International Journal of Botany Studies
www.botanyjournals.com
ISSN: 2455-541X
Received: 14-12-2021, Accepted: 29-12-2021, Published: 14-01-2022
Volume 7, Issue 1, 2022, Page No. 247-250

Comparative study of phytochemical analysis of different musa species

R Karthika[1*], B Sridevi[2], Kalaimathi J[1], A Shagathaj Banu[2], D Birundhavathi[2], S Kanimozhi[2]

[1] Assistant Professor, Department of Biochemistry, Theivanai Ammal College for Women, (Affiliated to Annamalai University), Chidambaram, Tamil Nadu, India

[2] Associate Professor, Department of Biochemistry, Theivanai Ammal College for Women, (Affiliated to Annamalai University), Chidambaram, Tamil Nadu, India

[3] Department of Biochemistry, Theivanai Ammal College for Women, (Affiliated with Annamalai University), Chidambaram, Tamil Nadu, India

Abstract
The aim of presence study to evaluates of Qualitative Phytochemical screening method and Quantitative analysis of three different species of Musa varieties in three various solution like chloroform, ethanol and aqueous solutions. Phytochemical compounds are worth repeating for modern medicine that applying scientific principle to herbalism and abilities to cure diseases. The health benefit of phytochemical is essential that have been reported to illicit both positive and negative biological affect. The phytochemicals is used to improve nutritional food staff profile and role in pharmaceutical industries. Quantitative analysis is used for determining the amount of a chemical in a sample.

Keywords: phytochemicals screening, ethanol, chloroform and aqueous extract of different musa

Introduction

The traditional herbal medicine is popular amongst rural dwellers worldwide. About 3.4 billion people in developing countries in world depend on plant based traditional medicines [1]. Natural products have been an integral part of the ancient traditional medicine system. According to the world health organization (WHO), a medicinal plant is any plant, which is one or more organs, substances that contains, be used for therapeutic purpose. The non-nutrient plant chemical compounds and bioactive compounds which were often referred to as phytochemicals [2-5].

Banana is the fruit of a plant of the genus Musa (family Musaceae), which is cultivated primarily for food and secondarily for the production of fiber used in the textile industry are also cultivated for ornamental purposes. Almost all the modern edible pathenocarpic bananas come from the two wild species – Musa acuminate Musa balbisiana. The scientific names of bananas are Musa acuminata, Musa Balbisiana or hybrids of Musa acuminata and balbisiana, depending on their genomic constitution [6]. Bananas are vigorously growing, monocotyledonous herbaceous plants. The banana is not a tree but a high herb that can attain up to 15 meters of height. The cultivars vary greatly in plant and fruit size, plant morphology, fruit quality and disease and insect resistance. Most bananas have a sweet flavor when ripe; exceptions to this are cooking bananas and plantains. Plantains are hybrid bananas in which the male flowering axis is either degenerated, lacking, or possess relicts of male flowers. Plantains are always cooked before consumption and are higher in starch than bananas [7]. The two groups of plantains, French and Horn, produce fewer fruit per plant than sweet bananas. The groups differ in whether the male parts of the inflorescence are present or absent. In countries where only a few cultivars of banana are consumed, there may be a clear distinction between plantains and bananas; in countries where many 13 cultivars are consumed, there is no distinction in the common names used [8].

Red bananas should have a deep red or maroon rind when ripe, and are best eaten when unbruised and soft. This variety contains more beta carotene and vitamin C than yellow bananas. It also contains potassium and iron. The redder the fruit, the more carotene and the higher the vitamin C level [9].

Plantains contain more starch and less sugar than dessert bananas, therefore they are usually cooked or otherwise processed before eaten. They are typically boiled or fried when eaten green, and when processed, they can be made into flour and turned into baked products such as cakes, bread and pancakes.

Green plantains can also be boiled and pureed and then used as thickeners for soups [10]. The fruits of the Cavendish bananas are eaten raw, used in baking, fruit salad, and to complement foods. The outer skin is partially green when bananas are sold in food markets, and turns yellow when the fruit ripens [11].

Materials and Methods

All the experiments were performed in the laboratory of bio chemistry department in Theivanai ammal college for women(autonomous), Villupuram, Tamil nadu, India.

Collection of Fruit Samples

Different banana sample such as, Musa acuminata red Decca, Musa balbisiana, Musa acuminata cavendish (red banana, plantains, cavendish) are collected from banana farm around the Villupuram District, Tamil nadu, india.

The phytochemical compositions of fruit of three different Musa species

Fig 1: Fruit of red banana (musa acuminata red decca)

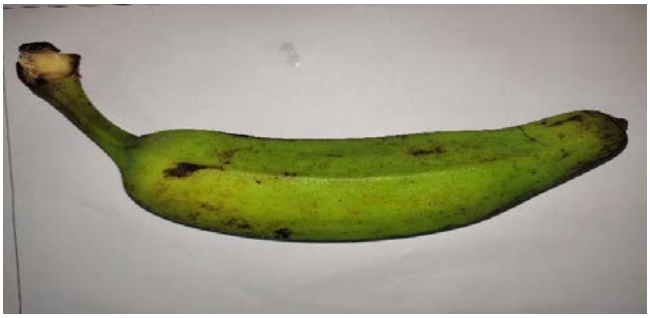

Fig 2: Fruit of plantains (Musa balbisiana)

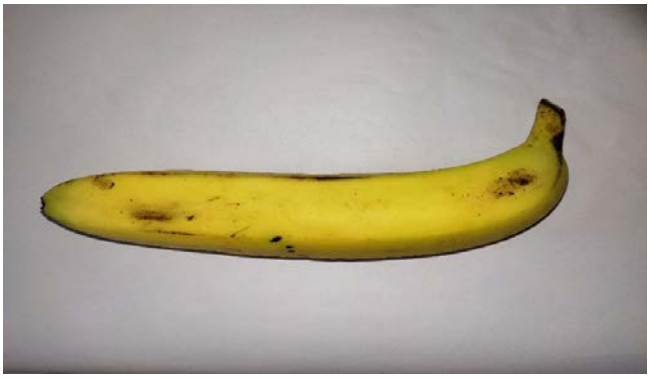

Fig 3: Fruit of cavendish banana (Musa acuminata cavendish)

Sample Preparation

The collected samples of banana pulp were cut into small pieces (each one is 20 gram). Then cruch by mortar and peatles for fine particals.

20 gram of grained banana pulp samples were soak with 25ml of chloroform, ethanol and aqueous solutions and then put in Erlenmeyer flask and marked by permananent marker. It were kept in shaker and leaves it for 24 hours at room temperature. The extracted solvent was filtered using a whatman filter paper and then filtrate solution poured into a petriplate and then the solution keep in room temperature. The extract of samples were collected using 2ml of solvent. These extracts were used for the detection of phythochemicals analysis.

Phytochemical Analysis

Phytochemical screening was analyses to detect the presence of bioactive compound and it was performed by standard procedures. After the addition of specific reagents to the test solution. the test was detected by visual observation of colour change or by precipitate formation. Qualitative phytochemical selection was performed to identify the phytochemical constituents, i.e, tannins, saponins, terpenoids, phenols, anthraquinones aqueous, reducing sugars

Phytochemical Screening

Detection of reducing sugar

5 ml of extracts was added with 5ml of boiling Fehling solution for 2-5min. A brick red precipitate indicates the presence of reducing sugar.

Detection of tannin

2 ml of extracts was taken into a test tube and added few drops of 0.1% or 1m ferric chloride. A blue black or greenish black coloration indicates the presence of tannin.

Detection of saponins

Foam test: 2 ml of extract was shaken with 5 ml of distilled water in a test tube. If foam persist for ten minutes which indicates the presence of saponins.

Detection of anthraquinones

2 ml of extracts with added 2 ml of ammonium hydroxide solution. A bright pink color indicates the presence of anthraquinones.

Detection of Phenols

Ferric chloride test: 2 ml of extract were treated with 3-4 drops of 0.1%or 1m ferric chloride solution. Formation of bluish black colour indicates the presence of Phenols.

Detection of Terpenoids

2 ml of extract were treated with 2 ml of chloroform, then added 3ml of or few drops of sulfuric acid. Formation of Radish brown coloration in the inter face indicates the positive result of presence of terpenoids.

Detection of flavonoids

About 2ml of extract was taken and add few drops of 10% of ferric chloride solution. The occurrence of green or blue color indicates the presence of phenolic hydroxyl group.

Quantitative Analysis

Estimation of Carbohydrate: The amount of carbohydrates in banana sample was estimated by *Anthrone* method (hedge and forfeiter 1964)

Procedure: Weigh 100 mg of banana sample into a boiling tube and hydrolyse by keeping it in a boiling water bath for 3 hours with 5ml of 2.5 N HCL and cooled to room temperature. Neutralize it with solid sodium carbonate until the effervescence ceases. Made up the volume 100ml and centrifuge it and collected the supernatant and 0.5 and 1ml of the aliquots were taken analysis.Pipette out 0.2, 0.4, 0.6, 0.8, 1.0 ml of the working standard in test tube. The aliquots make up to 1.0ml including the sample tubes by adding distilled water. In the blank marked tube 1ml add distilled water was taken. Then added 4ml of antrone reagent in all tubes and heated in boiling water bath for8 minutes. Cooled rapidly and read the green or dark green colour at 630 nm. Draw the standard graph by plotting concentration of the standard on the X- axis vs absorbance on the Y-axis. From the graph calculate the amount of carbohydrates in the sample.

Estimation of Protein by Lowry's Method: The amount of protein present in the pulse sample were estimated by *lowrys method (lowrys et al., 1951)*

Procedure: Extraction is usually carried out with buffers used for the enzyme assay. Weigh 70 g of the sample homogenized with 5 — 10 ml of buffer and centrifuged. The supernatant as used for protein estimation. Pipetted out 0.2, 0.4, 0.6, 0.8, and 1.0 ml of working standard in the series of test tube and 0.1 and 0.2 ml of the sample into Other test tubes. Made up the volume to 1 ml with distilled water. A tube with 1 ml of water serves as blank. Added 5 ml of reagent C to these tubes including blank, mixed well and allowed to stand for 10 minutes. Then added 0.5 ml of reagent D, mixed well and incubated at room temperature in the dark for 30 minutes. Blue colour was developed which is read at 660 nm. Draw a standard graph and calculate the amount of protein in the sample.

Estimation of Lipids: Total lipids were extracted and estimated by the method of *Bligh and Dyer (1959).*

Procedure: In this method a mixture of chloroform and methanol (2:1) was used. The banana sample (about 1g net weight) is the ground in a pestle and rotors with about 10ml of distilled water. The extract is transferred to a conical flask and 30 ml of chloroform – methanol mixture was added and mixed well. For complete extraction, it is advisable to keep the over nights at room temperature preferably in the dark.At this period, further addition of 20ml chloroform and 20 ml of water is made. The resulting solution subjected to centrifuge, and then generally 3 layers was seen. Clear layer of chloroform containing lipid, a coloured aqueous layer of methanol with all water soluble with all soluble materials and a nick pasty interface were seen.

Result

Table 1: The phytochemical compositions of fruit of three different Musa species.

		Musa acuminata red Decca			***Musa Balbisiana***			***Musa acuminata cavendish***		
S.NO	**phytochemical**	**Ethanol**	**Chloroform**	**Aqueous**	**Ethanol**	**Chloroform**	**Aqueous**	**Ethanol**	**Chloroform**	**Aqueous**
1	**Reducing Sugar**	+	+	+	+	+	+	+	+	+
2	**Saponins**	+	-	+	+	-	+	+	-	+
3	**Tannins**	+	+	+	+	+	+	+	+	+
4	**Anthraquinones**	-	-	-	-	-	-	-	-	-
5	**Phenols**	-	+	-	-	-	-	-	+	+
6	**Terpenoids**	+	+	-	+	+	-	+	+	-
7	**Flavonoids**	+	-	-	+	-	-	+	-	+

+ = detected─ = not detected

Table 2: This table shows the result of quantitative analysis of three banana in 100 gram of samples

S.no	Sources	Carbohydrates	Protein	Lipid
1	*Musa acuminata red Decca* (red banana)	21.77g	1.3g	0.3g
2	*Musa Balbisiana* (plantains)	31.89g	1.4g	0.37g
3	*Musa acuminata cavendish* (cavendish banana)	28.65g	1.1g	0.2g

Discussion

The phytochemical analysis of different banana extracts was performed. Among these, plantains showed that the presence of tannin, terpenoids, saponins, reducing sugar, and flavonoids. Then the absence of phenols, anthraquinones on the ethanol extract. When it treated with chloroform, it shows a presence of tannin, terpenoids, reducing sugar and absence of phenols, anthraquinones, saponins and flavonoids on chloroform extract. when it treated with aqueous, it shows the presence of tannin, saponins, reducing sugar and absence of phenols, terpenoids, anthraquinones, flavonoids. Red banana, showed that the presence of tannin, terpenoids, saponins, reducing sugar, and flavonoids. Then the absence of phenols, anthraquinones on the ethanol extract. When it treated with chloroform, it shows a presence of tannin, terpenoids, reducing sugar and absence of phenols, anthraquinones, saponins and flavonoids on chloroform extract. when it treated with aqueous, it shows the presence of tannin, saponins, reducing sugar and absence of phenols, terpenoids, anthraquinones, flavonoids. Cavendish banana, showed that the presence of tannin, terpenoids, saponins, reducing sugar, and flavonoids. Then the absence of phenols, anthraquinones on the ethanol extract. When it treated with chloroform, it shows a presence of tannin, terpenoids, reducing sugar and absence of phenols, anthraquinones, saponins and flavonoids on chloroform extract. when it treated with aqueous, it shows the presence of tannin, saponins, reducing sugar and absence of phenols, terpenoids, anthraquinones, flavonoids Quantitative analysis is any method used for determine the amount of a chemical in a sample. In table 4 shows, how much the qualitative amount in present in it. In Musa balbisiana showed the 31.89 gram of carbohydrates and 1.4 gram of protein and 0.37gram 0f lipids presented in 100 g of sample. In Musa acuminata red Decca shows that the 21.77gram of carbohydrates, 1.3 gram of protein and 0.3 gram of lipid present in that banana. In Musa acuminata cavendish showed that the 28.65 gram of carbohydrates, 1.1 gram of protein and 0.2 gram of lipid is presented The quantitative analysis of different banana samples was performed. Among the amount present in the sample. The high level of carbohydrates presents in plantains. The protein rich banana is plantains. Plantains rich in lipids.

Conclusion

All part of banana is nutritional and traditional use. Many *in vitro* studies, animal model studies and clinical studies suggest that various parts of banana act as food medicines for treatment of disease like diabetes, hypertension, cancer, ulcers, diarrhoea, urolithiasis and infections. Other medicinal uses are in surgical dressing, pain, relief, food,

pharmaceuticals, nano medicine. In comparative study of different bananas (plantains, red banana, cavendish), the best source is plantain banana *(Musa balbisiana)* compare to other two banana because it has high value of carbohydrates, proteins, lipids to others. Also used for the treatment for the various diseases including diabetic, diarrhoea, scabies and inflammation and exhibits different pharmaceutical properties. It has medical purpose and as food staples because they are interesting sources of bioactive secondary metabolites. phytochemical study of Musa species has been indicated that presence of pharmacological activities.

Acknowledgement
The authors would like to thank our college management for supportand TACW DST-FIST for providing instrument facilities

Conflict of Interests
Herewith all the authors declare that they do not have any conflict of interests.

References
1. Sarkar SD, Nahar L. Chemistry for pharmacy students General, Organic and Natural Product Chemistry. England: John Wiley and Sons, 2007, 283-359.
2. Abo KA, Ogunleye VO, Ashidi JS. Antimicrobial potential of Spondias mombin, croton zambesicus and Zygotritonia crocea. Journal of Pharmacological Research,1991:5(13):494-497.
3. Liu RH. Potential synergy of phytochemicals in cancer prevention: mechanism of Action. Journal of Nutrition,2004:134(12):3479-3485.
4. Nweze EL, Okafor Jl, Njoku O. Antimicrobial Activities of Methanolic extracts of Traumeguinesssis (scchumn and Thorn) and Morinda Lucinda used in Nigerian Herbal Medical practice, Journal of Biological Research and Biotechnology,2004:2(1):34-46.
5. Doughari JH, Human JS, Bennade S, Ndakidemi PA. Phytochemicals as chemotherapeutic agents and antioxidants: possible solution to the control of antibiotic resistant verocytotoxin producing bacteria. Journal of Medicinal Plants Research,2009:3(11):839-848.
6. Englberger L. carotenoid-rich bananas in Micronesia. Info Musa, 2003.
7. Merriam-webster online dictionary. Archived from the original on march 9, 2013.
8. Porcher, Michel H. Sorting Musa names. The university of Melbourne. Archeived from the original on march 2, 2001. Retrieved, 2011.
9. Bananas. red bananas description and facts. www.foodreference.com
10. plantain-description, uses, history and facts. Enclopedia Britannica. Retrieved, 2021.
11. the cavendish banana. Peakland heritage.org, 2019. Archived from the original on14 march 2016.