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PHARMACOGNOSTIC STUDIES OF *COSTUS SPECIOSUS* (J. KOENIG) SM

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ABSTRACT

Costus speciosus belongs to family Costaceae. *C. speciosus* is a tropical Zingiberaceae plant, which is wide spread throughout Southeast Asia. It is considered as an important component in many human and veterinary medicines; *C. speciosus* is widely used in treating various diseases. It is distinguishable from other families within the order by well- developed aerial shoots which have a characteristic monostichchous (one-sided) spiral phyllotaxy. Its close relationship with Zingiberaceae is evidenced by its former placement as a subfamily within the larger Zingiberaceae family. In the present study the pharmacognostic evaluation of the plant was carried out by studying the physico-chemical parameters like ash values, extractive values and pharmacognostic tests as it is medicinally important.

KEYWORDS: *Costus speciosus,* ash values, extractive values, physico-chemical.

INTRODUCTION

Costaceae, to which the plant *Costus* belongs, is one of the most easily recognizable groups within the Zingiberales. The placement of Costaceae within Zingiberaceae was largely based on broad similarities of inflorescence and floral characters. (Specht and Stevenson, 2006). Although these types of characters may indicate common ancestry, they are not sufficient to overcome the morphological and anatomical differences that warrant independent familial rank of the two linkages.

Costus speciosus is an erect succulent herb with root stocks and tuberous rhizome, stem spirally twisted growing in marshy places and shades. (Joshi, 2000). Leaves 20-30 by 5-7.5 cm., sessile. (Sala, 1994). Leaves simple, spirally arranged, oblanceolate or oblong, glabrous

above, silky pubescent beneath with broad leaf sheaths (Prajapati, 1984). The leaves of this spices are less fleshy and have an acrid taste. (Thambi *et al*., 2015)

In Ayurveda, *Costus speciosus* is used to subdue vata and kapha and promote complexion. It is reported to cure dyspepsia, fever, cough, and other respiratory disorders. It is one of the constituents of indigenous drug 'amber mezhugu' useful in rheumatism. *Costus speciosus* leaves showed 0.58% of diosgenin (Sulakshana *et al*., 2014).

Carbohydrates, tannins, steroids and anthocyanates were present in *Costus speciosus*. (Khayyat *et al*., 2017). Diosgenin is a steroidal saponin considered the major constituent isolated from *C. speciosus*. This plant is also used in India to control diabetes (Vihalakshi *et al*., 2010 and Kapoor, 1990).

MATERIALS AND METHODS

Collection of Plant Material

The plant material i.e. leaves of *Costus speciosus* for the present work was collected from Tungareshwar forest (Vasai) and Sanjay Gandhi National Park (Borivali) & authenticated.

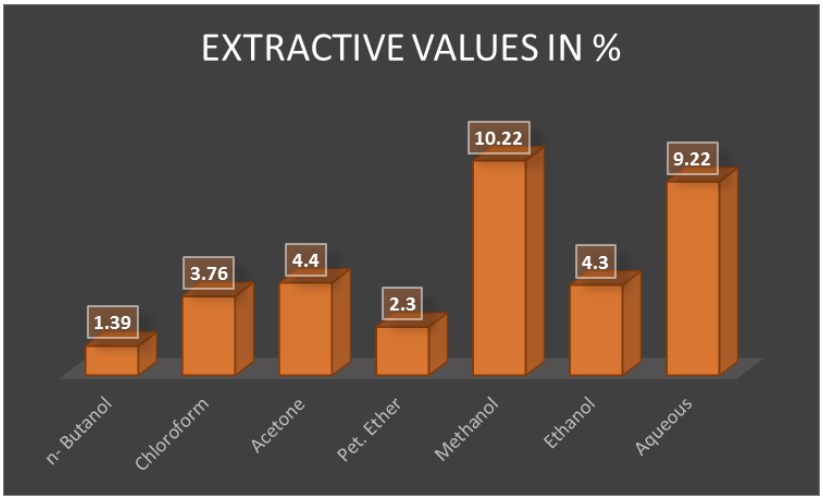
Determination of total and acid insoluble ash content was done by the method described by Shah and Quadry, 1983. For determination of extractive values the method is as described by Trease and Evans (1983) & Wallis (1985). Pharmacognostic tests performed were as described by Khandelwal (2007). For thin layer chromatography hydro alcoholic extract was used (Shanmugam et al., 2010).

OBSERVATIONS AND RESULTS

The total ash value obtained is 15.33%, water soluble ash value is 7.46% and acid insoluble ash is 7.87%.

Extractive Values obtained were water 9.92%, ethanol 4.303%, methanol 10.244%, petroleum ether 2.304%, acetone 4.4%, chloroform 3.76% and n-Butanol 1.392%.

The extractive value was highest in methanol followed by water. The value was then higher in acetone, ethanol, chloroform, petroleum ether and n-Butanol.



Pharmacognostic Tests

The dried powdered material was extracted with chloroform, methanol, ethanol, petroleum ether, distilled water, in an extraction apparatus.

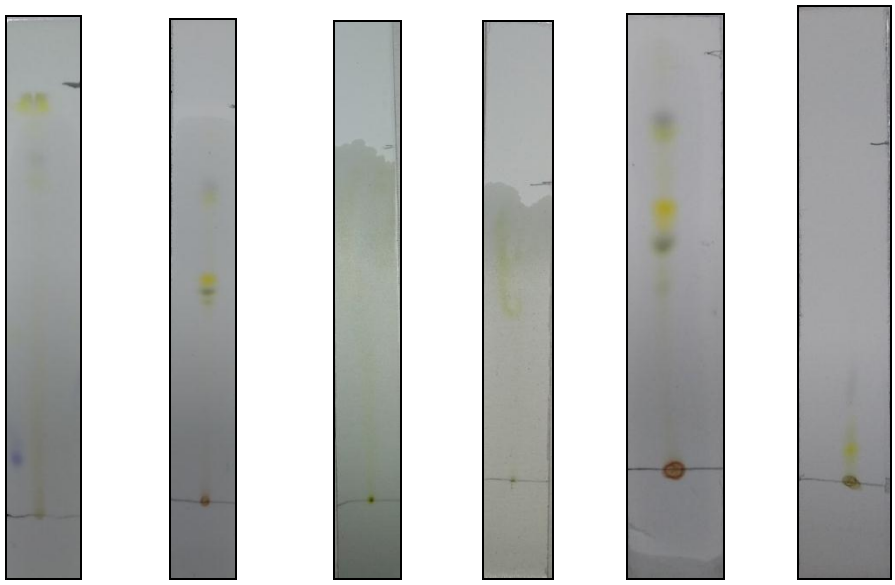
T.S. + REAGENT	**OBSERVATION**	**INFERENCE**
(Molish's Test) **T.S. + Alpha Naphthol in Alc.+ conc. HCl**	Violet ring formed at the junction of two liquids	Carbohydrates present
(Benedict's Test) **T.S. + Benedicts reagent**	Solution appears sea green in color	Reducing sugars present
(Fehling's Test) **T.S. + Fehling's A + Fehling's B (keep in boiling water bath)**	Blue ppt	Reducing sugars present
(Tollen's Phloroglucinol Test) T.S. + conc. HCl + 0.5% Phloroglucinol (Heat)	Yellow color appears	Hexose sugars present
T.S + Cobalt chloride+ Boil and cool + NaOH	Greenish blue color appears	Glucose present
(Ninhydrin Test) **T.S. + Ninhydrin solution (boiling water bath)**	Purple color appears	Amino acid present
Precipitation test for proteins: **5% $CuSO_4$** **5% lead acetate**	 Ppt Ppt	Proteins present
(Salkowski Reaction) **T.S. + Chloroform + conc. Sulphuric Acid**	Chloroform layer appears red	Steroid present
T.S. + Water	Persistent foam observed	Saponin present
Dil. HNO_3	Yellow colour	Tannins and phenols present
T.S. +$FeCl_3$	Green colour	Tannins present
T.S. + Dragendorff reagent	Brown ppt	Alkaloids present

The Data showing presence of phytoconstituents in the leaf of *Costus speciosus.* Alkaloids, tannins, saponin, proteins, steroids, carbohydrates, hexose sugars and reducing sugars are present.

Thin layer chromatography

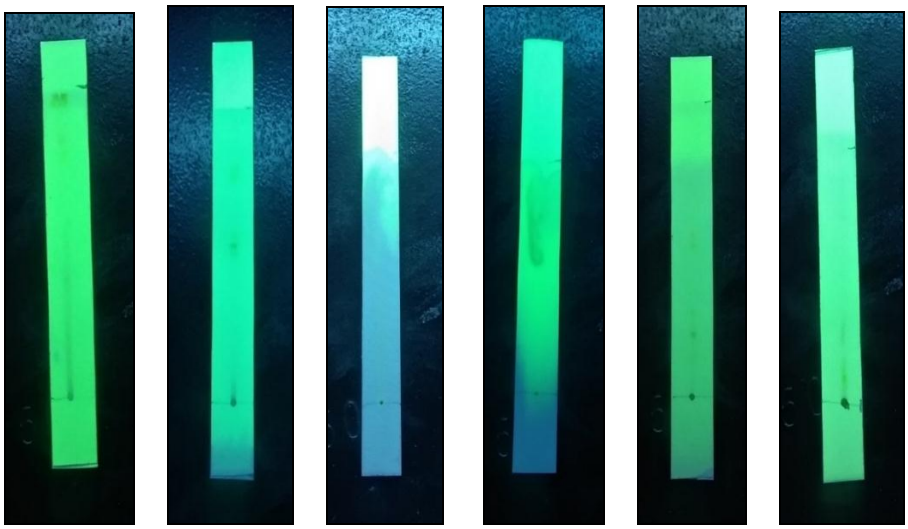
Phyto-constituents	Mobile Phase	Spraying reagent	No. of spots	Spot colour	Rf value
Alkaloids	Ethyl acetate: Methanol: Water (10: 1.35: 1)	Dragen-droff's reagent followed by 10% Methanolic sulphuric acid	1 2 3	Yellow Light purple Greenish yellow	0.780 0.849 0.972
Phenols	Toluene: Acetone: Formic Acid (4.5: 4.5: 1)	20% sodium carbonate solution followed by Folin-Ciocalteu reagent	1 2 3	Light green Yellow Yellowish green	0.4 0.528 0.771
Flavanoids	Ethyl acetate: Formic acid: Glacial Acetic acid: Water (10:1.1:1.1:2.6)	1% ethanolic aluminum chloride reagent	1	Greenish light yellow	0.387
Saponin	Chloroform: Glacial Acetic acid: Methanol (6.4: 3.2: 1.2: 0.8)	Anisaldehyde sulphuric acid reagent	1	Light yellow	0.584
Tannins	Toluene: Ethyl acetate: Formic acid: Methanol (3: 3: 0.8: 0.2)	5% Ferric chloride reagent	1 2 3 4 5	Light green Dark green Yellow Green Light purple	0.442 0.538 0.615 0.788 0.826
Terpenoids	n-hexane: Ethyl acetate	Anisaldehyde sulphuric acid reagent	1 2	Yellow Light purple	0.215 0.352

Under visible light



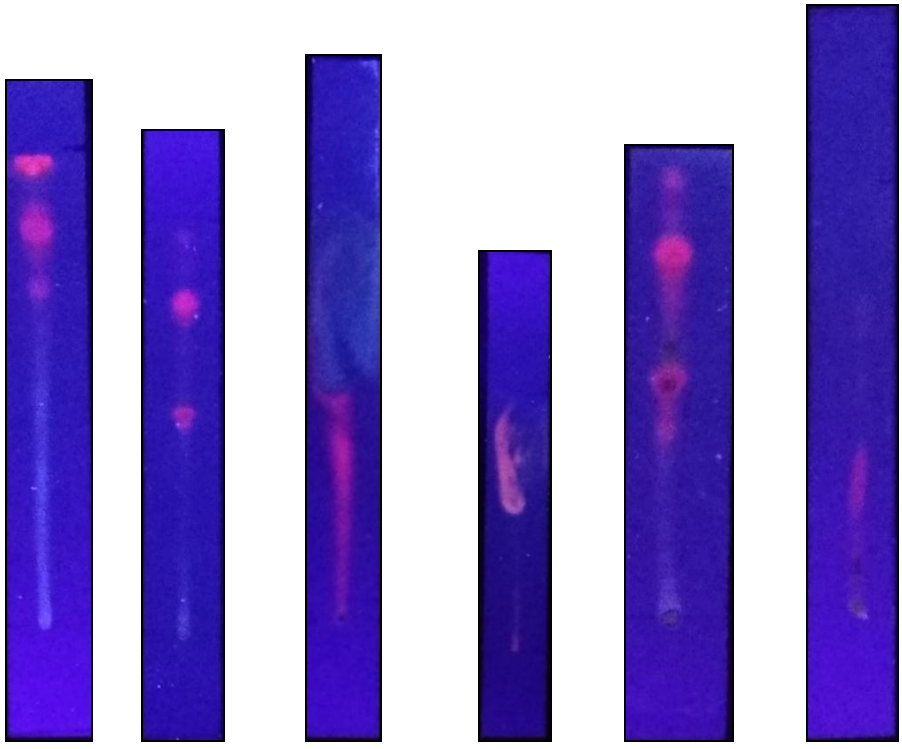
Alkaloids Phenols Flavanoids Saponin Tannin Terpenoid

Under short UV light



Alkaloids Phenols Flavanoids Saponin Tannin Terpenoid

Under long UV light



Alkaloids Phenols Flavanoids Saponins Tannins Terpenoids

SUMMARY AND DISCUSSION

The preliminary phytochemical screening revealed the presence of alkaloid, tannins, saponins phenols, steroid, protein and reducing sugars in the leaves.

The total ash value and acid insoluble ash values were 15.33% and 7.87% respectively, which is high suggesting that the plant has high content of calcium oxalate.

The extractive value in water was 9.92%, in ethanol 4.03%, in methanol 10.224%, in petroleum ether 2.304%, in acetone 4.4%, in chloroform 3.76%, in butanol 1.392%. Thus, the extractive values were in the order of methanol 10.224% > water 9.92% > acetone 4.4% > ethanol 4.03% >chloroform 3.76% > petroleum ether 2.304% > butanol 1.392%.

Vaidya and Shingadia (2017) have already studied the pharmacognosy of *Barringtonia acutangula*, phtochemical screening and pharmacognostic studies of *Psidium* and *Helicteris* have been studied by Vaidya (2012, 2015).

CONCLUSION

Physiochemical and qualitative chemical analysis of plant are important and they confirm the quality and purity of plant and its identification. Here the information collected was useful for further pharmacological and therapeutical evaluation along with the standardization of plant material. The present work is a small contribution in this direction.

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