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Review Article

Standardization and Phytochemical Screening activity of Abrus Precatorius Linn Root Extracts

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ABSTRACT

Abrus precatorius is one of the important medicinal plant belonging to the family Fabaceae. It is used as the common effective medicinal herb in many countries. The study plant has many therapeutic values like anti-inflammatory, ant diabetic, antimicrobial and antioxidant activities. The present study deals with the physicochemical and preliminary phytochemical analysis of Abrus precatorius roots. Five different solvents like Hexane, Petroleum ether, Chloroform, Methanol, and Aqueous were used to obtain the extract. These extracts were subjected for physicochemical and qualitative phytochemical analysis by using the standard procedures. Physico-chemical parameters like moisture content, total ash, water soluble ash and sulphated ash values were calculated. Alkaloids, flavonoids, glycosides and phenols are present in the all the extracts. These bioactive compounds obtained from the phytochemical analysis may be the responsible for the pharmaceutical activity.

Keywords: Phytochemical, Physico chemical, Flavonoids, Alkaloids, Abrus precatorius ash value.

INTRODUCTION

Abrus precatorius locally known as Rosary pea or Ratti, is indigenous to India and is commonly found in other tropical and sub-tropical regions. India is one of the major producers of herbs and herbal products. In the last few decades, there has been an exponential growth in the field of herbal medicine. It is getting popularized in developing and developed countries owing to its natural origin with few or no side effects compared to synthetic drugs. The knowledge of plant properties was acquired by ancient civilization that passed down from generation to generation until today. Plant showed wide range of pharmacological activities including antioxidant, antibacterial, antimicrobial, anti-diabetic, anticancer, cardiovascular, respiratory, immunological, anti-inflammatory, analgesics and other pharmacological effects [1-3] The medicinal value of the herbs lies in their phytochemical compounds which produce distinct physiological actions on the human body. The most important of these compounds are alkaloids, tannins, and flavonoid and phenolic compounds. Phytochemicals are expansively found at different levels in various medicinal plants and used in herbal medicine to treat diverse elements such as wounds, toothache, cough malaria and rheumatism diseases [4]

Abrus precatorius commonly known as Indian liquorice, a substitute to Glycyrrhiza glabra L. is used in traditional medicine to treat human numerous diseases. The study plant has rich medicinal value. Leaves are used as nerve tonic,[5] applied on cuts and swelling and mouth ulcers.[6] Roots are used for gonorrhoea, jaundice and haemoglobinuria bile.[7] The fixed oil from seed is said to promote hair growth.[8] Decoction of dried root is used to treat bronchitis and hepatitis.[9]

MATERIALS AND METHODS

Collection and Preparation of plant material

The plant material was collected from Perunglathur, Kancheepuram District, Tamilnadu, India. Freshly collected root parts were cleaned with tap water to remove adhering dust and then shade dried. The shade dried plants were mechanically ground to fine powder. The powdered materials were passed through sieve no 25 and used for further analysis including extraction.

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UV Fluorescence analysis

Take about 0.5gms of plant powder into clean and dried test tubes. To each tube 5ml of different organic solvents like distilled water, acetone, ethanol, benzene, chloroform, diethyl ether, methanol, glacial acetic acid, sulphuric acid, nitric acid, hydrochloric acid, 5% FeCl3, 5% I2, picric acid, 1N NaOH and 1N NaOH + methanol was added separately. Then, all the tubes were shaken, and they were allowed to stand for about 20-25 min. The solutions obtained were observed under the visible day light and UV light of short wavelength (254 nm) and UV light of long wavelength (365 nm) for their characteristic colour. [10]

Determination of foreign matter

One gram of sample was weighed, and foreign matter was carefully separated. The matter differing in colour and texture were considered as foreign. The separated matter was weighed and subtracted from one gram and percentage was calculated.

Determination of moisture content

One gram of powder was weighed and dried at 80°C for 24 h in hot air oven. After 24 h, the powder was weighed again and the difference in the weight was determined. The percentage of moisture was calculated.

Determination of pH

The 5% suspension of powder was kept on shaker for 5 h with 140 rpm and filtered. The filtrate was analyzed for the pH using pH meter (Elico, India)

Determination of water-soluble extractive

Five grams of powder was taken in a 100 ml conical flask. About 25 ml of distilled water was added to it and kept on a rotator shaker (140 rpm) for 24 h. After 24 h, it was filtered and dried in hot air oven set at 80°C for 24 h and weighed again. The difference in the weight was determined and percent of water-soluble extractive was calculated [11].

Determination of alcohol soluble extractive

Five grams of powder was taken in a 100 ml conical flask. About 25 ml of absolute alcohol was added into it and kept on a rotator shaker (140 rpm) for 24 h. After 24 h it was filtered and dried in hot air oven set at 80°C for 24 h and weighed again. The difference in the weight was determined and percent of water-soluble extractive was calculated.

Determination of total ash content

The clean and dry crucible (silica) was weighed and recorded. 10 g of powder was weighed in crucible and powder was kept in a muffle furnace and heated up to 300°C for 3-4 h until the whole powder turns into ash. The crucible was cooled and weighed again. The difference in the weight was noted and percent of total ash was calculated.

Determination of water-soluble ash

1 g of ash was weighed, and 10 ml of distilled water was added to it. The mixture was kept on a shaker with 140 rpm for 8 h and filtered through ash-less filter paper. The ash remained in the paper was kept in a crucible (Silica) and burnt to ash again in a muffle furnace for 3-4 h. The weight of ash obtained was noted and percent of water-soluble ash was determined.

Determination of acid insoluble ash

One gram of ash was weighed and 10 ml of concentrated H2SO4 was added to it. The mixture was kept on a shaker with 140 rpm for 8 h and filtered through ash less Whatman No. 40 filter paper. The ash remained in the paper was kept in a crucible (Silica) and burnt to ash again in a muffle furnace for 3-4 hr. The weight of ash obtained was noted and percent of acid insoluble ash was determined [12].

Preliminary phytochemical screening

Phytochemical screening of petroleum ether, chloroform, methanol, hexane and aqueous solvent extracts of Abrus precatorius root was carried out by the following the methods.

Test for Alkaloids

1 ml of sample was taken, to that few drops of drag and off reagent was added and observed for orange red colour.

Test for Carbohydrates

1 ml each of Fehling's A and Fehling's B were mixed and heated for one minute and equal volumes of the filtrates were added and heated for 5-10min on a water bath. First yellow, then brick red precipitate indicated the presence of reducing sugars.

Test for fatty acids

0.5 ml of extract was taken and mixed with 5 ml of ether and allow it to dry on filter paper. Transparency on filter paper indicates the presence of fatty acids.

Test for Flavonoids

1 ml of sample was taken, to that concentrated HCl and magnesium chloride was added and observed for pink tomato red colour.

Test for Cardiac Glycosides

1 ml of extract was taken and glacial acetic acid 0.4 ml and ferric chloride solution and conc. H2SO4 was added and observed brown colour ring.

Test for Coumarin

2 ml of extract was taken and 10% NaOH was added and shaken well for 5 minutes and observed yellow colour.

Test for Saponins

1 ml of sample was taken, to that 2 ml of H2O (shaken vigorously) was added and observed for foaming appearance.

Test for Phenols

1 ml of extract was dissolved in 0.5 ml of 20% sulphuric acid solution followed by the addition of few drops of aqueous sodium hydroxide solution and observed blue colour.

Test for Tannins

1 ml of sample was taken and few drops of 0.1% ferric chloride was added and observed blue / black colourization / brownish green.

Test for Steroids

1 ml of sample was taken; to that 10% concentrated H2SO4 was added and observed for green colour.

Tests for Terpenoids

1 ml of sample was taken; 2 ml of chloroform and concentrated H2SO4 was added and observed for reddish brown ring colour.

Test for Quinones

1 ml of sample was taken, to that aqueous ammonia (shaking) was added and observed for change in colour of aqueous layer (pink, red or violet).

RESULTS AND DISCUSSION

According to the World Health Organization (WHO, 1998), before testing any herb for the corresponding pharmacological activity, it needs to be standardized by a set of guidelines for establishing identity and purity of the drug materials [49]. In the present work an attempt has been made to assess the herbal plant Abrus precatorius by standardizing some parameters according to the guidelines put forth by WHO.

Fluorescence is an important phenomenon displayed by various phyto-constituents present in plant materials. Some show fluorescence in the visible range in daylight. The ultraviolet light produces fluorescence in many natural products, which do not visibly fluorescence in daylight. Some of the substances may be often converted into fluorescent derivatives by using different chemical reagents and chemicals though they are not fluorescent, hence we can often assess qualitatively some crude drugs using fluorescence as it is the most important parameter of pharmacognostic evaluation [50-52]. The results of fluorescent analysis of root powder of medicinal plant was depicted in Table 2, the herbal formulation showed characteristic coloration upon treatment with multi-various chemical reagents.

PHYSICO-CHEMICAL ANALYSIS

Quantitative determinations of various physico-chemical parameters of the root powder were tabulated in Table 3. The results showed Moisture content to be 1%, Foreign matter as 0.01%, Total ash of 0.98%, Acid soluble ash was 0.1%, Water-soluble ash was 0.2%, Sulphated ash was 0.08%. Alcohol soluble extract was recoded to be 0.25g and Water-soluble extract was 0.35g. Parameters obtained shows the high-level purity of plant material which will be very much useful for further experimental studies.

PRELIMINARY PHYTOCHEMICAL SCREENING

The qualitative phytochemical screening showed the presence of various secondary metabolites (Table - 2). The results showed the presence of alkaloids, carbohydrates, flavonoids, glycosides, phenols, tannins, saponins, steroids, terpenoids, quinones, fatty acids and coumarins in overall extracts. Steroid, terpenoids, coumarin and glycosides are present in hexane extract. Chloroform extract reported the presence of tannin, saponin, proteins and carbohydrate. Petroleum ether showed the presence of Alkaloids, proteins, steroids, and glycosides. Saponin, flavonoids, quinones, glycosides and coumarin are not present in the aqueous extract. While methanolic extract reported high yield of phytochemicals with the presence of Tannin, saponin, flavonoids, alkaloids, protein, glycosides, carbohydrates, phenols and coumarin.

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