



PHYTOCHEMICAL, ANTIMICROBIAL AND ANTIFUNGAL PROPERTIES OF SEEDS OF ABRUS PRECATORIUS

KEYWORDS

Abrus Precatorius, antibacterial, antifungal

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ABSTRACT *The study is designed to screen the presence of various secondary metabolites and to determine the antimicrobial and antifungal activities of red and white seeds of *Abrus precatorius*. The impact of extracts of red and white seeds of *Abrus precatorius* on several bacterial strains were assayed by Agar well diffusion method. Antifungal effects of white seed extract were also assayed by Agar well diffusion method. Phytochemical screening showed the presence of various secondary metabolites like alkaloid, saponin, flavanoids, tannins, steroids, terpenoids and reducing sugar in mild to moderate degree. Both red and white seed extracts of *Abrus precatorius* showed antibacterial activity. The white seed extracts of *Abrus precatorius* also showed antifungal activity.*

Introduction

Abrus precatorius L. is commonly known as Gunja or Jequirity abundantly found all throughout the plains of India, from Himalaya down to Southern India and Ceylon. It has medicinal potential to cure various diseases. The roots, leaves and seeds of this plant are used for different medicinal purpose (Garaniya & Baporda, 2014). *Abrus precatorius* is a cylinder perennial climber that twins around trees shrubs and hedges. It is a legume with long, pinnate leafleted leaves. It is a severely invasive plant in warm temperate to tropical regions, so much so that it has become effectively pantropical in distribution. *Abrus precatorius* has been used as siddha medicine for centuries. The white variety is used to prepare oil that is claimed to be an aphrodisiac. A tea is made from the leaves and used for fevers, coughs and colds (Mendes, 1986). The plant is also used in Ayurveda and is said to promote hair growth. The plant is best known for its seeds which are poisonous therefore are used after mitigation (Verma et al, 2011). *Abrus precatorius* is known to possess antiseptic and anti inflammatory activity, which makes it useful in treatment of wounds (Shourie and Kalra, 2013). They are rich in wide variety of secondary metabolites such as tannins, alkaloids, flavonoids and phenolic compounds which has antimicrobial properties. *Abrus precatorius* act as a candidate for broad spectrum disease protection, so a resource for new biofungicide and also serves as a good starting material for the synthesis of environment friendly natural coagulant and disinfectant (Yasmin et al, 2015). The study is designed to determine the antimicrobial and antifungal activities of red and white seeds of *Abrus precatorius* and also to screen the presence of various secondary metabolites.

Material and Methods

Abrus Precatorious seeds were procured from local vendor. The identification of seeds was done by experts from Botanical Garden, Noida, Uttar Pradesh. The red and white seeds of *Abrus precatorius* were thoroughly washed and rinsed with double distilled water, dried and then powdered separately with a mechanical grinder and stored in an airtight container. The powder was then extracted with the organic solvents methanol and ethanol. The powder (2 g) was dissolved in 10 ml of each solvent and vortexed for 2 min and was

allowed to stand for 48 hrs on the rotary shaker at 2000 rpm. The mixture was then filtered using Whatman No.1 filter paper (125 mm). Phytochemical screening was performed by standard methods to test the presence of various secondary metabolites i.e. Alkaloids, Saponin, Tannins, Flavonoids, Steroids, Reducing sugars and Cardiac glycosides. The impact of extracts of red and white seeds of *Abrus precatorius* on several bacterial strains were assayed by Agar well diffusion method Different concentration of methanolic and ethanolic seed extract along with streptomycin sulphate (1mg/ml) was used as standard antibiotic and observed the zone of inhibition. Antifungal effects of red seed extract of *Abrus precatorius* were carried out by standard blotter method using mustard seeds and Antifungal effects of white seed extract in methanol on *Fusarium* species were assayed by Agar well diffusion method.

Results

Qualitative preliminary phytochemical analysis of methanolic and ethanolic extract of red and white seeds of *Abrus Precatorious* is performed with different chemical reagents to detect the presence of phytochemical constituents. Phytochemical screening showed the presence of various secondary metabolites like alkaloid, saponin, flavanoids, tannins, steroids, terpenoids and reducing sugar in mild to moderate degree (Table 1).

Table 1:- Qualitative Phytochemical analysis of different extracts of *Abrus Precatorius*

| S.No | Type of compounds | Red | White |
|------|-------------------|-----|-------|
| 1. | Alkaloid | ++ | + |
| 2. | Saponins | + | + |
| 3. | Glycosides | - | - |
| 4. | Flavonoids | ++ | ++ |
| 5. | Tannins | + | + |
| 6. | Steroids | + | + |
| 7. | Terpenoids | + | + |
| 8. | Reducing sugar | ++ | ++ |

+= Presence

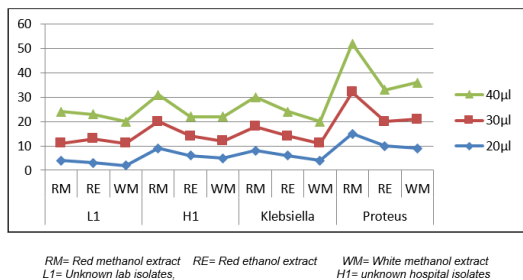
++= Moderate

-= Absence

Antibacterial activity:

The different concentration of methanol and ethanol extract of red seeds and methanol extract of white seeds of *Abrus precatorius* showed antibacterial activity against the tested organism *Klebsiella* and *Proteus* and two unknown isolates from hospital (Figure-1).

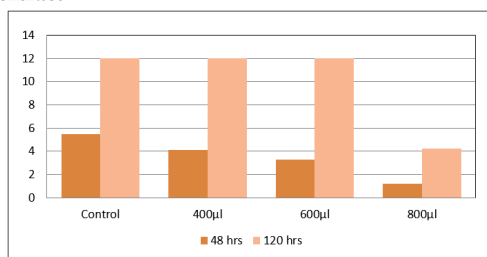
Figure 1:- Antibacterial activity of *Abrus precatorius* in methanolic and ethanolic Extract



Antifungal activity:

The methanolic white seed extract of *Abrus precatorius* showed antifungal property against fungus *Fusarium* (Figure-2).

Figure 2:- Antifungal activity of *Abrus precatorius* in methanolic seed extract



The antifungal property of *Abrus precatorius* were examined on the seeds of *Brassica Hirta* germinated on Murashigie and Skoog media was shown to be an effective surface sterilant (Figure 3).

Figure 3:- *Abrus precatorius* seed extract as a surface sterilant



Discussion

The study revealed the presence of biological active components in both red and white seed extracts, but it is clearly observed that phytochemicals are predominantly present in the methanol extract of red seeds. A study conducted by Zahir et al (2014) also showed the presence of bioactive chemicals in methanol extracts.

Our study showed the antimicrobial activity of the methanolic red seed extract effective against various bacterial strains. Similar study conducted by Karamaoko et al (2013) stated that the *Abrus precatorius* as a whole plant has a bactericidal action on various bacterial strains and also confirmed the antibacterial activity of seeds of *Abrus Precatorius*. A study conducted by Shourie & Kalra (2013) revealed that ethanolic extracts of *Abrus Precatorius* has remarkable antibacterial, antifungal and wound healing properties. The present study showed the antibacterial and also antifungal properties of ethanolic extract of red and white seeds of *Abrus*

Precatorius. Kekuda et al (2010) also showed the antibacterial and antifungal in crude methanolic seed extract of *Abrus precatorius* as seeds are highly rich in their phytochemicals.

Our study expressed that the extract of red seeds of *Abrus precatorius* showed antibacterial activity against gram negative bacteria is greater than white seeds. Sreeramulu et al (2009) demonstrated the antibacterial activity of white seed extract against gram positive bacteria.

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