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ANACARDIUM OCCIDENTALE: FOUNTAIN OF PHYTOCHEMICALS; THE QUALITATIVE PROFILING

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ABSTRACT

Medicinal plants are known to be potential source of new phytochemical substances with beneficial therapeutic effects. *Anacardium occidentale* Linn. (*Anacardiaceae*) is a tree native to Brazil and also found in tropical countries like Malaysia and India (Konkan region). The plant is reported to have anti-bacterial, anti-fungal, antioxidant activities and rich source of diverse groups of plant chemicals. In the present investigation different solvent extracts of leaves and bark of *A. occidentale* were qualitatively screened for their phyotochemical appearance. Total twelve extracts were screened; out of which eight were showing various phytochemicals namely Carbohydrates, Alkaloids, Flavonoids and Cardiac glycosides. Out of twelve extracts Flavonoid is present in eleven extracts except methanol extract of leaves. The results obtained from present investigation showed that the plant is a factory of various phytochemicals and it can be used in the treatment and prevention of many diseases.

KEYWORDS: *Anacardium occidentale*, Phytochemicals, Natural remedies.

INTRODUCTION

Human have protracted history of searching potential medicinal products from plants. Due to formation of multidrug resistance scientific community attracted towards natural remedies. Higher plants-derived natural products constitute 25% of the total natural products, their derivatives and analogs represent over 50% of all drugs in clinical use.[8] Plants are potent biochemical factories[7, 16] and have been components of phytomedicines. Phytochemicals are the non nutritive metabolite of plants which have antibacterial and antioxidant activity.[2,11]

The ethnic and rural people of India have preserved a large bulk of traditional knowledge of medicinal uses of plants growing around them.[4] *Anacardium occidentale* (Cashew) is an evergreen short tree belonging to family Anacardiaceae found in coastal region (Konkan) of Maharashtra, Goa and some part of Karnataka. Cashew is a main cash crop in Konkan region. Fruit of cashew (Cashew apple) is widely used in preparation of an alcocholic beverages in nearby Goa state. Cashew nut is a one of the highly nutritive and expansive dryfriut used in all over world.[1] The oil obtained from nut shell (CNSL) is industrially important and has very good antibacterial activity. Cashew syrup is a good remedy for coughs and colds. Cashew apple juice is effective for the treatment of syphilis.[1] Root infusion is an excellent purgative. Cashew apple is anti-scorbutic, astringent and diuretic and is used for cholera and kidney troubles. Bark is astringent, counterirritant, rubefacient, vesicant and used for ulcer. The kernel is a demulcent, an emollient and is used for diarrhoea. Buds and young leaves are used against skin diseases. The resinous juice of seeds is used for mental derangement, heart palpitation, rheumatism; it was used to cure the loss of memory that was a sequel to smallpox.[1] The present qualitative investigation was carried out for searching phytochemicals present in different solvent extracts of leaves and bark of *A. occidentale.*

MATERIALS AND METHODS

Collection of plant material

Leaves and bark of *Anacardium accidentale* were collected from domestic cashew farm located in Golvan, Maharashtra India situated at latitude 16.1339938, longitude 73.5863661 in summer season. Samples were collected in plastic container and transported to Microbiology department, Kankavli College, Kankavli, India.

Processing of Plant Materials

The leaves and bark were cleaned with running tap water and then surface sterilized by using 10% Sodium hypochloride. Cleaned leaves and bark were cut into small pieces and then allowed for drying in the dry shade for five days. Dry samples were use to prepare powder by using mixer grinder. After drying fine powder of both the samples was made using grinding mixer. The both powdered samples were stored separately in two cleaned sterile plastic containers and used for entire study.[9,10,12]

Solvent Extraction

Extraction of the powder was carried out using Soxhlet apparatus. Dried and powdered samples (20gm) were subjected to soxhlet extraction with six solvents‟ Chloroform, Hexane,

Acetone, Methanol, Ethyl Acetate and Distilled water. After extraction these were kept for evaporation at 50^0C for two days.[13, 14] Total twelve extracts were obtained; each extract was transferred into clean and air tight ependoff tube and stored in cooling condition.

From the respective extract 0.5 gm dissolved in 5 ml of DMSO and used for qualitative phytochemical analysis.[2]

Qualitative Phytochemical Study

Test for Carbohydrates (Molisch's test)

Three drops of Molisch's reagent were added to 2ml portion of the various extracts. This was followed by addition of2ml of conc. H_2SO_4 to the bottom of the test tube. The mixture was then allowed to stand for two-three minutes. Formation of a red or dull violet colour at the interphase of the two layers was a positive test.[15, 17]

Test for Alkaloids

0.5 ml of each extract was dissolved in 1% HCl and filtered the solution and filtrate is tested with Dragendroff's and Mayer' reagent separately. Appearance of turbidity is indication for presence of alkaloids.[17]

Test for Cardiac glycosides (Keller Kelliani's test)

0.5ml of each extract was treated with 2ml of glacial acetic acid in a test tube and a drop of ferric chloride solution was added to it. This was carefully added with 1ml concentrated H_2SO_4. A brown ring at the interface indicated the presence of deoxysugar characteristic of cardenolides. Below this layer greenish colour ring form which turn into violet after sometime.[15,17]

Test for Flavonoids (Alkaline reagent test)

1ml of each extract was treated with 3-4 drops of 20% NaOH solution. Formation of intense yellow colour, which becomes colourless on addition of dilute hydrochloric acid, indicates the presence of flavonoids.

Test for Phenols (Ferric chloride test)

0.5 ml of each extract was treated with aqueous 5% $FeCl_3$ and observed for formation of dark blue or black colour.

Test for Phlobatannins (Precipitate test)

2ml of each extract was boiled with 1ml of 1% aqueous HCl. Appearance of reddish precipitate is evidence for presence of phlobatannins.

Test for Proteins (1% ninhydrin solution in acetone)

2ml of filtrate was treated with 2-5 drops of ninhydrin solution placed in a boiling water bath for 1-2 minutes and observed for the formation of purple colour.[17]

Test for Saponins

1ml of extract was added 5ml of water in a test tube. The mixture was shaken vigorously and observed for the formation of persistent foam that confirms the presence of saponins.[17]

Test for Sterols (Liebermann-Burchard test)

1ml of each extract was treated with 1-2 drops of chloroform, acetic anhydride and conc. H_2SO_4 and observed for the formation of deep pink or red colour.[13,17]

Test for Tannins (Braymer's test)

1ml of each extract was treated with 10% alcoholic $FeCl_3$ solution and observed for formation of blue or greenish colour solution.[13,17]

Test for Terpenoids (Salkowki's test)

1ml of chloroform was added to 1 ml of each extract followed by a few drops of conc. H_2SO_4. A reddish brown precipitate produced immediately indicated the presence of terpenoids.[14,17]

Test for Quinones

0.5 ml of each extract was treated with conc. HCL and observed for the formation of yellow precipitate.[17]

Test for Oxalate

2ml of each extract were added a few drops of ethanoic acid glacial. A greenish black colouration indicates presence of oxalates.[17]

RESULTS

The present qualitative analysis of phytochemicals proved that the plant *A. accedentale* is potential source of diverse group of phytochemicals. Total thirteen extracts were screened for

presence of phytochemicals. Eight were showing various phytochemicals namely Carbohydrates, Alkaloids, Flavonoids and Cardiac glycosides. Out of thirteen extracts Flavonoid is present in twelve extracts except methanol extract of leaves [Table-1].

Table – 1: Phytochemical appearance in different extracts of leaves and bark of *A. accidentale*

Phytochemicals	Leaves extracts						Bark extracts					
	Ex. 01	Ex. 02	Ex. 03	Ex. 04	Ex. 05	Ex. 06	Ex. 01	Ex. 02	Ex. 03	Ex. 04	Ex. 05	Ex. 06
Carbohydrate	+	+	+	+	-	+	+	+	+	+	+	-
Alkaloids	-	-	+	+	-	-	+	+	-	+	-	+
C. glycosides	+	+	-	+	+	-	+	+	+	+	+	-
Flavonoids	+	+	+	-	+	+	+	+	+	+	+	+
Phenols	+	+	+	+	+	-	-	-	-	-	-	-
Phlobatannins	-	+	+	+	+	+	-	+	-	-	-	+
Proteins	-	-		-	-	-	+	-	+	+	+	+
Saponins	+	-	+	+	-	+	-	+	-	-	+	+
Sterols	-	-	-	-	-	-	+	-	+	+	+	+
Tannins	-	+	+	-	+	-	+	+	+	+	-	+
Terpenoids	+	-	-	+	+	-	-	-	+	+	+	-
Quinones	-	+	-	-	-	+	+	+	-	-	+	-
Oxalate	+	-	-	-	+	+	+	-	-	+	-	+

Ex. 01 – **Chloroform** Ex. 02 - **Hexane** Ex. 03 - **Acetone** Ex. 04 – **Methanol** Ex. 05 - **Ethyl acetate** Ex. 06 - **Aqueous** (+) – **Present** (-) – **Absent**

DISCUSSION

As per published literature bark and leaves of *A. accidentale* (Cashew) is traditionally used to treat many diseases such as vaginal discharge, common diarrhea, diabetes, weakness, muscular debility, urinary disorders, asthma, eczema, psoriasis, scrofula, dyspepsia, genital problems, bronchitis, cough, intestinal colic, leishmaniasis, venereal diseases.[3] The research article published by Jaiswal et. al. mainly focused on pharmacognostic investigation tree *A. occidentale*, Author studied microscopic and macroscopic characters of cashew leaves and studied its physiochemical parameters.[5] Dare et. al. studied effects of aqueous extract of A. occidentale on pregnancy outcome of Wistar rats; and on basis of result obtained from the study concluded that the extract of *A. occidentale* should not be taken by pregnant women, even when associated with diabetes, during pregnancy.[3] In research work carried by Jaiswal et. al. ethanol and aqueous extract of leaves of *A. occidentale* screened for presence of phytochemicals and the result obtained from this study showed that the both extract contain Carbohydrates, Proteins, Flavonoid, Alkaloid and Amino acids.[5]

The present study also made to attempt qualitative phytochemical profiling of leaves and bark extracts of *A. occidentale.* For this study six different solvents namely Chloroform, Hexane, Acetone, Methanol, ethyl acetate and Aqueous extracts of leaves and bark have been used. Total twelve extracts were screened for appearance of thirteen phytochemicals. It is important to note that from present investigation strong evidence to the leaves and bark of *A. occidentale* are the potential source of Carbohydrate, Flavonoid, Cardiac glycosides, Alkaloids and other diverse group of phytochemicals. Out of twelve extracts eleven extracts are positively observed for presence of Flavonoid except methanol extract of the leaves.

CONCLUSION

Above study firmly suggest that leaves and bark of the plant *A. accidentale* is potential source of diverse types of phytochemicals they may have diverse applications concern with healthcare diagnosis and treatment. Present qualitative investigation directed towards the purification and extractions of phytochemicals from the plant *A. accidentale* as well as other plants from same genus. Hence, these plants can be used to minimize the common health problems and for achieving a healthy life.

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