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PHYTOCHEMICAL STUDIES OF THE GENUS ZINGIBER FROM FAMILY ZINGIBERACEAE

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ABSTRACT

Phytochemical analysis of three *Zingiber* species (Zingiberaceae) revealed presence of phenols and phenolic compounds, acicubin, cyanogenic glycosides, flavonoid and lignins, leucoanthocyanis, catechol, tannins, quinone, naptho-quinones and coumarin are absence in all the species. The chemical compounds like syringin glycosides, saponin are doubtful in these species.

KEYWORDS: Phytochemical studies, *Zingiber* sp., Zingiberaceae.

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INTRODUCTION

Zingiberaceae is the largest monocotyledonous family in India. Zingiberals group has 52 genera and 1400 species concentrated in Indo-Malaysian region of Asia. Out of these 22 genera and 178 species are available in North-eastern and peninsular region of India[6]. Maharashtra state 11 genera and 32 species are found in wild and cultivated state. The members of this family are used in dyes, perfumes, medicines, ornamentals and other economic uses. Different types of chemicals are reported for development of products from few economic genera/species like *Alpinia, Zingiber, Curcuma*,etc.

The family Zingeberace has several discrepancies such as improper description of the type specimens leading to difficulty in identification of the species. In view of this family Zingiberace has challenges for taxonomist. Chemotaxonomy of Zingiberals in general and genus *Zingiber* in particular was studied.[10] Phytochemical screening of 14 species of Zingiberaceae was carried out[5]. They observed alkaloids in 8 species, flavanoids in 7 species and saponins in 3 species. Polyphenols and terpenoids were present in all the species. However Leucoanthocyanin, tannins and Raphids were absent in all species. Recently, phyto-chemical studies on the genus *Alpinia* carried out.[1] Phyto-chemical studies on three species belong to genus *Zingiber* viz. *Zingiber cernuum* Dalz., *Zingiber nessanum* (Grah.) Raman., *Zingiber zerumbet* Smith were made in south western Maharashtra.

MATERIALS AND METHODS

Three species like *Zingiber cernuum, Zingiber nessanum, Zingiber zerumbet* were collected from the forest areas of southern western Ghats of Maharashtra like Kolhapur, Satara and Ratnagiri, districts and maintained in nursery at ARI (MACS) Pune. The collections were identified with taxonomically by using floras of Maharashtra[8] and Flora of the Presidency of Bombay[3]. . Species were maintained under identical conditions for phytochemical studies. All the zingiber species are seasonal and they complete their life cycle from May to September.

Qualitative analysis of fresh material to detect phytochemicals in stem and leaves has been carried out by the methods suggested[4] for 15 tests. It includes cigarette test, Hot water test, Leucoanthocyanin test, HCl Methods test, HCN test, Syringin test, Juglone test A and B, Maule Test-A, Saponin Test-A, Tannin Test, Mucilage Test, Ehrlich Test etc.

RESULTS AND DISCUSSION

The phytochemical analysis from different tests are presented in table 1 and the results are discussed in following way.

Chemical compound presents in all the species

Observations recorded the tests like Cigarette test, Ehrlich test , HCN test- A , and Maule test present in these species. These chemical compounds have special significance in taxon delimination and suggesting relationship. In all these species Polyphonol, Aucubin

like substance, Cyanogenic glycosides, Lignins are present.

Chemical compound presents / absent in all the species

The Leucoanthocyanin test shows the presence of Leucoanthocyanins in *Zingiber zerumbet* and absence in *Z. nessanum, Z. cernum*. The Juglone test B shows the presence of Flavonoid substance in *Z. cernum* and absence in *Z. nessanum* and *Z. zerumbet*. Tannin test shows Tannin presence in *Z .cernum* and absence in *Z. nessanum* and *Z. zerumbet*. The Hot water test shows presence of Polyphenols in absent in *Z. zerumbet*. The Leucoanthocyanin test shows Leucoanthocyanins is absent in *Z. nessanum*, *Z. cernum*[2]. The Syringin test –A shows the presence of Syringin glycosides is absent in *Z. nessanum* and *Z. cernum*. The Saponin test shows presence of Saponins in *Z. zerumbet* and absent in *Z. nessanum*.

Chemical compound absent in all the species

The HCL-Methanol test , Juglone test – A, revealed absence of Catechol Tannins, Quinone, Naptho- quinines and Coumarin like substance is absent in all the species of Zingiber.

Chemical compound presents or absent in doubtful reactions

Presence of Polyphenols has been detected by Hot Water Test is doubtful in *Z. nessanum* and *Z. cernum*. The Syringin Test – A shows syringin giycosides but is doubtful in *Z. zerumbet*. The Saponin Test shows presence of Saponin in *Z. zerumbet* and doubtful in *Z. cernum.*

Presence/absence of variable quantities of chemicals or doubtful reactions for such chemical compounds has special significance in classification of species. Based on biochemical studies members of family Zingiberaceae can be separated with different compounds present in the family which can be help for selection of disease resistant type[7]. It can be helpful for searching new chemicals and separation of species from chemotaxonomic point of view[9].

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Table 1: Phyto-chemical tests

Name of the species	1	2	3	4	5	6	7	8	9	10	11	12
Zingiber nessanum	+	?	+++	-	-	++	-	-	-	+++	-	-
Zingiber cernum	++++	?	+++	-	-	+	-	-	+++	+++	?	+++
Zingiber zerumbet	+	-	+++	++	-	+	?	-	-	+++	+++	-

1. Cigarette test, 2. Hot Water test, 3. The Ehrlich Test, 4. Leucoanthocyanin Test, 5. HCL –Methanol Test, 6. HCN Test – A, 7. Syringin Test – A, 8. Juglone Test – A, 9. Juglone Test – B, 10. Maule Test –A, 11. Saponin Test – A, 12. Tannin Test

Symbols : 1) + = Very Weak 2) +++ = Strong 3) ? = Doutful 4) ++ = Weak
5) ++++ = Very Strong 6) - = Negative.

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