PRELIMINARY PHYTOCHEMICAL SCREENING OF AQUEOUS EXTRACT OF PLANTAIN FLOWER BRACT

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ABSTRACT

The Plantain flower bract of Musa Paradisiaca have many beneficial medicinal values. Musa paradisiaca is an ever-green tropical plant which belongs to the family musaceae. It belongs to the kingdom - Plantae, Divisions - Angiosperms, Order - Zingiberales, Family – musaceae, A Genus -musa. Plantain flower bract which is not used as ingredients for food and considered as useless material has minerals such as K, Fe, Ca, Mg and Vitamins like vitamin B3 and B2. In this study, the aqueous extract of plantain flower bract was prepared and analyzed for phytochemical constituents presence. It is reported that they posses Carbohydrates, Sterol &Steroids, Quinones / Anthraquinones, Alkaloids, Leucoanthocyanidins, Tannin, Anthocyanin and Terpenoids and shows absence of Amino Acids and Proteins, Phenols, Glycosides, Cyanogenic Glycosides, Flavonoids, Volatile oils and Lignin.

KEY WORDS: Musa Paradisiaca, Bracts, Aqueous Extract, Phytochemical.

I. INTRODUCTION

Banana tree is considered to be one of the largest flowering plants with many medicinal values. Banana tree grows from a corm which is usually known as rhizome. (Rajesh 2017) At matured stage it can grow up to the height of 2-4 meter, it belongs to the large perennial monocotyledonous.(Marikkaretal 2016) 52 countries in the world produces plantain with the capacity of 33 million metric tons per annum. (Ezeigboetal 2018) It is well known that medicinal plants have great value in drug discovery. So that, in our study we are screening phytochemicals that is present in the plantain flower bract by making aqueous extract of the bract. To obtain extract of the plants various types of solvents have been used such as water, ethanol, methanol, chloroform, ether and acetone from which phytochemical can be extracted(SamellKeoetal 2017) This Phytochemical can be used in medications to promote the health of human beings in a traditional way from the plants(NidalJaradatetal 2015). In bract the total phenolic contents were revealed as the minimum amount when it is compared with the other parts of the plantain flower. (Gunavathy 2014) Some organic compounds are present in the medicinal plants and these compounds in human body cause some physiological actions. The compounds are as follows Alkaloids, Terpenoids, Flavonoids, Amino Acids, Carbohydrates, Fixed oils and Fats Glycosides, Phytosterols,

Phenolic compounds and Tannins, Proteins, Saponins, Gum and Mucilage. (Sanjeevkumar 2016) To prevent the damage of DNA these phytochemical present in Musa paradisiaca are used (KhinNannNyuntSwe 2012) Most of the plant compounds contains antinutrients and also some toxic effects, by applying some methods it could be removed and the methods are germination, fermentation, boiling, soaking, autoclaving and some other processing methods (Akinsanmi 2015) The medicinal property of the plantain flower bract is mainly used for the treatment and prevention of Dog bites, Snake bites etc. (Satheesh Kumar Bhandary 2012). Some studies proved that plantain has high fibers which is good for diabetes patients because high fibrous diet lowers the blood sugar level (Maria Patricia Silvestre etal 2016)This Musa Paradisiaca plant has antiulcerogenic activity and also used in the treatment of ulcer. (Ibukun etal 2012)In this study we screened the phytochemicals using the aqueous extract of plantain flower bracts.

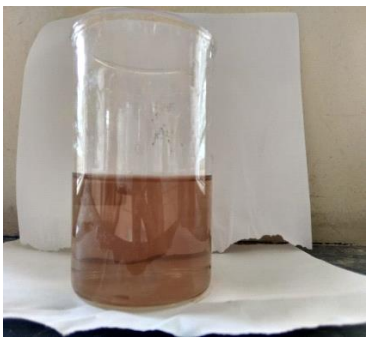
II. MATERIALS AND METHODS

COLLECTION OF BRACTS

The plantain flower was procured from the near village Vengalapuram and used its bract as the sample for the study.

PREPARATION OF SAMPLE OR PREPARATION OF AQUEOUS EXTRACT

25g of plantain flower bract was weighed accurately and washed thoroughly with double distilled water. Then the bract was cut into small pieces and allowed to boil in 500ml distilled water at 100℃ for 1hr and then it was cooled and filtered. Then the filtrate was stored at 4°C and it could be utilized for 1 week.



PHYTOCHEMICAL SCREENING

TEST FOR ALKALOIDS

WAGNER'S TEST

Few ml of extract is treated with few ml of Wagner's reagent.The formation of reddish-brown color shows the presence of alkaloids

MAYER'S TEST

Few ml of extract with few drops of Mayer's reagent is treated together.The creamy layer formation is the confirmation of presence of alkaloids

HAGER'S TEST

1 ml of extract is treated with 1 ml of Hager's reagent and the formation of orange precipitate in the bottom is the presence of alkaloids

TEST FOR CARBOHYDRATES

MOLISCH TEST

2ml of Molisch reagent is added with 2 ml of extract.Then mixed well and carefully added 1ml of conc. Sulphuric acid along the side of the test tube in slanting position. Then the presence of violet color ring at the junction of liquid shows the presence of carbohydrate.

FEHLING'S TEST

0.5ml of Fehling's A and 0.5ml of Fehling's reagent B is mixed and added to the few drops of extract and heated in boiling water bath. Formation of red color precipitate indicates the presence of carbohydrate.

TEST FOR STARCH

Few drops of iodine are added to the few drops of extract.The formation of blue-black color shows the presence of carbohydrates

TEST FOR CELLULOSE

1ml of extract with few drops of iodine solution was added followed by few drops of sulphuric acid. Dark brown red color shows the presence of cellulose.

TEST FOR AMINO ACID AND PROTEIN

MILLON'S TEST

2ml of extract and then added 6 drops of Million's reagent. The formation of red color is the confirmation of the presence of amino acid.

BIURET TEST

Few ml of extract and equal volume of 40% sodium hydroxide and then 2 drops of 1% copper sulphate were added.The formation of violet color shows the presence of amino acid and protein.

NINHYDRIN TEST

Added 1ml of extract with 5 drops of 0.2% Ninhydrin in acetone.The formation of color indicates the presence of amino acid and proteins.

BRADFORD'S TEST

Few ml of extract with few drops of Bradford reagent is added.Formation of blue color indicates the presence of proteins.

TEST FOR PHENOLS

a) FERRIC CHLORIDE TEST

2ml of extract was added with 2ml of ferric chloride solution.The formation of deep bluish green solution shows the presence of phenol

b) PHOSPHOMOLYBDIC TEST

Added few ml of extract with few ml of Phosphomolybdic acid reagent and added few ml of liquor ammonia.The formation of blue color indicates the presence of phenol.

c) CATECHOL TEST

To 2ml of extract with Ehrlich's reagent added few drops of concentrated hydrochloric acid.The formation of brown or black color is the confirmation of presence of Catechol.

TEST FOR STEROL AND STEROIDS

a) SALKOWSKI TEST

To few ml of extract added few ml of chloroform and equal volume of concentrated H2SO4. Appearance of red color in chloroform layer and green fluorescence in acidic layer shows the presence of cholesterol

TEST FOR GLYCOSIDES

KELLAR KILLANI TEST

To few ml of extract added glacial acetic acid along with ferric chloride and added concentrated H2SO4 which is dissolved in ferric chloride along the side of the test tube. Appearance of reddish-browncolor changing to bluish green at the junction in 2-3 minutes indicates the presence of cardiac glycosides.

TEST FOR QUINONES / ANTHROQUINONES

a)CHLOROFORM-AMMONIA TEST

Added few ml of concentrated sulphuric acid and 5 ml of chloroform in few ml of hot extract and kept in boiling water bath. From that take 2 ml and added 1ml of 10% ammonia and shake well. The appearance of pink red in the ammoniacal layer indicates the presence of anthracene derivative.

b)BORNTRAGER'S TEST

In 5ml of extract added 10% ferric chloride and 1ml of concentrated hydrochloric acid. Cool and filtered it.Then shake the filtrate with diethyl ether and added strong ammonia. Formation of pink or deep red color aqueous layer shows the presence of Anthraquinone.

TEST FOR CYANOGENIC GLYCOSIDES

The Picrate impregnated paper was dipped into the extract for 2 hours. The appearance of yellow or brown red color shows the presence of Cyanogenic Glycosides.

TEST FOR FLAVONOIDS

a) DECOLORIZING TEST

Few ml of extract was added with few ml of diluted sodium hydroxide. Appearance of yellow color changes to colorless solution after the addition of diluted hydrochloric acid. The change of colorless solution indicates the presence of flavonoids.

b) AMMONIA TEST

Dip the filter paper in the extract and expose to ammonia vapors. The color change to yellow indicates the presence of flavonoids.

c) LEAD ACETATE TEST

To few ml of extract added equal volume of 0.5% acetic acid and filtered it and then added 1ml of 1% lead acetate to the filtrate. The flocculants white precipitate is the confirmation of presence of flavonoids.

TEST FOR LEUCOANTHOCYANIDINES

To ml of extract added few ml of concentrated HCl and kept in the boiling water bath until it boils. Formation of reddish color shows the presence of leucoanthocyanidins.

TEST FOR TANNIN

BRAEMER'S TEST

To few ml of extract added few drops of 10% ferric chloride. The appearance of dark green color shows the presence of tannin.

TEST FOR HYDROLYSABLE TANNIN

To 4 ml of extract added 4 ml of 10% ammonia. The formation of emulsion on shaking indicates the presence of hydrolysable tannin

TEST FOR ANTHOCYANIN

To 2ml of extract added 1ml of sodium hydroxide was added and boiled for 5minutes.. The formation of green color is the confirmation of the presence of anthocyanin

TEST FOR VOLATILE OIL

To 2ml of extract added 0.1ml of diluted sodium hydroxide and few drops of diluted hydrochloric acid. The formation of white precipitate shows the presence of volatile oil.

TEST FOR LIGNIN

Dipped the filter paper in the extract and added a drop of phloroglucinol reagent. The appearance of red or purple color indicates the presence of lignin.

TEST FOR TERPENOIDS

To few ml of extract added 2ml of chloroform and added 5ml of concentrated sulphuric acid along the side of the test tube. Appearance of reddish brown at the interphase indicates the presence of terpenoids.

III. RESULT AND DISCUSSION

In Phytochemical screening, the presence of Carbohydrates was confirmed by doing the tests Molisch, Fehling's, Starch, and Cellulose. It shows positive result for Molisch, Fehling's, and Cellulose but negative result for Starch. And for Proteins and Amino acid-Millon's, Biuret, Ninhydrin and Bradford's test were done. It shows the absence of protein and amino acids. Phenols are also absent and it was identified by Ferric chloride, Phosphomolybdic and Catechol test. In Salkowski test it gives positive result for steroids and sterol.It also gives negative result in Liberman-Buchard test. Glycosides are absent and it was confirmed by KellarKillani, Legal's, Raymond's and Antimony Trichloride test. Chloroform-ammonia, Borntrager's test shows the presence of Quinine and Anthraquinone. Cyanogenic glycosides are absent and it was confirmed by dipping the picrate impregnated paper into the extract. Alkaloids are present and by positive results tested by Mayer's, Hager's and Wagner's test. Test such as Decolorization, Ammonia and Lead acetate test shows the absence of Flavonoids. Leucoanthocyanidin is present and it is confirmed by leucoanthocyanidin test. Braemar's test gives positive result for tannin and negative result in hydrolysable tannin. Anthocyanin is confirmed by Anthocyanin test. Volatile oils and Lignin are absent and it is done by volatile oil and lignin test. Terpenoids are present which is confirmed by terpenoids test.

PHYTOCHEMICAL	**TEST**	**RESULT**
Carbohydrates	Molisch	+
	Fehling's	+
	Starch	-
	Cellulose	+
Amino Acids & Proteins	Millon's	-
	Biuret	-
	Ninhydrin	-
	Bradford's	-
Phenols	Ferric Chloride	-
	Phosphomolybdic	-
	Catechol	-
Sterols & Steroids	Salkowski	+
Glycosides	KellarKilani	-
Quinones / Anthraquinone	Chloroform – Ammonia	+
	Borntrager's	+
Cyanogenic Glycosides	Cyanogenic Glycosides	-
Alkaloids	Mayer's	+
	Hager's	+

	Wagner's	+
Flavonoids	Decolorization	-
	Ammonia	-
	Lead Acetate	-
Leucoanthocyanidins	Leucoanthocyanidins	+
Tannin	Braemar's	+
	Hydrolysable tannin	
Anthocyanin	Anthocyanin	+
Volatile oils	Volatile oils	-
Lignin	Lignin	-
Terpenoids	Terpenoids	+

IV CONCLUSION

This study proves that plantain flower bract is used as diet for diabetic patient and also used as medicine because it provides some useful drugs for human use from the phytochemical present in the bract. As it has phytochemical such as carbohydrates, sterol & steroids, quinones / anthraquinones, alkaloids, leucoanthocyanidins, tannin, anthocyanin and terpenoids and it may also protects against the free radicals. In future , the antioxidant activity of aqueous extract of plantain flower bract can be studied.

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REFERENCES

A.O. Akinsanmi , G. Oboh, , A.J. Akinyemi, and A.S. Adefegha. Assessment of nutritional,anti-nutritional and antioxidant capacity Unripe, ripe and over ripe plantain (musa paradisiaca) peels. International journal of advanced research.3(2015): 63 - 73.

O.R. Ezeigbo1, I.C. Ezeigbo. Comparative Analysis of the Nutritional Content of Ripe and Unripe Plantain (Musa paradisiaca) obtained from Nigeria. UPI Journal of Chemical and Life Sciences. 2(2018): 1-14.

N. Gunavathy, S.padmavathy, S.C. Murugavel. Phytochemical evaluation of musa acuminata bract using screening, FTIR, and UV- spectroscopic analysis. Journal of international academic research for multidisciplinary. 2 (2014):212-221

O. E. Ibukun,I. J. Kade, T. A. Oguntoyinbo,T.Ogunmoyole and O.D. Johnson. Effect of ripening on the phytochemical constituents and antioxidant properties of plantain (Musa paradisiaca). Journal of medicinal plants research. 6(2012):5077-5081.

KhinNannNyunt Swe. Study on Phytochemicals and Nutritional Composition of Banana Flowers of Two Cultivars (Pheekyan and Thee hmwe). Universities Research Journal. 5(2012):1-6.

Maria Patricia Silvestre, H.A.Liwayway. Hypoglycemic Potential of Banana Leaves (Musa paradisiaca) in Albino Rats. International journal of food engineering. 2(2016):71-74.

J. M. N. Marikkar,S. J. Tan, A.Salleh, A.Azrina, and M. A. M. Shukri. Evaluation of banana (Musa sp.) flowers of selected varieties for their antioxidative and anti-hyperglycemic potentials. International Food Research Journal.5(2016):1988-1995.

Nidal Jaradat1, Fatima Hussen and Anas Al Ali. Preliminary Pytochemical Screening, Quantitative Estimation of Total Flavonoids, Total Phenols and Antioxidant Activity of Ephedra AlataDecne. J. Mater. Environ. Sci. 6(2015):1771-1778

N. Rajesh. Medicinal benefits of Musa Paradisiaca (banana). International journal of Biology Research. 2(2017):51-54.

SamellKeo, ChannethMeng, SokunvaryOeung, Voleak Nov, SreyAuon Lon, TepyVichet, ThongsyVa, MakaraSourn, Sin Chea. Preliminary phytochemical screening of selected Medicinal Plants of Cambodia. Asian Journal of Pharmacognosy. 1(2017): 16-23

C.B. Sanjeevkumar,L. Ramesh Londonkar, M.K.Umesh, L.H. Aruna, P.K. Amarvani. Preliminary Phytochemical Screening from Different Extracts of Bryonopsislaciniosa Fruits. Research and Reviews: Journal of Herbal Science. 5(2016):25-29.

Satheesh Kumar Bhandary, N. SuchethaKumari, S. VadishaBhat,K.P. Sharmila, Mahesh Prasad Bekal. Preliminary phytochemical screening of various extracts of punicageanatum peel, whole fruit and seeds. Nitte University Journal of Health Science. 2(2012):34-38.