International Journal of Current Advanced Research
ISSN: O: 2319-6475, ISSN: P: 2319-6505, Impact Factor: SJIF: 5.995
Available Online at www.journalijcar.org
Volume 7; Issue 1(I); January 2018; Page No. 9323-9326
DOI: http://dx.doi.org/10.24327/ijcar.2018.9326.1537

Research Article

PHYTOCHEMICAL SCREENING OF THE ETHANOLIC EXTRACT OF SOME MEDICINAL PLANTS OF CHOTANAGPUR PLATEAU FROM JHARKHAND, INDIA

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A R T I C L E I N F O

Article History:
Received 11th October, 2017
Received in revised form 10th November, 2017
Accepted 26th December, 2017
Published online 28th January, 2018

Key words:
secondary metabolites, antioxidants, spermatorrhoea, galactogogue, dyspepsia.

A B S T R A C T

Proteins, carbohydrates, alkaloids, flavonoids, tannins, saponins, glycosides, phenols, steroids, phlobatannins and terpenoids distribution in seven medicinal plants belonging to different families were assessed and compared. The medicinal plants investigated were Alangium salvifolium (L.f.) Wang., Cassia fistula L., Cyperus rotundus L., Phyllanthus niruri L., Sida acuta Burm.f., Rumex vesicarius L., and Tridax procumbens L. phytochemical screening of these plants revealed the presence of medicinally active primary and secondary metabolites. Proteins, carbohydrates, phenols, glycosides, steroids, tannins, terpenoids and saponins present in all the plants, except the absence of alkaloid in Cyperus rotundus L., flavonoids in Alangium salvifolium (L.f.) Wang and Sida acuta Burm.f., Phlobatannin absent in all the plants respectively. The results obtained indicate that the crude drug extracts of the aerial parts and roots of the plant samples possesses pharmacological activities like antioxidants, antirheumatic, anti-inflammatory, antidiarrhoeal, antidysentric, spermatorrhoea, jaundice, laxative, leprosy, dropsy, gonorrhoea, menorrhegia, galactogogue ,dyspepsia, antidote and skin diseases etc. These supports the fokloric use of the plants in various ailments and diseases.

INTRODUCTION

Plants synthesize potent biochemicals which constitute the components of phytomedicine since time immemorial. The medicinal plants having many pharmacologically active like alkaloids, glycosides, flavonoides, tannins, phenols, steroids and fixed oils etc, which are stored in their specific parts of leaves, stems, bark, flowers, fruits, seed and roots etc.[1,2] The compounds may act individually, additively, or in synergy to improve health.[3] In the past few decades there has been renewed attention and interest in the use of traditional medicines globally.[4,5,6] Several factors are responsible for the resurgence of herbal medicine, drug resistant seems to be the prime cause, adverse side effects and cost effectiveness are the another factors were traditional medicine score over the synthetic drug.[3,7, 8,14] WHO has estimated that at least 80% of the world population chiefly relies on traditional medicines for their primary health care needs and it can safely be presumed that major part of traditional therapies involve the use of plant extract for their active principles.[5,9, 10, 11] Whereas in developing countries like India 65% of the rural areas use Ayurveda and medicinal plants to elliviate the illnesses and disorders.[5, 6,11,12] In developed countries 25% of all prescriptions dispensed from community pharmacies contained plant extract prepeared from higher plants.[9] The efficacy of the active constituents of many higher plants are beyond dout such as Artimisin an effective antimalarial drug obtained from *Artimisia annua*,Colchicine from *Colchicum autumnale*,Vinblastin and Vincritine derived from *Catharanthus roseus*, Phodophyllotoxin from *Podophyllum peltatum* and Paclitaxel obtained fro *Taxus brevifolia* are the strong antineoplastic agents.[13] *Alangium salvifolium* (L.f.) Wang.,*Cassia fistula* L., *Cyperus rotundus* L., *Phyllanthus niruri* L., *Sida acuta* Burm.f. L., *Rumex vescarius* L., and *Tridax procumbens* L., are extensively used in tribal medicine. Their various uses in traditional medicine are given in table 1. Recently several studies have been conducted on herbs under a multitude of ethnobatanical ground because these are the important source of imfomation of bioactive principle responsible for the therapeutic activity of medicinal plants. [9]. The present study was therefore designed to evaluate these fokloric claims in cure of different diseases and to identify its active principles by way of phytochemistry.

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MATERIALS AND METHODS

Plant Materials

The leaves, stems and tubers were collected from west

Table 1 Ethnomeicinal Uses Of The Plants

Sl. No.	Species	Family	Vernacular name	Traditional uses
1.	Alangium salvifolum(L.f.) Wang.	Alangiaceae	H. Ankol, Ho. Ankol	Bark and root used in jaundice, cure boils, fruit is eaten by the local people.
2.	Cassia fistula L.	Caesalpiniaceae	H. Banderlathi, Ho. Hari	Flowers are eaten, seed and young leaves as sherbet, seeds are used in swollen throat, purgative, bark in snakebite.
3.	Cyperus rotundus L.	Cyperaceae	H. Motha, Ho. Kesari dumbu	Rhizome is used as galactoguge, Rhizome is eaten by local people as staple food.
4.	Phyllanthus niruri L.	Euphorbiaceae	H. Bhumiaonla, Ho. Otemerel	Whole plant is used as diuretic, astringent, plant juice with sugar candy is given in jaundice, also used in dropsy and genitourinary infection.
5.	Sida acuta Burm.f..	Malvaceae	H. Ho. Ipipiung	Leaves to ripen ulcers, root in facilitate child birth.
6.	Rumex vesicarius L.	Polygonaceae	H.Chuka , Ho.Buru palki Aa	Used as potherb, leaf juice in toothache.
7.	Tridax procumbens L.	Asteraceae	H. , Ho.Garagusam Aa	Leaves in diarrhoea and dysentery, hair-restore and applied to fresh cuts.

Table 2 Preliminary Phytochemical Analysis Of Ethanolic Extract Of Plants

Phytochemicals		Plants						
		Alangium salvifolium (L.f.) Wang.	**Cassia fistula L.**	**Cyperus rotudus L.**	**Phyllanthus niruri L.**	**Sida acuta Burm.f.**	**Rumex vesicarius L.**	**Tridax procumbens L.**
Proteins	Millon's	+ (+)	+++	+	+	+	+++	+ (+)
Carbohydrates	Ninhydrin Test	+	_	+ (+)	+	+	_	_
	Fehling's Test	+	++	+	+	+	+	+
	Benedicts Test	+ (+)	+	+	+	+	+++	+
Phenols & Tannins	Iodine Test	_	_	_	+	+	_	_
		+	+++	+	+	+	+	+
Flavonoids	Shinoda Test	_	+	+ (+)	_	+	+	_
	Alkaline reagent test	_	_	+	_	+	_	_
Saponins		+	+++	+ (+)	+ (+)	+ (+)	+++	+ (+)
Gycosides	Liebermann's test	_	+	+	+	+	+	+
	Salkowski's test	+	+	+	+	+	+	+
Steroids	Keller- Kilani test	+	+	+	+ (+)	+ (+)	+++	+
	Leibermann's test	+	+	+	+	+ (+)	_	+
	Cl + H_2SO_4	+ (+)	+	+	+ (+)	+	+	+ (+)
	Cl + H_2SO_4+ Acetic Acid	+	_	+ (+)	+	+	+	+++
Alkaloids		+	+	_	+	+	+	+
Phlobatannin		_	_	_	_	_	_	_
Terpenoids		+	+	+	+	+	+	+

Abbreviation : + (+) ; trace, ++ ; moderate, +++ heavy, + ; present, - Absent

Table 3 Extractive Value Of The Plants In Ethanolic Extract Of The Plants2

Sl.no.	Plant	Extract	Extractive value %ww
1.	Alangium salvifolium (L.f.) Wang.	Ethanol	2.3%
2.	Cassia fistula L.	-	12.04%
3.	Cyperus rotundus L.	-	4.8%
4.	Phyllanthus niruri L.	-	2.5%
5.	Sida acuta Burm.f.	-	1.58%%
6.	Rumex vesicarius L.	-	7.98%
7.	Tridax procumbens L.	-	08.16%

Table 4 Moisture Content In The Plant Powders

Sl.no.	Plant	Moisture content in %
1.	Alangium salvifolium (L.f.) Wang.	0.43%
2.	Cassia fistula L.	0.99%
3.	Cyperus rotundus L.	0.92%
4.	Pyllanthus niruri L.	0.29%
5.	Sida acuta Burm.f..	0.81%
6.	Rumex vesicarius L.	0.76%
7.	Tridax procumbens L.	0.6%

singhbhum and surrounding areas from July to December 2016. Samples were authenticated by Dr. Kiran Shukla (H.O.D. University Department of Botany, Kolhan University, Chaibasa, Jharkhand). The voucher specimens were deposited in the University Department of Botany, Kolhan University, Chaibasa, Jharkhand. The samples were washed with tap water to remove dust and contaminant. The plant samples were shade dried until all the moisture evaporated and pulverized by using mechanical grinder and stored in air tight jar for further use.

Extraction of Plant Material

The plant materials were extracted with ethanol using sohxlet apparatus continuously for 6 to 8 hours. 50 gm of dried plant material was packed in filter paper and loaded into the thimble of sohxlet apparatus. 250 ml of ethanol was poured into the flask and the all apparatus was set. The extraction was

performed for 6-8 hours. Later the extracted solvent was evaporated under reduced pressure. Then the extract was kept in refrigerator for further use.

Phytochemical Screening

Chemical test were carried out on the aqueous extract and on the powdered specimens using standard procedures to identify the constituents as described by Sofowara (1993), Trease and Evans (1989) and Harbone

Extractive Value

About 5gm of air dried coarsely powdered sample of plants were accurately weighed and macerated for 24 hours with 100 ml of solvent (Ethanol) in a separate conical flasks with stopper. The flasks were then shaked in Magnetic stirrer for 40 minutes and then allowed to stand for 24 hours. Extract were filtered rapidly, 25 ml of extract was transferred in China dish and evaporated to dryness on water bath. The dried extract was further dried in hot air oven to constant weight at 105^0C, cooled in desiccators and weighed.

The percentage of extractive values of different solvents was calculated using formula given below

Extractive Value (% w/w) = [(Weight of residue x 100) / (25 x Weight of sample)] x 100

Moisture Content

5gm air dried coarse powder of sample were accurately weighed in previously tarred crucible and dried at 105^0 C in hot air oven to constant weight and cooled in desiccators. Percentage of moisture content was calculated using the expression given below

$$\text{Moisture content (\% w /w)} = \frac{\text{Difference in weight before and after drying}}{\text{Weight of the sample before drying}} \times 100$$

RESULTS

The present study carried out on the plant samples revealed the presence of medicinally active primary and secondary metabolites. The phytochemical screening and pharmacognostic study of the seven medicinal plants are summarized in table 2, 3, and 4. Proteins carbohydrates, phenols, glycosides, steroids, tannins, terpenoids and saponin present in almost all the plants. Flavonoids present in Cassia fistula, *Cyperus rotundus* L. and *Rumex vesicarius* L. and absent in rest of the plants. Alkaloid present in all the plants except *Cyperus rotundus* L. whereas Phlobatannin absent in all the plants. Extractive value of ethanol is shows maximum than other solvents.*Alangium salvifolium* (L.f.) Wang. is highest in all the plants. The result shows moisture content is highest in *cyperus rotundus* L. and lesser in amount in *Cassia fistula* L.

DISCUSSION

The phytochemical screening of the crude yields of chemical constituents of the plants studied showed that the leaves and stems were rich in alkalois flavonoids, tannins and saponins. They were known to to show medicinal activity as well as exhibiting physiological activity.[14] The secondary metabolites contributes significantly towards the biological activities of medicinal plants such as anti-inflammatory, antileprosy antioxidants, antidiabetic, anticarcinogenic, antimalarial, anticholergenic,and antimicrobial activities etc.[23, 24, 25] Steroids present in all plants are the source of hormonal balance (sex hormones) since steroidal stucture could be the source as potent starting material in synthesis of these hormones.[15] Steroids are also responsible for cholesterol-reducing properties. And also help inregulating immune response.[16] Saponins, alkaloids, flavonoids and glycosides have the antibiotic and antimicrobial activities.[1] Recent findings shows that alkaloids have antineoplastic properties.[13] Flavonoids are water- soluble antioxidants and free radical scavengers, which prevent oxidative cell damage and all have strong anticancer activity.[17, 18, 19] Terpenoids are known to possess antimicrobial, antiparasitic, antifungal, antiviral, antimicrobial, anti- allergic, antihypergycemic,anti-inflammatory,,antispasmodic and immunnmodulatory properties.[20,21] tannins and phlobatannins have been reported to possess astringent properties. They are known to hasten the healing of wounds and inflammmed mucous membranes.[22]

CONCLUSION

It is evident from the study that all the plants contained maximum number of secondary metabolites, so these plants possess highest therapeutic efficacy. A great deal of interest has been renewed recently in the isolation, characterization and pharmacological activities of these phytochemicals. Pharmaconostic and phytochemical screening can serve as a basis for proper identification of a plant and also help in finding their way into purified phytochemicals, rather than in the form of traditional galenical preparation.

Acknowledgement

The author is geatfuf to Dr. Kiran Shukla H.O.D. university department of Botany, K.U., Dr. V. S. Sinha, H.O.D. department of Botany, Tata College,Chaibasa and Dr. D. S. Gupta, University department of Botany, K.U. for their guidance and also thankful to U.G.C. New Delhi, Govt. of India, for financial assistance.

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How to cite this article:

Reena Sinku and Manoj Ranjan Sinha (2018) 'Phytochemical Screening of the Ethanolic Extract of Some Medicinal Plants of Chotanagpur Plateau From Jharkhand, India', *International Journal of Current Advanced Research,* 07(1), pp. 9323-9326. DOI: http://dx.doi.org/10.24327/ijcar.2018.9326.1537

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