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RESEARCH ARTICLE

PHYTOCHEMICAL SCREENING OF MALAXIS MUSCIFERAROOT EXTRACT

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Abstract

The phytochemical screening of the root extract of Malaxismuscifera, commonly known as the fly orchid, was conducted to analyze its chemical composition and identify the presence of bioactive compounds.Alternative medicine has become popular these days as it is gaining practices across the globe. Ayurvedic medicine is one of the important forms of alternative medicine that was widely available in India. The present study mainly focuses on the identification of therapeutic properties of Malaxismuscifera. The ethanolic extract of Malaxismusciferaroots are used for its anti-oxidant and antimicrobial activity. Malaxismusciferadried roots shown good anti-oxidant and anti-microbial properties. The ethanolic extract of Malaxismusciferawas checked for anti-microbial activity against pathogenic bacteria such as E. coli, Staphylococcus aureus, Pseudomonas.

Introduction:-

Medicinal plants have found extensive applications in various industries such as pharmaceuticals, cosmetics, agriculture, and food. The historical records of civilizations across the world document the use of medicinal herbs for treating diseases. However, in the prehistoric era, individuals may not have been fully aware of the potential health risks associated with the use of irrational therapies [1]. With the advancement of medical research, it has been established that plants contain active principles that are responsible for the curative properties of herbs. Prior to the synthetic era, humans heavily relied on medicinal herbs for the prevention and treatment of diseases, utilizing the active constituents present within these plants [2]. The introduction of scientific procedures in the field of botanical research has enabled researchers to gain a better understanding of the presence of toxic principles within the plant kingdom. Through rigorous scientific analysis, researchers have been able to identify and study the toxic compounds that can be found in various plant species. This knowledge has been crucial in determining the safety and potential risks associated with the use of certain plants in medicine, agriculture, and other industries. [3-5]. The efficacy of certain herbal products has been widely recognized and supported by scientific evidence. Notable examples of such herbal products include Silybum marianum, which contains silymarin and has demonstrated beneficial effects, Artemisia annua, which contains artemisinin and has been effective against malaria, and Taxus baccata, a source of taxol which has shown promise in cancer treatment [6-8]. Indeed, randomized controlled trials (RCTs) have provided evidence for the efficacy of certain established remedies, including Ginkgo biloba, in treating specific conditions [9]. Some researchers suggest that hypericin, a red pigment present in the plant, is the main active principle responsible for the herb's antidepressant effects. It is believed to act as a monoamine oxidase inhibitor

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(MAOI) and may contribute to the modulation of neurotransmitters involved in mood regulation[10]. Recent research has been increasingly focused on exploring the biological activities of medicinal herbs, particularly in the context of cancer. Scientists are actively investigating the potential of various herbal sources to discover new molecules that could serve as valuable tools in the fight against this devastating disease. [11]. The roots and woody portion have been used traditionally for curing various ailments like stomach pains, fever, veneral disease, rheumatism and act as a blood purifier and it also possesses antioxidant, antileprotic effects [12, 13].

Methodology:-

Plant Material

Malaxismuscifera root material was selected and made as smoothie for phytochemical screening studies. Root material was dried, powdered and then used for the studies. The procedures recommended in Indian Pharmacopoeia and WHO guidelines were followed to calculate the physico-chemical constants[15].

Extraction using ethanol and water

Five grams of dried coarse powder of roots were macerated with 100ml of 90% ethanol in a closed flask for 24hrs, shaken frequently for 6 hours and allowed to stand for 18hrs. Filtered immediately taking precautions to prevent loss of ethanol. 25ml of the filtrate was evaporated to dryness in a tarred flat bottomed shallow dish. The residue was dried at 105^0C and weighed. The percentage of ethanol soluble extraction was calculated with reference to air dried drug. Five grams of coarse powder was weighed and dissolved in 100ml of water in a stoppered flask, heated at 80^0C, shaken well and allowed to stand for 10min. It was cooled; 2gms of kieselghur was added and filtered. 5ml of the filtrate was transferred to a tarred evaporating dish and the solvent was evaporated on a water bath. The percentage of water-soluble extraction was calculated with reference to air dried drug.

Determination of crude fiber content

About Two grams of the drug was accurately weighed and extracted with ether. Then 200ml of 1.25% sulphuric acid was added and boiled for 30min under reflux. It was filtered and washed with boiling water until free of acid. The entire residue was rinsed back into flask with 200ml of boiling 1.25% sodium hydroxide solution and again boiled under reflux for 30min. The liquid was quickly filtered and the residue was washed with boiling water until neutral, dried at 110^0C to constant weight. It was then ignited to 30min at 60^0C, cooled and weighed. The percentage of crude fiber content was calculated with reference to the air-dried drug.

Determination of loss on drying

Glass stoppered shallow bottle was weighed that had been dried in the same conditions to be employed in the determination. About one gram of the sample was transferred to the bottle and distributed evenly by gently side wise shaking to a depth not exceeding 10mm. Place the loaded bottle in a drying chamber (the stopper was removed and left in the chamber). The sample was dried to a constant weight and allowed to cool. The bottle along with the content was weighed. The process was repeated until the successive weights differed not more than 0.5mg (drying to constant weight). The percentage loss of weight was calculated with reference to the air-dried drug.

Determination of foaming Index

1gm of the coarsely powdered drug was weighed and transferred to 500ml conical flask containing 100ml of boiling water. The flask was maintained at moderate boiling at 80-90^0C for about 30min. It was cooled, filtered into a volumetric flask and sufficient water was added through the filter to make up the volume to 100ml. Ten stoppered test tubes were cleaned (height 16cm, diameter 1- 6cm) and marked from 1 to 10. 1, 2, 3ml up to 10ml of the filtrate was measured and transferred to each tube and adjusted the volume of the liquid with water to 10ml. Then the tubes were stoppered and shaken lengthwise for 15sec uniformly, allowed standing for 15min the length of the foam was measured in each tube. If the height of the foam in each tube is more than 1cm, the foaming index is more than 1000. In this case, 10ml of the first decoction of the root material is measured and transferred to a 100ml volumetric flask (V2) and the volume is made to 100ml and followed the same procedure.

Fluorescence Analysis

The fluorescence analysis of the drug powder as well as various extracts was carried out by using the method of Chase and Pratt. The behavior of the powder with different chemical reagents was also carried out.

Results and Discussion:-

Ash analysis and moisture contents

Plant species with medicinal properties have been playing a fundamental role in the efforts for drug discovery all over the world. 80% populations in developing countries are dependent on plants for their primary health care, and despite the significant progress in the field of synthetic organic chemistry of the twentieth century, more than 25% of prescribed medicines in developed countries are derived directly or indirectly from plant sources.

Table 1:- Phytochemical studies of Malaxismusciferaroot extract.

S.No	Secondary metabolites	Methanol	Ethyl acetate	Ethanolic	Aqueous
1	Steroids	+	-	+	-
2	Triterpenes	+	+	+	-
3	Saponins	-	-	+	++
4	Tri terpinoidalsaponins	+	-	++	-
5	Alkaloids	+	+	+	+
6	Carbohydrates	-	-	+	-
7	Flavonoids	+	+	++	+
8	Tannins	+	+	+	+
9	Glycosides	-	-	+	-
10	Polyphenols	+	+	++	+

Extraction values

Extractions of crude powder drug with different solvents gives different extraction values. Extraction value is one of the useful methods for evaluation of crude drugs, and provides guidance about the most suitable solvent to be used for extraction, and also helps in detecting various types of adulteration and exhausted materials i.e., Water and alcohol soluble extraction values can be used for the detection of adulterants, defective processing and poor quality of the drug while petroleum ether soluble extraction value indicates lipid contents present in the crude drugs. The fluorescence analysis of powder with various reagents and extracts are given in the Table 3 and 4.

Table 2:- Fluorescence analysis of powder.

S.No	Reagents	Day light	Short UV	LongUV
1.	Powdered root (PR)	Red	Red Dark	Red
2	PR + 1 N HCl	Yellow	Red	Red
3	PR + 1 N NaOH	Red	Red	Pale Red
4	PR + 50% HCl	Yellow	Fluorescent Red	Fluorescent Red
5	PR + 50% H2SO4	Dark Red	Dark Red	Dark Red
6	PR +50%HNO3	Dark brown	Brown	Reddish brown
7	PR + ethanol	Red Fluorescent	Red	Light Red
8	PR + ethanol + 1 N NaOH	Red	Brown	Red

Conclusion:-

Phytochemicals present in the different extracts of roots of Malaxismusciferawas identified as prominent source for anti-oxidant property. Among the extracts ethanolic extract has highestanti-oxidant property when compared to other extracts. In the present study it was found that Malaxismusciferaroots ethanolic extract has an excellent antimicrobial activity. The pathogenic bacteria were inhibited in presence of the root extracts of Malaxismuscifera. Therefore,the future studies should be aimed to exploit this plant to be used as one of the best medicinal plants is controlling pathogenic bacteria.

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