



# Asian Journal of Research in Chemistry and Pharmaceutical Sciences

Journal home page: [www.ajrcps.com](http://www.ajrcps.com)



## PHYTOCHEMICAL ANALYSIS OF VARIOUS EXTRACTS FROM RHIZOMES OF *ARISAEMA UTILE*

Arif Hussain Bhat\*<sup>1</sup>, Ghulam Mustafa Rather<sup>1</sup>, Aparna Alia<sup>2</sup>, Bharty Kumar<sup>1</sup>

<sup>1</sup>\*Department of Botany, Government M.V.M. Bhopal, Madhya Pradesh, India.

<sup>2</sup>Department of Botany, Rajeev Gandhi College, Shahpura, Bhopal, Madhya Pradesh, India.

### ABSTRACT

Medicinal plants are a rich source of bioactive phytochemicals or bionutrients. Studies have shown that these phytochemicals have an important role in preventing chronic diseases like cancer, diabetes and coronary heart diseases. The present study was conducted for the photochemical analysis of different solvent extracts from rhizomes of *Arisaema utile* plant. Phytochemical analysis of the different solvent extracted samples suggested the presence or absence of various metabolites including steroids, alkaloids, saponins, flavonoids, carbohydrates and fats in varying concentrations. The present study provides evidence that solvent extracts of *Arisaema utile* contains medicinally important bioactive compounds and this justifies the use of plant species as traditional medicine for treatment of various diseases.

### KEYWORDS

Phytochemicals, Alkaloids, Steroids, Terpenoids, Flavonoids and Saponins.

### Author for Correspondence:

Arif Hussain Bhat,  
Department of Botany,  
Government M.V.M. Bhopal,  
Madhya Pradesh, India.

**Email:** arifbhat96@gmail.com

### INTRODUCTON

*Arisaema utile* is a tuberous perennial plant which belongs to the family Araceae and subfamily Aroideae. It can be found growing on rocky slopes at an altitude of 2,400-4,600 meters. It grow in shady, moist, well-drained and fertile soil. *Arisaemas* are tuberous perennials that die back to the ground in winter. *Arisaema utile* emerges in spring. They are found in forests and open hillsides in the Himalayas from Himachal Pradesh, India to Bhutan. Most of the species from genus *Araceae* have a history of use in folk medicine for the treatment of various infectious diseases. *Arisaema utile* is a promising alternative to the commercially

available standards like Kenamycin and Ascorbic acid for antimicrobial and antioxidant activities respectively. Further this plant also shows prominent cytotoxic activity against few cancer cell lines<sup>1,2</sup>. Therefore this plant needs to be properly examined for the phytoconstituents which can revolutionise the medical science. Medicinal plants have been of age long remedies for human diseases because they contain components of therapeutic value<sup>3</sup>. Some of them are also used for prophylactic purposes. An increasing interest in herbal remedies has been observed in several parts of the world and many of the herbal remedies have been incorporated into orthodox medicinal plant practice. Diseases that have been managed traditionally using medicinal plant include malaria, epilepsy, infantile convulsion, diarrhea, dysentery, fungal and bacterial infections<sup>4</sup>. Medicinal herb is considered to be a chemical factory as it contains multitude of chemical compounds like alkaloids, glycosides, saponins, resins, oleoresins, sesquiterpene, lactones and oils (essential and fixed)<sup>5</sup>. India has one of the oldest, richest and most diverse cultural traditions associated with the use of medicinal plants. According to an estimate, 120 or so plant based drugs prescribed for use through the world come from just 95 plant species<sup>6</sup>. Natural antimicrobials can be derived from plants, animal tissues and microorganisms<sup>7</sup>. The shortcomings of the drugs available today propel the discovery of new pharmacotherapeutic agents from medicinal plant research<sup>8</sup>. The amount of phytochemical substances varies considerably from species to species and even from plant to plant, depending on the age and various ecological and climatic factors<sup>9</sup>. Plants have limitless ability to synthesize aromatic substances, mostly phenols or their oxygen-substituted derivatives<sup>10</sup>. Most of the natural products are secondary metabolites and about 12,000 of such products have been isolated so far. These products serve as plant defense mechanisms against predation by microorganisms, insects and herbivores<sup>11</sup>. Today there is growing interest in chemical composition of plant based medicines. Several bioactive constituents have been isolated and studied for pharmacological activity. During the

last two decades, the pharmaceutical industry has made massive investment in pharmacological and chemical researches all over the world in an effort to discover much more potent drugs, rather, a few new drugs. Plants have successfully passed the tests of commercial screenings. Roughly estimated 35,000-75,000 medicinal plants can make a significant contribution as a re-emerging health aid to fulfill the health vacuum<sup>12</sup>. About 13,000 plant species worldwide are being used to yield drugs to treat different diseases<sup>13</sup>. Plants have the ability to synthesize a variety of primary and secondary metabolites. These metabolites are responsible for various important biological functions including antibacterial, antifungal, anti-diabetic, anticancer activities etc. These biologically important compounds include glycosides, alkaloids, saponins, resins, oils, tannins, sterols, flavonoids etc<sup>14</sup>. Phytochemical screening of different plants for such bioactive compounds leads to preliminary screening of the plant as potential medicinal plant<sup>15</sup>.

## MATERIAL AND METHODS

### Plant Material

The *Arisaema utile* plant material was collected from Gulmarg area of District Budgam of Jammu and Kashmir, India. The localities where the plant material was collected are usually situated between 2400-4600m. Voucher specimen of *Arisaema utile* bearing specimen no 27911, was deposited at KASH herbarium in centre of plant taxonomy, University of Kashmir, Srinagar, Jammu and Kashmir, India<sup>1</sup>.

### Preparation of extracts

To prepare the Methanolic, Chloroformic and Hexane extracts, 200gms of shade dried plant material were grinded to powder. It was separately subjected to soxhlet extraction with the above solvents in order of their increasing polarity. The solvents were then evaporated under reduced pressure and dried using a rotary evaporator at 55°C. Dried extracts were stored in labeled sterile flasks at 5°C in the refrigerator, until when required for use.

### **Phytochemical analysis**

Chemical tests for the screening and identification of bioactive chemical constituents in the medicinal plant under study were carried out in extracts using the standard procedures as described by<sup>16-19</sup>.

### **Phytochemical analysis for different class of compounds**

#### **Test for Flavonoids**

0.2 grams of plant extracts was added into test tube containing 2ml of diluted sodium hydroxide and mixed well. After mixing 2ml of diluted hydrochloride was added into the test tubes and observed for colour change. The appearance of the yellow colouration indicated the presence of flavonoids.

#### **Test for Alkaloids**

0.5 to 0.6 g of various extract was mixed in 8 ml of 1% HCl, warmed and filtered. 2 ml of the filtrate were treated separately with both reagents (Maeyer's and Dragendorff's), after which it was observed whether the alkaloids were present or absent.

When a drop of crude extract was mixed with Dragendorff's reagent alkaloids gave reddish brown precipitate indicating the presence of alkaloids.

When the extract was mixed with Mayer's reagent the appearance of cream colored precipitate indicates the presence of alkaloids.

#### **Test for Saponins: Foam Test**

2.0 g of various extracts were mixed with 10 ml of distilled water and was shaken vigorously to the formation of stable persistent froth. The frothing was mixed with 3 drops of olive oil and shaken vigorously for the formation of emulsion thus a characteristic of saponins.

#### **Test for Carbohydrates: Molisch's Test**

To 2ml of extract 2-3 drops of alpha naphthalene solution in alcohol was added, shaken for 2 min and 1 ml of concentrated sulphuric acid was added slowly from the sides of the test tube. A deep violet colour at the junction of two layers indicates the presence of carbohydrates.

#### **Test for Terpenoids: Knollar's test**

5 mg of extract is treated with 2ml of 0.1% anhydrous stannic chloride in pure thionyl chloride.

A deep purple color that changes to red indicates the presence of terpenoids.

#### **Test for Steroids: Salkowski test**

10 mg of extract was dissolved in 2 ml of chloroform and 2ml of concentrated sulphuric acid was added from the side of the test tube. Test tube was shaken for few minutes. The development of reddish brown colouration in chloroform layer indicated the presence of sterols.

#### **Fatty Acids**

0.5 ml of extract was mixed with 5 ml of ether. These extract was allow it for evaporation on filter paper and dried the filter paper. The appearance of transparence on filter paper indicates the presence of fatty acids.

### **RESULTS**

Analysis of the data showed that the Phytochemical analysis of different solvent extracted samples from rhizomes of *Arisaema utile* showed the presence of several bioactive compounds in varying quantities including steroids, flavonoids, saponins, alkaloids, carbohydrates and oils (Table No.1). The presence of these bio-active compounds may be responsible for their bioactivities

### **DISCUSSION**

Phytochemical screening of the different extracts from *Arisaema utile* revealed that methanolic crude extract contain steroids, alkaloids, flavonoids, terpenoids, carbohydrates and oils in moderate to higher concentrations while saponins in lesser concentration. The n-hexane soluble samples possessed steroids, terpenoids, and oils in higher concentrations, flavonoids in moderate concentrations while carbohydrates were present in lesser concentrations. Saponins and alkaloids were found to be absent in n-hexane extract. Ethyl acetate fraction showed the presence of flavonoids in higher concentrations, steroids, terpenoids and saponins in moderate concentrations while steroids, terpenoids and carbohydrates were found in lesser concentrations. Alkaloids and oils were found to be absent in ethyl acetate extracts of *Arisaema utile*. The presence of these bio-active compounds may be responsible for their bioactivities shown by the

*Arisaema utile* extracts and also justifies the use of plant species as traditional medicine for treatment of various diseases.

**Table No.1: Phytochemical screening of different solvent extracted fractions of *Arisaema utile***

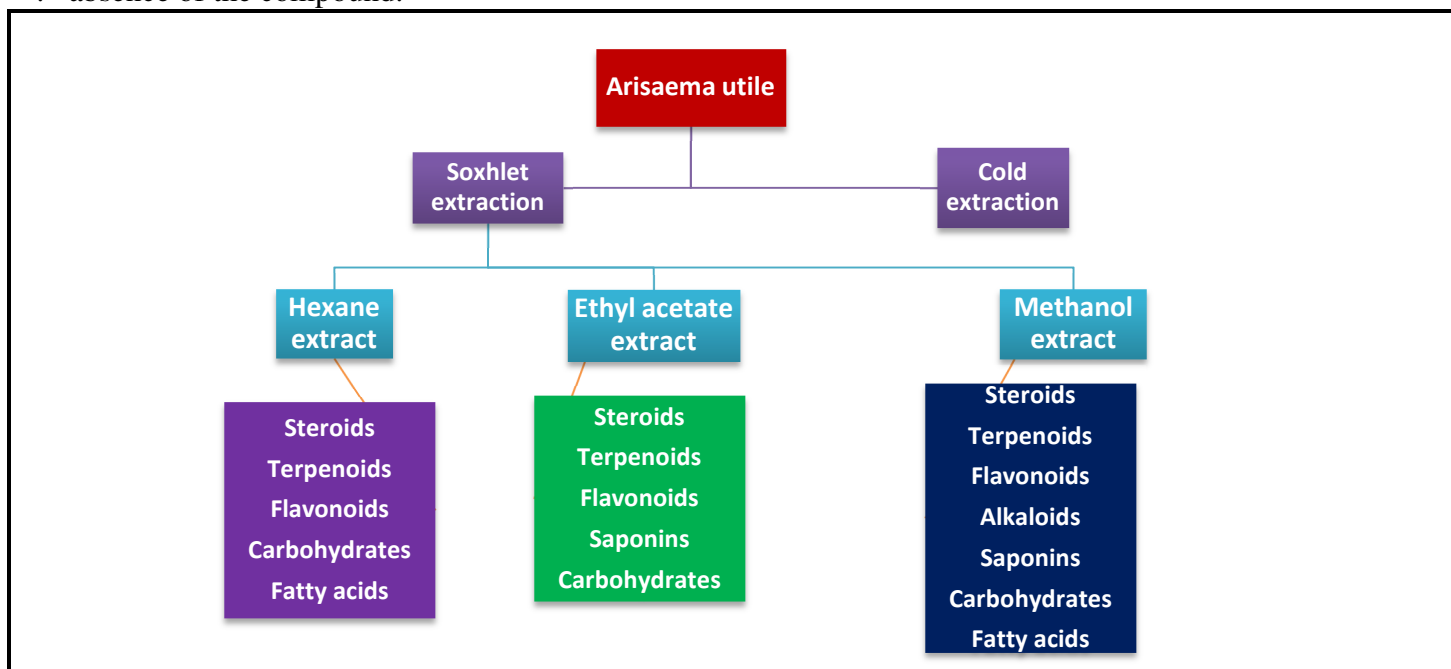
S.No	Plant Extract	n-Hexane	Ethyl acetate	Methanol
1	Steroids and terpenoids	+++	+	++
2	Flavonoids	++	+++	++
3	Alkaloids	-	-	++
4	Saponins	-	++	+
5	Carbohydrates	+	+	+++
6	Fatty acids	+++	-	++

+++: abundance

++: moderate quantity

+: less amount

--: absence of the compound.



### CONCLUSION

From these results it can be concluded that different solvent extracts of *Arisaema utile* contains various secondary metabolites in varying concentrations as shown in table 1. The presence of these bio-active compounds may be responsible for their bioactivities shown by the *Arisaema utile* extracts and also justifies the use of the plant species in traditional medicine for treatment of various diseases.

### ACKNOWLEDGMENT

We would like to thank Director, Centre of Research for Development (CORD), University of Kashmir for proving Lab facilities and necessary support.

### CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

## BIBLIOGRAPHY

1. Sofi Mubashir et al. Antimicrobial, Cytotoxic and Antioxidant activities of *Arisaema utile*, *Journal of Pharmacy Research*, 5(3), 2012, 1368-1370.
2. Irshad A B. Phytochemical screening of extract of *Arisaema utile*; *International Journal of Advance Research in Science and Engineering*, 7(2), 2018, 1095-1098.
3. Kumar R S, Venkateshwar C, Samuel G, Rao S G. Phytochemical Screening of some compounds from plant leaf extracts of *Holoptelea integrifolia* (Planch.) and *Celestrus emarginata* (Grah.) used by Gondu tribes at Adilabad District, Andhrapradesh, India, *International Journal of Engineering Science Invention*, 2(8), 2013, 65-70.
4. Amrit P S. Promising Phytochemicals from Indian Medicinal plants, *Ethnobotanicals Leaflets*, 1, 2005 Edition, Article 18.
5. Lewington A. *Plants for people (The Natural History Museum London, UK)*, 7, 1990, 232.
6. Zaika L L. Spices and herbs: their antimicrobial activity and its determination, *J Food Safety*, 9(2), 1975, 97-118.
7. Cordell G A. Pharmacognosy. New roots for an old science, In: Atta-ur-Rahman, Basha F Z, editors. *Studies in natural products chemistry, Bioactive natural products (Part A)*, Elsevier Science Publishers, Amsterdam, 13, 1<sup>st</sup> Edition, 1993, 826.
8. Baquar S R. Medicinal and Poisonous Plants of Pakistan, *Printas, Karachi, Pakistan*, 1989, 401- 482.
9. Geissman T A. Flavonoid compounds, Tannins, Lignins and related compounds, In M. Florkin and Stotz EH Editors. *Pyrrole Pigments, Isoprenoid compounds and phenolic plant constituents*, New York: N Y Elsevier, 9, 1<sup>st</sup> Edition, 1963, 265.
10. Fransworth N R, Morris R W. Higher plants: The sleeping Giant of Drug Development, *Am. J. Pharm*, 148(2), 1976, 46-52.
11. Khalil A T, Shinwari Z K, Qaiser M and Marwat K B. Phyto-therapeutic claims about euphorbiaceous plants belonging to Pakistan; An ethno medicinal review, *Pak. J. Bot*, 46(3), 2014, 1137-1144.
12. Ashfaq M, Shah K W, Ahmad S and Singh D. Preliminary phytochemical screening of alcoholic and aqueous extracts of *Mentha longifolia* L. leaves, *Intl. J. Phram. Res. Rev*, 3, 2012, 384-386.
13. Ahmad T, Singh S B, Panday S. Phytochemical screening and physicochemical parameters of crude drugs: A brief review, *Intl. J. Phram. Res. Rev*, 2(12), 2013, 53-60.
14. Madiha I, Jehan B, Mohammad S. Phytochemical screening and antibacterial activity of different solvent extracted samples of *Arisaema jacquemontii*; *Pak. J. Pharm. Sci*, 31(1), 2018, 075-081.
15. Sofowora A. Medicinal Plants and Traditional Medicine in Africa, *John Wiley and Sons Limited*, 2<sup>nd</sup> Edition, 1993, 96-106.
16. Trease G E, Evans W C. *Pharmacognosy, Saunders*, 15<sup>th</sup> Edition, 2002, 214-393.
17. Harborne J B. Methods of plant analysis, In: *Phytochemical Methods (Chapman and Hall, London)*, 1973.
18. Parekh J, Chands S. Phytochemical screening of some plants from Western regions of India, *Plant Arch*, 8(2), 2008, 657-662.

**Please cite this article in press as:** Arif Hussain Bhat et al. Phytochemical analysis of various extracts from rhizomes of *Arisaema utile*, *Asian Journal of Research in Chemistry and Pharmaceutical Sciences*, 6(3), 2018, 145-149.