WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 10, Issue 14, 1076-1084. Research Article ISSN 2277– 7105

A RESEARCH ON PHYTOCHEMICAL ANALYSIS OF BIOACTIVE COMPOUNDS IN SOME MEDICINAL PLANTS OF ASTERACEAE FAMILY

Tambe Varsha Nandkumar[1]*, Aher Nitin Balkrishna[2], Deshmukh Dhananjay Babanrao[3] and Dale Dipali Mohan[4]

Lecturer[1,4], Principal[2], Head of Department[3]

Ashvin College of Pharmacy, Manchi Hill. Tal Sangamner, Dist Ahmednagar, Pin Code 413714.

Article Received on
14 October 2021,

Revised on 04 Nov. 2021,
Accepted on 24 Nov. 2021

DOI: 10.20959/wjpr202114-22345

***Corresponding Author**
Tambe Varsha Nandkumar
Lecturer Ashvin College of Pharmacy, Manchi Hill. Tal Sangamner, Dist Ahmednagar, Pin Code 413714.

ABSTRACT

The phytochemical analysis of the plants is very important commercially and has great interest in pharmaceutical companies for the production of the new drugs for curing of various diseases. Medicinal plants of Asteraceae family have many bioactive compounds which are used for curing of various human diseases and also play an important role in healing. The present investigation deals with the phytochemical studies of various parts of different medicinal plants like dyssodia greggii and caesulia axillaris of Asteraceae family. The main objective of the research work was to check the presence or absence of the phytochemical constituents in all the selected medicinal plants. Hence methanolic (90%) extracts of flower, root and leaf powders of selceted plants have been screened for qualitative determination of different secondary metabolites like, glycoside. alkaloids, flavonoids, tannins, reducing sugar, saponin and terpenoids etc. The antimicrobial activities of essential oil of caesulia axillaris also observed. It is expected that the important phytochemical properties recognized by our study in the indigenous medicinal plants of Asteraceae will be very useful in the curing of various diseases.

KEYWORDS: Medicinal plants, Methanolic extracts, Phytochemical study, dyssodia greggii, caesulia axillaris.

INTRODUCTION

The Asteraceae or Compositae (commonly referred to as the aster, daisy, composite, or sunflower family) are an exceedingly large and widespread family of flowering plants (Angiospermae).[1] The group has more than 23,000 currently accepted species, spread across 1,620 genera (list) and 12 subfamilies. In terms of numbers of species, the Asteraceae are rivaled only by the Orchidaceae. (Which of the two families is actually larger is unclear, owing to uncertainty about exactly how many species exist in each family).[2] The main feature of the family is the composite flower type in the form of capitula surrounded by involucral bracts.[3] The name "Asteraceae" comes from *Aster*, the most prominent genus in the family,[4] that derives from the Greek word, meaning star, and is connected with its inflorescence star form. As for the term "Compositae",[5] more ancient but still valid, it obviously makes reference to the fact that the family is one of the few angiosperm ones to have composite flowers. This family has a remarkable ecological and economical importance and is present from the polar regions to the tropics, colonizing all available habitats.[6] The Asteraceae may represent as much as 10% of flora in many regions of the world. Most members of Asteraceae are herbaceous, but a significant number are also shrubs, vines, or trees. The family has a worldwide distribution and is most common in the arid and semiarid regions of subtropical and lower temperate latitudes.

The Asteraceae are an economically important family. Some members provide products, including cooking oils, lettuce, sunflower seeds, artichokes, sweetening agents, coffee substitutes, and herbal teas. Several genera are popular with the horticultural community, including marigold, pot marigold (also known as calendula), cone flowers, various daisies, bright flowers.[7] Fleabane chrysanthemums, dahlias, zinnias, and heleniums. Asteraceae are important in herbal medicine, including *Grindelia*, *Echinacea*, yarrow, and many others. A number of species have come to be considered invasive, including, most notably in North America, dandelion, which was originally introduced by European settlers who used the young leaves as a salad green. Dyssodia is a small genus of flowering plants in the daisy family. Most dyssodias are now treated as members of other related genera, including Thymophylla or Adenophyllum, with Dyssodia as genus synonym. Dyssodia greggii is usually retained in this genus. Several species of Dyssodia (sensu lato) have found their way into the nursery trade and are relatively popular flowering annuals for hot, dry sites.[8] Generally sold as threadleaf dyssodia (Dyssodia tenuisecta) and golden dyssodia (Dyssodia cf. pentachaeta). Caesulia is a monotypic genus of flowering plants in the aster family,

Asteraceae, containing the single species Caesulia axillaris. Its common name is pink node flower. It is native to Bangladesh, Burma, India, Nepal, and Sri Lanka. This plant grows in wet and aquatic habitat, such as marshes, wet meadows, and irrigation ditches. It may grow on wet land or float in water bodies. It grows in rice paddies in some areas, but it is usually not weedy.

Plants are considerably useful and economically important for all mankind. They may due to their food value or by means of their active constituents that are used in the treatment of many human diseases. Plants contain hundreds or thousands chemicals and metabolites make them medicinally important.[] Medicinal and aromatic plants a gift of nature are being used against various infection and diseases in the worlds since past history.[9] It represents extraordinary reservoir novel molecule About 43% of total plants from Indian subcontinent (approximately 7,500 species) are reported to have medicinal value.[8] In recent years there has been a gradual revival of interest in the use of medicinal plants because herbal medicines have been reported to be safe and without any adverse side effects.[1] Much work has been done on ethno medicinal plant in India. Interest in a large number of traditional natural products has increased for finding their phytochemical and antimicrobial activity. It has been also suggested that aqueous and ethanol extracts from plants used in allopathic medicines are potential sources of antiviral and antimicrobial agents.[5] tahats leads to finding of antimicrobial potential among the local and wild plants.[10] Herbal raw material is highly susceptible to fungal infection during post harvest processing and storage in tropical and sub tropical countries.[12] Most of these fungi are toxemic in nature producing micro toxin, therapy, affecting the quality of herbal raw materials as well as the herbal formulation.[2] This is one of the major reasons for decline of Indian share in the global herbal market[2,5] which can be control by even by such plant those having antimicrobial activity which include activity against pathogenic fungi as well as bacteria. The effects of plant extracts on fungi and bacteria have been studied by a very large number of researchers in different parts of the world with positive results. Antibacterial activity were recorded in various plant Against S. aureus, S. epidermis, B. cereus etc.[11] Antioxidants act as repository of anti-inflammatory, antifungal, antibacterial and anti-carcinogenic.[10] Various plant materials are believed to have antifungal activity and many essential oils have been reported to have antifungal activities with no side effects on humans and animals.[11] Current work has been done by considering folk medicinal values of Caesulia axillaris Roxb. and Psoralea corylifolia L. to find out their anti microbial activity against pathogen in lab condition.

C.axillaris Roxbfrom family Asteraceae is known to cure baldness and goitre in traditional Indian system of Medicine. The plant is a common weed abundantly growing in paddy fields in India and showed appreciable yield of EO. Its essential oil has been reported against some insects pests causing deterioration of food commodities Axillari is have been tested for its efficacy as aflatoxin B1 suppressor and against fungi deteriorating herbal raw materials.

Besides, the safety profile of the oil has been observed through animal trails so as to find out its efficacy as a preservative of herbal raw materials. However in the present investigation for the first time the chemically characterised oil of C. The main objective of the present investigation was screening of fungi responsible for biodeterioration of the stored raw materials of Andrographics paniculata Nees, Terminala bellirica Roxb. and Tinosporacordifolia (Thunb.).[9] P. corylifolia is a medicinally important plant, belongs to Fabaceae family. It is well recognized in Indian folkloric medicine. Seeds were used for many decades as traditional medicinal system.[9] The seeds are used in indigenous medicine as laxative, aphrodisiac, and diaphoretic in febrile conditions. And it also specially recommended for treatment of leucoderma leprosy and inflammatory diseases of the skin.[4]

MATERIALS AND METHODS

Leaves Stem and Seeds of both plant has been collected from Sangmner, Manchi hill local forest area of Maharashtra. Plant material further allowed for shed dry and makes fine powder before using it extraction. For anti microbial analysis each plant sample was extracted in Hexane, Chloroform and Methanol with soxhlet extraction. To find out fungal strain Lactophenol and Cotton blue activity were used. For the growth of fungal strain SMKY Medium, Nutrient Agar, CDA and PDA media were used.For growth of fungus 10 gm of each plant material added in 90 ml of sterile distill water with shaking for 15 min and then dilutions were made on Potato Dextrose Agar Plate, which allowed for incubate for 7 days at 37℃ growth of fungus were observed℃ for4-5 days on plate and further identified by mold colonies in subculture.

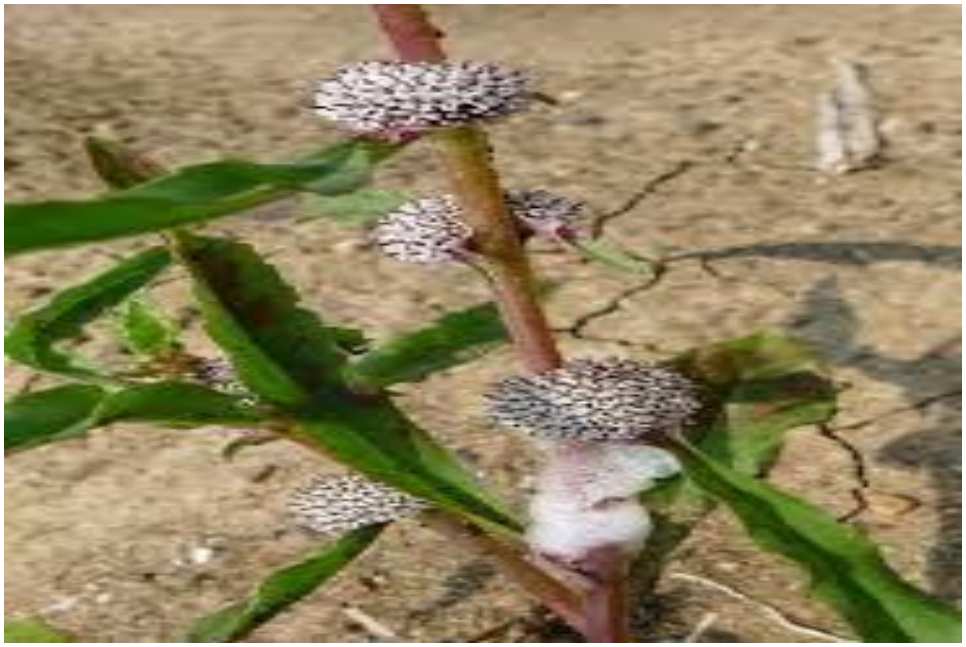

Fig. no. 1: Caesulia axillaris.

Table no. 1: Caesulia axillaris taxonomic classification.

Caesuliaaxillaris Taxonomic classification	
Kingdom:	Plantae
(unranked):	Angiosperms
(unranked):	Eudicots
(unranked):	Asterids
Order:	Asterales
Family:	Asteraceae
Genus:	***Caesulia*** Roxb.
Species:	***C. axillaris***

Fig. no. 2: *Dyssodia greggii*.

Table no. 2: Dyssodia greggii taxonomic classification.

Caesulia axillaris Taxonomic classification	
Kingdom:	Plantae
(unranked):	Angiosperms
(unranked):	Eudicots
(unranked):	Asterids
Order:	Asterales
Family:	Asteraceae
Subfamily:	Asteroideae
Tribe:	Tageteae
Genus:	***Dyssodia***

Experimental

Plant extraction

The plant samples were collected locally and processed. The cleaned and shade dried plant material was ground into fine powder using electric blender. Plant extracts in methanol were prepared by soxhlet extraction. The extracts were filtered into pre-weighed beakers. The filtrates were dried in a Digital rotator vacuum evaporator until a constant dry weight of each extract was obtained. The residues were stored aseptically at 5°C for further use.

Phytochemical screening

For preliminary phytochemical analysis the freshly prepared crude methanolic extract of flowers of plant was tested for the presence or absence of reducing sugar, tannins, flavonoids, saponins, steroids and alkaloids etc. by using standard phytochemical procedures which are presented in Table 3.

RESULT

Table 3: Phytochemical screening of D. greggii & C. axillaris.

Sr. No.	**Chemical constituents**	**Test**	***D.greggii***	***C. axillaris***
1	Test for Reducing Sugar	Benedict's Test	+	-
		Fehling's Test	+	-
2	Test for Phenolics	Bromine water	+	+
		Dil. Iodine solution	+	+
3	Test for Alkaloids	Mayer's test	+	+
		Hager's test	+	+
4	Test for Flavonoids	Sulphuric acid test	+	+

		Zinc Hydrochloride test	+	+
5	Test for steriods	Libermann Test	-	+
		Salkowski reaction	-	+
6	Test for Proteins	Biuret test	-	-
		Millions test	-	-
7	Test for Fats & Oils	Solubility test	-	+
8	Test for Amino acid	Ninhydrin test	+	+
		Test for Tryptophan	-	-
9	Test for Cardiac Glycoside	Keller-killiani test	-	-
		Baljet's test	-	-
10	Test for Saponin Glycoside	Foam test	-	+
11	Test for Coumarin Glycoside	Sodium Hydroxide Solution	-	-
12	Test for Hexose sugars	Tollen's phloroglucinol test	+	-
		Selwinoff's test	+	-
13	Test for Nitrophenol & o-nitrophenol	Aromaticity	+	+
14	Test for tannins	Ferric Chloride test	+	+
15	Test for Vitamins (Ascorbic acid)	Sodium nitroprusside	-	+
16	Test for Amino Acid	Diazotisation	_	+
17	Test for Quinones	Methanolic KOH	+	_

Determination of ash values

Ash Value is used to determine quality & purity of crude drug. It contains inorganic radicals like phosphates, carbonates, potassium etc. For determination of ash values crude drug, like dried leaves of plant was used by using standard procedure and results are presented in table 2.

Table 2: Determination of ash values of plant D. greggii.

Total Ash value	Water soluble Ash value	Acid insoluble Ash value
30.5%	32%	29%

Saponification test: A saponification test for essential oil of C.axillaris is carried out and saponification value is found to be 2.805mg of KOH/gm of oil.

Screening for antimicrobial activity

The major causes of human communicable diseases are the microorganisms and this has worsened dramatically within the last few decades mainly due to developed resistance by pathogens. A growing challenge in antimicrobial therapy is the progressive development of resistance by microorganisms to the activity of antibiotics. This challenge has necessitated the search for new and effective antimicrobial agents to which resistance has not developed. Medicinal plants are known to contain varied phytochemical constituents as potential antimicrobial agents; ethno-medically, bacterial infections have been treated successfully with herbal remedies. In the present study antimicrobial activity of oil of C. axillaris has been carried out and data is reported as follows in Table 2. The antimicrobial activity was tested through agar diffusion method. Chloramphenicol (40 µg) was used as positive control.

Table 3: Antimicrobial activity of essential oil of *Caesulia axillaris.*

Microorganisms	Inhibition zone (mm)						Control
	4mg	8 mg	10mg	12 mg	16 mg	20 mg	
S. aureus	-	3	5	8	10	13	17
E. coli	-	5	7	10	12	15	20
P. aeruginosa	-	-	4	7	10	14	26
C. albicans	-	-	-	6	9	12	15

Experiments were done in triplicate and results are mean values.

The essential oil evaluated in this study presented a great variety of alkaloids & flavonoids that could be considered as answerable for the antimicrobial activity. Although they usually occur as complex mixtures, their activity may generally account for in terms of their major components.

CONCLUSION

Phytochemical screening of the plant extract and essential oil confirmed the presence of several bioactive compounds like glycosides, terpenoids, alkaloids etc. which could be responsible for the versatile medicinal properties of these plants. In order to study the effects of these compounds on biological system needs more studies as these compounds might be responsible for use of this plant in different diseases.

REFERENCES

1. Garg, SN., Agrawal SK, Duhan SPS. Chemical examination of the leaf oil of Caesulia axillaris Roxb. J. Essent. Oil Res., 1993; 5: 139 - 142.
2. Patil MB, Khan PA and Shaikh M. Ethno Ecological Knowledge and Medicinal Flora from South-Western Satpuda, Maharashtra. Life Sciences Leaflet, 2015; 63: 44-56.
3. Shukla AC, Pandey KP, Mishra RK, Anupam Dikshit, Neetu Shukla. Broad spectrum antimycotic plant as a potential source of therapeutic agent. Journal of Natural Products, 2011; 4: 42-50.
4. Patil MB, Khan PA. Antibacterial Activity of Leaves of Nyctanthusarbor-tristis L, Hibiscus rosa-sinensis L. and Sapindus emerginatus Vahl. Science Park Research Journal, 2015; a 31: 1-5.
5. Sunccia Kocic – Tanackov, Grodana Dimic, Jelena levic, Ilija Tanackov and Danijela Tuco. Antifungal activities of basil (Ocimum basilicum L.) extract on Fusarium species. African Journal of Biotechnology, 2010; 10(50): 10188-10195.
6. Patil MB, Khan PA. Ethnomedicinal Studies of Acalypha Indica L. (Euphorbiaceae). Review of Research Journal, 2015; 4:7: 1-5.
7. Patil MB, Khan PA. Review: Techniques towards the Plant Phytochemical. International Journal of Science Info, 2016; I.3: 157-172.
8. NK Dubey, KA Singh, P. Shukla. R. Microbial contamination of raw materials: a major reason for the decline of indias global herbal market. Curr. Sci, 2008; 94-95.
9. Servili, M., B. Sordini, S. Esposto, S. Urbani, G. Veneziani, I.D. Maio, R. Selvaggini, and Taticchi. Biological activities of phenolic compounds of extra virgin olive oil. Antioxidants, Khan et al. World Journal of Pharmaceutical Research 2014; 3(1): 1-23, www.wjpr.net
10. Sokmen A, Jones BM and Erturk M. The in vitro antibacterial activity of Turkish medicinal plants. J Ethnopharmacology, 1999; 67: 79-86.
11. Sarawat AK. and S. Chand. Continuous somatic embryogenesis and plant regeneration from hypocotyl segments of Psoralea corylifolia Linn. An endangered and medicinally important Fabcaceae plant. Current Sci, 2011; 18(10): 1328-1331.
12. Latha PG, KR. Panikkar. Inhibition of Chemical carcinogenesis by Psoralea corylifolia seeds. J. Ethnopharmacol, 1999; 68(1-3): 295-298.