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Preliminary Investigation of Various Secondary Metabolites from Some Gymnosperm species

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ABSTRACT

It is a universal fact that always plants play an important role in human life. India is well known for its richest biodiversity. But in the present era plants like Gymnosperms are ignored for their conservation. This paper deals with primary screening of some ornamental gymnosperms viz, *Araucaria heterophylla*, *Cycas circinalis*, *Thuja occidentalis* and *Zamia furfuracea* for their wealth of phytoconstituents by using preliminary qualitative phytochemical tests. The fresh foliage tissue was obtained from botanical garden of Yashavantrao Chavan Institute of Science College, Satara. and phytochemical screening was performed as per standard methods for the presence of secondary metabolites viz, Saponins, Phenols, Tannins, Flavonoids, Sugars, Triterpens, Phytosterols.

Keywords: Gymnosperm, Secondary Metabolites, Phytochemicals.

INTRODUCTION

It has been recognized that natural compounds play an important role in pharmaceutical care. Plants-derived substance have recently become of great interest owing to their versatile application. Plants are the richest bio-resource of traditional system of medicine, food supplements, folk medicine, pharmaceutical intermediates and chemical entities for synthetic drug. At Present naturally occurring phytochemicals are of major scientific interest. Technically the term "phytochemical" refers to every naturally occurring chemical substances present in plants, especially to those phytochemicals that are biologically active¹. Plants contain some natural products which perform definite physiological action on the human body and these bioactive substances include Saponins, Phenols, Tannins, Flavonoids, Sugars, Triterpens, Phytosterols². These compounds are synthesized by primary or rather secondary metabolism of plants. Secondary metabolites are chemically and taxonomically extremely diverse compounds with obscure function. They are widely used in the human therapy, veterinary, agriculture, scientific research and countless other areas³. Gymnosperm plants are known from 300BC Years ago. This word is discovered by Theophrastus a pupil of Aristotle in his book "enquiry in to plants". Today gymnosperm plants were commonly grown in garden only for ornamentation apart from this gymnosperm plants were also used in medicine. So in this

investigation we try to screen out the phytochemical constituents. Knowledge of the chemical constituents of plants is desirable because such information will be valueable for synthesis of complex chemical substances⁴. In the present work, qualitative phytochemical analysis was carried out in four gymnospermic plants viz *Araucaria heterophylla*, *Cycas circinalis*, *Thuja occidentalis* and *Zamia furfuracea*.

MATERIALS AND METHODS

The leaves of *Araucaria*, *Cycas*, *Thuja*, and *zamia* were collected from Botanical garden of Yashavantrao Chavan Institute of Science Satara. The identity of the plant was authenticated in a department by using available standard literature and care was taken to collect only fresh and healthy leaves. The leaves were washed and allowed to keep in oven for drying.

EXTRACTION OF A MATERIAL

Dried powder of leaf was successively dissolved in 50ml of distilled water. Then this extract was filtered with the help of Buchannan funnel. The pure filtrate was taken out for further phytochemical analysis.

Following tests were carried out for analysis

Preliminary photochemical testing for the presence of various compounds by standard methods like Anthocyanins and Leucoanthocyanins⁵, Steroids⁶, Benedict's test

for reducing sugar. Hagers test, Mayer's test, Wagner's test and Dragendroff's test for Alkaloid, Tannins⁷, Saponins⁸, Terpenoids by Salkowski test⁹ and compounds like Phenols, Flavonoids, Quinones, Glycosides and Triterpenes compounds by Khandelwal¹⁰ were conducted. Molisch's test, Benedict's test and Fehling's test for carbohydrates.

RESULT AND DISCUSSION

The phytochemical are non-nutritive plant chemicals that have protective or disease protective¹¹. The phytochemical screening of four gymnosperm plants was studied. Three plants (Table.1) showed positive results for Tannin. Tannins are secondary metabolites responsible for antimicrobial properties in various plants¹². Apart from this tannins contribute property of astringency i.e. faster healing of wounds and inflamed mucous membrane¹³. Only *Thuja* plants showed the positive results for phenol. The phenolic compounds are one of the largest and most ubiquitous groups of plant metabolites¹⁴. They possess biological properties such as antiapoptosis, antiaging, anticarcinogen, antiinflammation, antiatherosclerosis, cardiovascular protection and improvement of endothelial function, as well as inhibition of angiogenesis and cell proliferation activities. *Araucaria* and *zamia* plant showed the positive result for saponins have been extensively used as detergents, pesticides and molluscicides & also have beneficial health effects¹⁵. Saponin has the property of precipitating and coagulating red blood cells. Some of the characteristics of Saponins include formation of foams in aqueous solutions, hemolytic activity, cholesterol

binding properties and bitterness¹⁶. The three plants (Table 1) showed the positive result for flavonoids are hydroxylated phenolic substances known to be synthesized by plants in response to microbial infection and they have been found to be antimicrobial substances against wide array of microorganisms. Two plants *Thuja* and *Araucaria* showed the positive result for sugar. Phytosterols showed a positive result in all four plants (Table 1). Phytosterol acts as growth hormones in plants. The plants has been reported as cure for many diseases and the reason for the medicinal property may be because of the presence of these phytochemicals. It is well documented that the presence of these chemicals is responsible for various medicinal properties and reported time to time by various researchers¹¹.

CONCLUSION

Generally, the gymnosperms were cultivated as ornamental plants. But from the above study it is concluded that gymnospermic plants have a medicinal value due to the presence of phytoconstituents. These phytoconstituents make the plant useful for treating different ailments and have a potential of providing useful drugs of human use. Thus the further work aiming towards tracing out of phytochemical present in it and pharmacological activities are in progress.

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Table 1: Preliminary phytochemical screen of different species of gymnosperm

Tests conducted		Plant species			
		<i>Araucaria heterophylla</i>	<i>Cycas circinalis</i>	<i>Thuja occidentalis</i>	<i>Zamia furfuracea</i>
Alkaloids	Mayer's test	-	-	-	-
	Wagner's test	+	-	+	-
	Dragendroff's test	-	-	-	-
	Hager's test	-	-	-	-
Tannin by 1% lead acetate		+	-	+	+
Tannin by FeCl ₃ and KOH method		+	-	+	+
Flavonoid		+	+	+	-
Phenol		-	-	+	-
Steroid		-	-	-	-
Terpenoid		-	-	-	-
Saponin		+	-	-	+
Triterpenes		+	-	+	-
Phytosterol		+	+	+	+
Quinone		-	-	-	-
Glycoside		-	-	-	-
Carbohydrate	Molisch's test	+	-	+	-
	Benedict's test	+	-	+	-
	Fehling's test	+	-	+	-

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