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## Phytochemical Screening of *Alpinia Purpurata* (Vieill)

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### ABSTRACT

The medicinal plants have various complex chemical substances of different composition which occur as secondary metabolites. Ten principal bioactive compounds were investigated; a qualitative and quantitative phytochemical analysis was performed for the detection of alkaloids, phenols, flavonoids, tannins in dry rhizome of *Alpinia purpurata*. Powdered plant material was subjected to phytochemical screening using standard experimental procedure. Phytochemical study along with quantification of chemical constituents of study has been reported for the first time in the present investigation. The study scientifically validates the use of plants in traditional medicine and phytochemical data will be helpful for the standardization and quality control of precious indigenous drug and also Pharmaceutical industries.

**Key words:** Phytochemical, Secondary metabolites, *Alpinia purpurata*

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## INTRODUCTION

The aim of the present study was to evaluate the phytochemistry of various extracts from *Alpinia purpurata* rhizome; the genus *Alpinia* (Zingiberaceae family, Alpinioideae subfamily, Alpinieae tribe) is native to tropical and subtropical Asia [17]. Nowadays, it is cultivated in several places around the world due to the attractive beauty of its inflorescences and its therapeutic potential [28,33]. Red ginger *Alpinia purpurata* is a popular tropical landscape ornamental that has been grown in gardens in southern florida [5]. To develop red ginger as a cut flower crop for commercial production in florida requires the use of greenhouses and other product demands [6]. *Alpinia purpurata* is very recent and incipient and results show the presence of flavonoids rutin and kaempferol-3-O-glucuronide [34]. Flavonoids are present in several species of *Alpinia* and they are referred as promising therapeutic agents in the treatment of cardiovascular diseases [23]. The rhizomes of Zingiberaceae plants are widely used as spices or traditional medicine in Asian countries, eaten raw, or cooked as vegetables and as flavoring. Leaves of several Zingiberaceae have also been used for food flavoring and in traditional medicine [18]. Many *Alpinia* species are well-known medicinal herbs that have been shown by several previous studies to have various effects, namely, anti-inflammatory [37,15] antioxidant, antimicrobial [13,8] antidermatophytic [31,12] antinociceptive [2], hepatoprotective [16], immunostimulatory [4], and anticancer [19, 1] activities. The review of the plant leaf reported for above activity based upon the ethnomedical importance, present work was focused to reveal the quantitative and qualitative phytochemical studies of rhizome parts of *Alpinia purpurata*.

## MATERIALS AND METHODS

### General

Commercial chemical was obtained from Merck® and Sigma. Recordings were made in a UV-vis Spectrometer Shimadzu UV-2200. All reagents used, including solvents, were of analytical grade and procured from Ponmani & Co., Coimbatore, Tamil Nadu.

### Plant material

Fresh plant material was collected from Kovaipudhur, Coimbatore District, Tamil nadu, India. Efforts were made to collect the plant in rhizomes and flowering conditions for the correct botanical identification. The plant material was brought to the laboratory and identified with the help of Agriculture university of Coimbatore, Tamil nadu State.

### Sample preparation

Crude extracts was obtained from rhizome of *Alpinia purpurata* Coarse powder of the plant material was extracted by cold maceratioin method using successive solvents such as

petroleum ether, chloroform, ethanol, methanol and aqueous in increasing polarity for 48 hours respectively. The extracts were concentrated and dried under reduced pressure.

### **Secondary metabolites Of *Alpinia purpurata* species**

Secondary metabolites are chemicals produced by means of secondary reactions resulting from primary carbohydrates, amino acids and lipids [30]. Their direct role in plant metabolism is not yet well documented. However, their ecological role [10] and particularly in plant herbivore interaction [11,29] and chemotaxonomy [12] has been well established. Plants containing secondary metabolites particularly alkaloids, saponins and tannins are generally avoided by grazing animals and leaf feeding insects. Their presence in plants and intake at high level reduces the nutrient utilization [35], feed efficiency, animal productivity and in some cases death of animals [21]. The rhizome of *Alpinia purpurata* was dried in shade so as to prevent the decomposition of chemical constituents and was powdered in blender for phytochemical screening which consists of qualitative tests [24] for the presence of carbohydrates, proteins, tannins, reducing sugars, alkaloids, glycosides and flavonoides non-reducing sugars. Besides these, quantitative estimations were carried out for non-reducing sugars Tannins [27], Flavonoides [7], Alkaloids [14], Phenols [22] were estimated, using standard experimental procedure. Phytochemical investigations of ethanolic extract of *Alpinia purpurata* rhizome species was the subject of several studies, (summarized in Table -1), flavonoids, alkaloids, phenols, tannins, carbohydrates, protein, glycosides and other components were qualitatively screened and flavonoids, alkaloids, phenols, tannins were estimated (summarized in Table- 2).

### **RESULTS**

In the present study, Phytochemical tests were carried out for flavonoids, alkaloids, phenols, tannins, carbohydrates, protein, glycosides, Steroids, Resins, Thiols, saponins and reducing sugars on different extracts. The results are depicted in table No. 1. Results of phytochemical screening indicated that the rhizome of *Alpinia purpurata* showed positive test for carbohydrates in all the extracts, flavonoids, alkaloids, phenols, tannins, were present in methanolic, ethanolic and chloroform extractives. Negative results were aqueous and petroleum ether extractives, tannins also absent in methanolic, chloroform and petroleum ether, presents of aqueous, ethanol. Steroids were negative of all the four extracts of aqueous, ethanolic, methanolic and chloroform, positive in petroleum ether. Positive results were showed for proteins and resins aqueous, methanolic and ethanolic extracts but negative of resin in methanolic, chloroform and petroleum ether, protein was also absent in petroleum ether extracts. The rhizome of *Alpinia purpurata* positive test for glycosides in aqueous, ethanolic, and methanolic and chloroform and also negative of petroleum ether. Thiols negative and saponins positive were in ethanolic extract and saponins absent in methanolic, chloroform and petroleum ether. The rhizome of *Alpinia purpurata* was carried out in different extracts in the present investigation, quantitative estimations were also carried out for Phenols, Flavonoids, Alkaloids, and Tannins. The results are given in table no. 2. Results of the

quantitative estimation of Phenols and Tannins were more in aqueous, ethanolic, Alkaloids and Phenols were more in chloroform. Phenols, Flavonoids, and Alkaloids indicated that petroleum ether and methanol were less in quantity of the rhizome.

**PHYTOCHEMICAL SCREENING OF DIFFERENT EXTRACTS OF *Alpinia purpurata* rhizome  
TABLE NO – 1**

Name of the Test carried out	Reagents used	A. Aqueous Extract	B.Eanolic Extract	C.Methanolic Extract	D.Chloroform Extract	E. Petroleum ether Extract
Carbohydrates	a)Fehlings	+	+	+	+	+
	b)Benedict's	+	+	+	+	+
	c)Molisch	+	+	+	+	+
Tannins		+	+	--	--	--
Steroids	A)Salkowski	--	--	--	--	+
Resins	a)Ferric chloride	+	+	--	--	--
	b)Lead acetate	+	+	--	--	--
Proteins	a)Millon's	+	+	+	+	--
Alkaloids	a)Dregendroffs	--	+	--	+	--
	b)Wagner's	--	+	--	+	--
	c)Meyer's	--	+	--	+	--
Flavonoids	a)Zinc hydro chloride	--	+	+	+	--
	b)Magnesium hydrochloride reduction test	--	+	+	+	--
	c)Alkaline reagent test	--	+	+	+	--
Thiols	a)Sodium nitroprusside	--	--	+	+	--
Glycosides	a)Sodium hydroxide	+	+	+	+	--
Phenols	a)Ferric chloride	+	+	--	+	--
	b)Lead acetate	+	+	--	+	--
	c)Liebermann's	+	+	--	+	--
Saponins	a)Sodium bicarbonate	+	+	--	--	--

+ve: Present -ve: Absent

**ESTIMATION OF SECONDARY METABOLITES IN DIFFERENT EXTRACTS OF *Alpinia purpurata* rhizome  
TABLE NO. 2**

Parameters	Aqueous%	Ethanol%	Methanol%	Chloroform%	Petroleum ether %
Phenols	6.2	9.5	8.5	6.37	0.87
Alkaloids	0.23	0.38	0.27	14.9	0.78
Flavonoids	0.61	0.85	0.32	0.79	0.37
Tannins	13.8	12.5	0.8	0.6	0.03

The results are mean of three determinants. Results are in g / 100g dry tissue.



## DISCUSSION

Herbal medicine represents one of the most important fields of traditional medicine all over the world. To promote the proper use of herbal medicine and to determine their potential as sources for new drugs, it is essential to study medicinal plants, which have folklore reputation in a more intensified way [25]. Phytochemical screening portrays that most of the natural products tested for were present in all the studied plants. It was also found that alkaloids were present in the ethanolic extracts. On this premise it will be advisable to extract the rhizome of *Alpinia purpurata* with ethanol in an attempt to exploit its detoxifying and antihypertensive properties since alkaloids is known to be effective for this purposes [32, 20]. Phenols the aromatic compounds with hydroxyl group are widespread in plant kingdom. Phenols are said to offer resistance to diseases and pests in plants. Tannins are also known antimicrobial agents. Tannins are water – soluble polyphenols that are present in many plant foods and precipitate proteins. Tannins have been reported to prevent the development of microorganisms by precipitating microbial protein and making nutritional proteins unavailable for them [26]. The growth of many fungi, yeasts, bacteria and viruses was inhibited by tannins [9]. Tannins are reported to have various physiological effects like anti-irritant, antisecretolytic, antiphlogistic, antimicrobial and antiparasitic effects. Presence of tannins suggests the ability of these plants to play a major role for the treatment of some disease [3]. Flavonoids are also shown to inhibit microbes which are resistant to antibiotics [36]. The study scientifically validates the use of these plants in traditional medicine plant and phytochemical data will be helpful for the standardization and quality control of precious indigenous drug and also Pharmaceutical industries.

## CONCLUSION

It may be concluded from this study that the ethanolic extract of *Alpinia purpurata* is highly active. In addition, the results confirm the use of the plant in traditional medicine. The most active extracts can be subjected to isolation of the therapeutic and carry out further pharmacological evaluation.

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