka of Gunja root mix with Madya for drinking
17	A.H.Chi 20/16	Svitrakrumi Chikitsa	Svitaroga	Bhallatakadi lepa (Gunja seed used)
18	A.H.U. 22/70	Mukharoga pratishedha adhyaya	Kaphaja Galagand chikitsa	Lepa (Gunja seed used)
19	A.H.U. 24/29	Shirirog pratishedha adhyaya	Indralupta vyadhi	Lepa (Gunja root used)
20	A.H.U. 40/32	Vajikaran vidhi adhyaya	Viryavridhhi	Uchchata &shatavari Yog (Gunja seed used)
21	Bha Ni	Guduchyadi varga	Mukhasosha, krimi, indralupta, bhrama, shwasa	-
22	Kai Ni	Karaviradi Varga	Krimi, indralupta, vrana, kustha, kandu	-
23	Dha Ni	Aushadhi varga	-	-
24	Raj Ni	Guduchyadi Varga	Sotha, sula	-

### Pharmacological activities of *Gunja* (*Abrus Precatorious* Linn)-

Certain Common Therapeutic Uses in Ayurveda Powder of *shodhita Gunja* seeds are used generally in a dose of 60–180 mg in different diseased conditions<sup>20</sup> and a few selected of its specific indications are given below in combination with other drugs.

**1. Sweta kustha (white leprosy):** Paste composed of the seed of *Ab. precatorius* Linn. and *Plumbago zeylanica* root is applied as a stimulant dressing<sup>21</sup>. Or application of the paste of *Gunja* powder with butter removes *kustha*. If the part is pasted with butter kept in a copper vessel, it prevents relapse of disease<sup>22</sup>.

**2. Pradara:** *SwetaGunja* seeds, dry *Gular* (*Ficus racemosa* Linn.) fruit, *Gorakhmundi* (*Sphaeranthus indicus*), *Lodhra* (*Symplocos racemosus*) and *Aswagandha* (*Withania somnifera*) all ingredients are powdered and taken with rice water<sup>21</sup>

**3. Vandhattya (infertility):** *Gunja* seed powder, *jeeraka* and *ghrita* are taken daily in the morning at the time of menstruation<sup>21</sup>.

**4. Shiroroga (disease of head):** Roots of *Gunja* are rubbed with water and *nasya* is given to cure *mastakasula*, *ardhamastakasula*, etc.<sup>21</sup>. Or snuffing with *Gunja* root is useful in all types of head diseases<sup>22</sup>.

**5. Indralupta (alopecia):** *Gunja* root and fruit are powdered and then *lepa* are prepared with *kateri* (*Solanum xanthocarpum*) leave juice<sup>21</sup>. Or the scalp should be incised, and the paste of *Gunja* applied thereon frequently. Along with the *rasayan*, drug should be used<sup>22</sup>

**6. Keshya (promoting hair growth):** *Lepa* made with *Gunja* leaves, *shuddhavatsanabha*, *tila*, *tila* oil, *mulethi* (*Glycyrrhiza glabra*) and *kanji* are used<sup>21</sup>

7. **Kukkur kasa (cough):** Fine powder of *Gunja* root (21 /2–3 ratti) and *sunthi* are taken and both are licked with honey to relieve *kasa*. Or grinded roots of *A. precatorius* is taken with pure clarified butter thrice a day for four days to cure cough <sup>21</sup>.
8. **Vajikarana (aphrodisiac):** Powder of *SwetaGunja*, *Satavari* and sugar are taken with milk for the management of *vajikarana*<sup>24</sup>.
9. **Palitty (graying of hair):** A paste of leaves and seeds is made, and juice is extracted. This juice is applied on hair as oil once a day one hour before taking bath <sup>21,25</sup>.
10. **Krimi (parasitic disease):** Grinded roots of *A. precatorius* is taken with pure clarified butter thrice a day for four days to cure cough <sup>21,25</sup>.
11. **Avabahuka (pain in arms):** The part is incised with a fine razor and paste of *Gunja* seeds is applied thereon. It alleviates *avabahuka*, *visvachi*, sciatica and other pains caused by *vata*<sup>22</sup>.
12. **Gandamala (cervical adenitis):** Oil cooked with root and seeds of *Gunja* and double water destroys, by massage and snuff, chronic *gandamala*<sup>22</sup>.
13. **Darunaka (dandruff):** Oil cooked with *Gunja* seeds along with *bhringaraja* juice destroys itching, dandruff and other diseases of scalp <sup>22</sup>.
14. **Dantakrumi (dental caries):** Root of either *Gunja* or *asvagandha* is chewed with teeth. It relieves the pain caused by dental caries <sup>22</sup>.
15. **Netraroga (defects of vision):***Gunja* root pounded with goat's urine removes defects of vision and blindness <sup>22</sup>.
16. **Karnaroga (for promoting growth of ear lobes):** Butter extracted of the buffalo's milk boiled with *Gunja* powder, by massage, promotes growth of ear lobes <sup>22</sup>.
17. **Vasarpa (Erysepelas):** In erysipelas caused by *pitta*, paste of *Gunja* leaves is applied <sup>22</sup>.

## THERAPEUTIC USES/MEDICINAL BENEFITS

The medical benefit of parts of the *A. precatorius* plant are as follows-

### Leaves

The leaves of *A. precatorius* are used as a tonic and aphrodisiac. The leaves of *A. precatorius* are used to treat leucoderma, skin diseases, itching, eye diseases, and wounds<sup>26</sup>. The leaves of *A. precatorius* are also efficacious to treat stomatitis, asthma, dental caries, migraine, fever, and tuberculosis<sup>27</sup>. *A. precatorius* leaves soaked in warm oil are applied to the surface of the skin, experiencing rheumatic pain<sup>26</sup>. *A. precatorius* leaves juiced mixed with oil can be applied over a bloating stomach<sup>28</sup>. *A. precatorius* leaves powder mixed with sugar are also being used for treating menorrhagia and leucoderma<sup>29</sup>. *A. precatorius* leaves are used in the treatment gastritis, diarrhea, insomnia, cancer, kidney disease, and heart disease<sup>30</sup>.

### Seeds

*A. precatorius* seeds are used to treat skin diseases, ulcers, and nervous system disorders <sup>31</sup>. *A. precatorius* seed paste is applied to the skin to treat shoulder joint stiffness, sciatica, bruises, and paralysis<sup>32</sup>. Seeds of *A. precatorius* are also used as laxative in small doses, as seeds in large doses are toxic and causes cholera-like symptoms<sup>33</sup>. *A. precatorius* seeds are even used as a natural contraceptive<sup>34</sup>.

### Root

*A. precatorius* roots are used to treat rheumatism, alexiteria, laryngitis, and vomiting<sup>35</sup>. *A. precatorius* root extract is used to treat in different coughs<sup>36</sup>. In addition, the root can be also used to treat cancer, gastritis, diarrhea, insomnia, kidney disease, and heart disease <sup>37</sup>. *A. precatorius* roots are also indicated in treating jaundice, gonorrhoea, and other infections<sup>29</sup>.

## **Pharmacological activities of *Gunja* (*Abrus Precatorious Linn*) as per modern Science-**

### **Anti-diabetic activity**

The anti-diabetic effect of chloroform - methanol extract of *Abrus precatorius Linn. Linn. Linnseeds* (50mg/kg) was conducted in alloxan induced diabetic rabbits. It was observed that there is significant reduction of blood glucose level after treatment at different intervals. This proved that *Abrus precatorius Linn. Linn. Linn.* seeds exhibit significant anti-diabetic properties nearly equal to that of chlorpropamide<sup>38, 39</sup>. In another study, rat model after treatment with Ethanol/water (1:1) extract of the aerial parts of *Abrus precatorius Linn. Linn. Linn.* at a dose of 250 mg/kg showed reduction in only 30% of blood glucose level<sup>40</sup>.

### **Anti-inflammatory activity**

*Abrus precatorius Linn. Linn. leaves* extract was studied to assess the anti-inflammatory activity on inflammation induced by croton oil on rat ear model. Extract of *A. precatorius* was simultaneously applied with croton oil to the rat ear. The study showed that there was a reduction in the inflammatory response in combined application were observed after 6 hrs. as compared to application of croton oil alone. The extract showed 2% more reduction in the inflammatory response as compared to croton oil alone group. This study proved the usefulness of the leaves of *Gunja* in the treatment of inflammatory diseases<sup>41</sup>. In another study similar model were treated with isolated active constituents' triterpenoid, saponins and their acetates derivatives from leaves. It was observed that there was reduction in inflammation in these different test compounds but the acetate group showed greater inhibition at both 300 µg and 600 µg than the parent compounds. The acetates derivatives of parent compounds were observed to be more effective at 600 µg concentration as compared to all other treated groups<sup>42</sup>.

### **Anti-malarial activity**

Isoflavaquinone-abruquinone compound isolated from *A. precatorius* extract showed antimalarial activity. Assessment of antimalarial activity was then carried out based on cytotoxicity and antiplasmodial activity. Cytotoxicity activity was evaluated in melanoma cells (A375), whereas antiplasmodial activity was evaluated by micro-radioactive methods. The assay of the *A. precatorius* extract was carried out at three diverse times in triplicate in 96-plate culture with the culture mostly at the ring stage at 0.5-1% parasitemia. *A. precatorius* extract showed IC<sub>50</sub> values below 20 g / ml<sup>43</sup>.

### **Antidiarrheal activity**

In an in vivo study, dry seed chromatography fraction of *A. precatorius* (10 mg/kg) was administered through intra gastric path in castor oil induced rats. It was observed that chromatographic fraction showed significant antidiarrheal activity<sup>44</sup>.

### **Antispasmodic activity**

It was observed that in an in vivo study, the chromatographic fraction of *A. precatorius* seeds at a dose of 0.2 mg/ml given to epinephrine-induced mice actively affected ACh-, PGE-2-, oxytocin- and epinephrine induced contractions in those mice models<sup>45</sup>.

### **Immunomodulatory activity**

An in vitro study was conducted to assess the immunomodulatory effect of *A. precatorius* seeds. *Abrus* agglutinin was separated from, from the seed extract of *A. precatorius*. This compound was observed to be similar to ML-1 with regard to the it's actions in specificity of activities like carbohydrates [gal (β1 → 3) gal



/ Nac], observed both in native (NA) and heat denatured (HDA) conditions for NK cell activation, cytokine secretion, murine splenocyte proliferation, and thymocyte proliferation. It was observed that HDA and NA activated splenocytes and induced the production of cytokines such as IFN- $\gamma$ , IL-2, TNF- $\alpha$ , and TNF- $\beta$ , was observed which exhibit a type of Th1 immune response. Native agglutinin abrasive and HDA-induced conditioned media of adherent splenocytes can stimulate non-adherent splenocytes and vice versa. Heat denatured abrasive agglutinin and induced NK cell activation at a much lower concentration than NA concentration, but the rate of NK cell activation was higher for NA, along with this thymocyte proliferation by HDA and NA was evaluated which proved that Abrus agglutinin can be used as a potential immunomodulator in the original form as well as in the extracted form<sup>46,47</sup>.

### **Anti-Depressant activity**

Roots of Abrus Precatorious, showed significant antidepressant activity when treated with ethanol (70%) extract on mice of both sexes at variable dosage levels<sup>48</sup>.

### **Antitumor activity**

Different extracts such as Ethanol, aqueous extracts were studied and given through different routes in mice. It was observed that extract of *A. precatorius* leaves given intraperitoneally to mice showed inactive results in Sarcoma 180 (ASC) AP074 70. While, aqueous extract of *A. precatorius* seeds administered intraperitoneally to mice showed active results in Sarcoma (Yoshida solid and ASC) 71 and aqueous extract of *A. precatorius* seeds when given subcutaneously to mice indicated inactive results in Sarcoma (Yoshida ASC) AP012 72.

### **In vitro cytotoxic activity -**

In a study, coarse powder of dried leaves of Gunja when extracted with chloroform and ethanol using Soxhlet apparatus, to assess the cytotoxic activity by MTT assay<sup>50</sup> method using human cancer cell lines in an in vitro study using - (A549) lung cancer, (hepG2) liver cancer, (HCT116) colon cancer, (HeLA) cervical cancer against Doxorubicine as a standard, the ethanol extract showed potential cytotoxic effect as compared to chloroform extracts in all the cancer cell lines<sup>51</sup>.

### **Neuroprotective effect-**

Petroleum ether extract from aerial parts of Abrus precatorius Linn at different concentration (100 mg/kg and 200 mg/kg) was assessed in hypoxic neurotoxicity induced rats, the extract was tested at different doses showed spatial behavior significantly as compared to hypoxic rats. The extract restored was observed to decreased levels of enzymes such as glutamate, dopamine and acetylcholinesterases, proving its neuroprotective effect on oral use<sup>52</sup>.

### **Antiviral activity-**

In a study it was observed that Ethanol/water (1:1) extract of the aerial parts at a concentration of 50 mcg/ml in cell culture was not active on Ranikhet virus and Vaccinia virus. In another study similar results was obtained from a study of cell culture method using water and methanol extracts of dried seeds of Abrus precatorius against HLTV-1<sup>53</sup> virus.

### **Memory enhancer activity-**

Abrus precatorius was examined in Alzheimer's disease model by identification of microglial cells (MGC) activation in autoptic brain samples by glycohistochemical method. Abrus precatorius agglutinin recognizes MGC in the cerebral white matter showed rod-like cells and appear to be particularly dense in those areas

proximal to an oligodendroglial cell showing regeneration of cellular some structure in this part. Active constituent lectin from *Abrus precatorius* plant has been found to identify the microglial cells activation in atopic brain samples from Alzheimer's disease subjects histochemically<sup>54</sup>.

#### **Diuretic activity -**

The diuretic activity was studied in male rats after oral administration of ethanol/water (1:1) extract of the aerial parts at a dose of 250 mg/kg, the study showed non-significant results<sup>55</sup>. Another study was investigated in renal damage induced Sprague dawley wistar rats orally administered alcohol (1.6g/kg). But the crude extract (200mg/kg) when administered in addition to alcohol for six weeks with normal feeds and water showed decrease significant elevation of potassium, sodium, creatinine and malondialdehyde in serum levels. Histological studies also confirmed with structural alterations in renal tubules, glomerular infiltration as compared with chronic inflammatory cells. In further study, simultaneous administration of same doses of alcohol and seed extract of *Abrus precatorius* resulted in decrease of alcohol induced renal injury. In this study, malondialdehyde level were measured which indicated that the decrease in renal injury is related to the attenuation of alcohol induced lipid peroxidation due to the seed extract (p)<sup>56</sup>

#### **Antifertility activity-**

In a study, evaluation of the antifertility activity of *A. precatorius* seed extract was carried out in adult male albino mice of BALB/c strain by intraperitoneal administration to assess the integrity of spermatozoa DNA and sperm production. The daily sperm production was measured in this study by calculating testicular spermatids in the Horwell chamber and DNA decay to epididymal spermatozoa was quantified by comet test in 20 days of the experimental procedure. The administration of ethanol seed extract in (20 and 60 mg/kg) caused a very significant alleviation in daily sperm production. Also a reversal in sperm production was observed in all these animals after 20 days of stopping the therapy. Also, no significant reversibility in DNA damage was monitored during the period of therapy. This proved that *precatorius* seed extract showed its activity as antifertility or contraceptive agent, along with a risk of DNA decay to spermatozoa and could cause teratogenic effects also<sup>57</sup>.

#### **Antifungal activity-**

Antifungal activity of 1% seed extract of *A. precatorius* was assessed, the study showed that the extract effectively inhibited the growth of *Cryptococcus neoformans*<sup>58</sup> proving its antifungal activity.

#### **Carcinogenic activity –**

In a study, aqueous/ethanol (50%) extract of *Abrus precatorius* was studied. it was observed that the extract was observed to exhibit, protective effects in HepG2 cells and Nnitrosodiethylamine (NDEA) against hepatocellular carcinoma in swiss albino rats. Also, 50% aqueous or ethanol (50%) extract showed strong cytotoxic effects on HepG2 cells. It was also observed that there was markedly increased of p53. Decrease in the liver weights was also observed in the animals treated with extract at a dose of 100 and 200 mg/kg. In a study, similar findings were observed against sarcoma after intraperitoneal of water extract (5mcg/kg) and subcutaneous administration of protein fraction of seed the extract (20mcg/kg). it was observed that the agglutinin protein from the seeds produced a significant antitumor activity<sup>59</sup>.

#### **Anti-implantation effect: -**

Methanol extract of *abrus precarios* seeds was administered in pregnant rats with 0mg/kg dose, a significant anti-implantation activity was observed. In another study, the ethanol extract of roots and petroleum ether

extract of roots were also studied which showed negative results while ethanol (95%) root extract (100 mg/kg) showed significant results when administered orally to rats. The aqueous seed extract was also negative but petroleum ether extract shows positive results. Also, semen coagulation was observed in rat semen when treated with ethanol/water (1:1) extract of aerial parts of plant<sup>60</sup>.

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61. **Figure-** *Abrus Precatorius*(L): An Evaluation of Traditional Herb- Scientific Figure on ResearchGate. Available at- <https://www.researchgate.net/figure/picture-of-abrus-precatorius-herb>