https://doi.org/10.48047/AFJBS.6.7.2024.3277-3302

African Journal of Biological Sciences

Journal homepage: http://www.afjbs.com

Research Paper Open Access

PHYTOCHEMISTRY, PHARMACOLOGICAL ACTIVITIES AND TRADITIONAL USES OF *MUSA ACUMINATA*

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Volume 6 issue 7 2024
Received:01June2024
Accepted:30June2024
doi:10.48047/AFJBS.6.7.2024.3277-3302

Abstract

The banana plant, also known as *Musa acuminata*, naturally grows in tropical and subtropical regions. The therapeutic properties of *M. acuminata* have been the subject of a significant amount of investigation over the course of the past few decades. According to traditional medical practices, the entire plant, including the fruits, peel, pseudostem, corm, blooms, leaves, sap, and roots, is utilised for the treatment of a wide range of ailments. *M. acuminata* has been used to treat a wide variety of disorders, including dysentery, bronchitis, fever, cough, allergy infections, sexually transmitted diseases (STDs), and even some non-communicable diseases, according to the literature that was evaluated. Inflammation, diabetes, hypolipidemia, cancer, and infections are just some of the conditions that *M. acuminata* has been shown to prevent and treat through its pharmacological properties. Research in phytochemistry and pharmacology, which are given in this review, has provided evidence that supports the traditional application of different parts of *M. acuminata* for the treatment of a variety of diseases and disorders. This article presents a comprehensive analysis of the biological effects of *M. acuminata* extracts, along with a correlation of the probable processes and phytochemicals involved. The purpose of this analysis is to provide effective intervention choices for the prevention and management of sickness.

Keywords: *Musa acuminata*, Phytochemistry, Pharmacological activity, Traditional uses

Introduction

As it relates to agriculture, the term "banana" is used to refer to both sweet bananas and plantains, which are both belonging to the genus Musa. The Musaceae family is comprised of three genera: Musa, Ensete, and Musella[1]. Individual genera constitute the family. Among the 65 species that comprise the genus Musa, bananas and plantains, both wild and cultivated, are included. There are three ancient Indian manuscripts that describe the banana: the Ramayana, which dates back to 2000 BC, the Arthashastra, which dates back to 250 BC, and the Cilappatikaram, which dates back to 500 AD[2]. These all provide evidence of the banana's historical significance and widespread consumption in India. Beyond their obvious gastronomic appeal, these fruits have been shown to have potential health benefits, which is a fascinating element that has been disclosed by recent scientific studies. As a result of the recent uptick in interest in therapeutic and preventative nutrition, research into the bioactive components of *Musa acuminata*, particularly those with antioxidant and anti-inflammatory properties, has developed into an extremely important field of study[3]. It has always been a significant underestimation of the pharmacological and therapeutic effects that plants offer. Ethnobotanical literature provides a wealth of information regarding the use of plant infusions, powders, and extracts by practitioners

of traditional medicine for the treatment of a wide variety of ailments. When it comes to healing injuries and illnesses, several societies continue to rely only on plant components as their approach. There is evidence that this practice extends back thousands of years. Several of these plants, which were formerly utilised solely on the basis of traditional beliefs, are now being shown to be effective through the findings of studies today. According to the World Health Organisation (WHO), numerous people in undeveloped countries continue to rely on traditional medicine as their primary method of providing fundamental medical treatment. As a result, there is a significant demand for plants that possess medicinal characteristics, on the part of both developing nations and developed nations[4]. There are a great number of species that are in jeopardy of going extinct since the majority of them are still obtained from the wild without being managed by scientific methods. To be considered a balanced diet, one must consume a certain amount of fruits and vegetables. Numerous health advantages are associated with bananas and other types of fruits. Bananas are beneficial to the body because they assist in the storage of minerals like as calcium, nitrogen, and phosphorus. These minerals are necessary for the growth of new and healthy tissues, and bananas help the body store them. Originally originating in Southeast Asia, the *Musa acuminata* colla banana is a wild species of tree. Musa plant components have been used in traditional medicine for a very long time, and modern study has proved that these statements are true. Musa plant components can be applied topically or taken orally[5]. *Musa acuminata* is said to possess a wide range of pharmacological effects, the majority of which are attributed to the presence of phenolic compounds. This plant's roots, pseudostems, leaves, fruits, and flowers have all been used for therapeutic purposes for a very long time by medicinal practitioners from Africa, Asia, Oceania, and other indigenous communities. Including its traditional applications, pharmacological qualities, and phytochemical composition, this article offers a complete review of the *Musa acuminata* plant[6].

Taxonomical classification of *Musa acuminata*

Kingdom	Plantae
Subkingdom	Viridiplantae
Division	Tracheophyta
Subdivision	Spermatophytina
Class	Magnoliopsida
Order	Zingiberales
Family	Musaceae
Genus	Musa
Species	acuminata

Geographical distribution of *Musa acuminata*

Musaceae is a family of plants that originated in Southeast Asia, which is characterised by its hot and tropical climate. It is believed that the *Musa acuminata* originated mostly in Malaysia, despite the fact that it is scattered quite far beyond. It was in India and Burma where the native species of *M. balbisiana* originated, and it was there that the illness eventually spread[7]. The Indo-Burman peripheral region was the birthplace of triploid AAA banana types, which were the product of natural hybridization between *Musa acuminata* and *Musa balbisiana*. More than three hundred of the six hundred different types of Musa germplasm are thought to have evolved in India as a consequence of this. Bananas are mentioned in a number of ancient Indian treatises, such as the Ramayana (2000 BC), the Arthsastra (250 BC), and the Chilappthikaram (500 AD). This suggests that the banana fruit was farmed in India for a considerable amount of time and that it was an ancient fruit. Antonius Musa, a Roman physician and botanist who lived from 63 BC to 14 AD, was honoured with the naming of the species acuminata, which was derived from the Latin term for sharp or acuminate. Musa's name was also chosen for the genus. *Musa acuminata* can be found in its natural habitats in a number of different regions of India. These regions include the Kaziranga forest range in Assam, the Khasi hill ranges in Meghalaya, the

southern and middle Andamans, and the Western Ghats of Karnataka[8]. A number of countries are currently engaged in the cultivation of *Musa acuminata*, with Brazil, China, India, Ecuador, Columbia, and Venezuela being among the top five countries in this regard.

Botanical description of *Musa acuminate*

Stems that are subterranean and pseudostems are characteristics of monocotyledonous herbaceous plants such as *M. acuminata*. Both freely stooling plants (four to thirty stems) and sparsely stooling plants (one to two stems) are possible for these species. This plant is a perennial. Rhizomes, which grow horizontally beneath the earth, and corms, which are vertically grown compact structures covered loosely with thin leaves, are the two types of stems that plants can actually have. Rhizomes grow directly beneath the ground[9]. The pseudostem, which is composed of leaf sheaths that tightly overlap one another, is narrower and shorter than the pseudostems of the most common banana kinds, which are between three and five metres tall and have a diameter of less than twenty-five centimetres at the base. A glaucous or pruinose appearance can be observed in the petioles and leaf sheaths of the plant.

The leaf blades are normally oblong in shape and have a rounded base. They measure between 2.0 and 2.5 metres in length and between 0.4 and 0.6 metres in width. However, there have been reports of blades that are acute on one side and rounded on the other. The top can be green with or without spots of dark brown pigmentation, while the underside can be green, green with traces of purple, or fully purple. The underside can also be green with hints of purple. Blades can be scarcely waxed or extensively waxed beneath, while midribs can be green, greenish yellow, or weakly to strongly coloured with red pigmentation. Midribs can also be greenish yellow. It is possible for the petioles to be anywhere between sixty and ninety centimetres in length[10]. They can be exceedingly thin or extremely thick, and their margins can either be extensively bent over the channel or left erect, depending on the cultivar. In the majority of instances, the petioles have reached their complete maturity, particularly at the base, where they attach to the pseudostem and penetrate the leaf sheath. Typically, a red line surrounds the petioles that are considered to be suspicious[11]. These petioles may occasionally be slightly curled outward from the pseudostem. An inflorescence that is either subhorizontal or vertically deflexed is exhibiting characteristics. At other times, it is thickly pubescent with brown hairs, while at other times, it has a smooth

rachis and peduncle that are free of hairs. As few as two blooms can be found in the upper hand of the male flower, whereas the basal flower cluster of the female flower can have as many as ten blooms. The female flowers are arranged in two rows, and each bract has approximately sixteen of them. The complicated tepal is around 2.5 centimetres in length and possesses a free tepal that is half-length and translucent. It can be white, yellowish, or somewhat purple in colour, and it has lobes and a tip that is either yellow or white. The ovaries can be any shade of pale green, yellowish green, or purplish. They can also be entirely hairless or ornamented with a few small hairs around the base of the ovary[12].

At this stage in their development, male buds are formed in a manner that allows them to gurgle. Although bracts are often purple or crimson in colour (varying from deep red to dark violet), they can occasionally be yellow at the very tip and on the exterior. Bracts are often convoluted and frequently overlap at the very tip. The bracts exhibit a subtle longitudinal rib pattern, and the inner surface of the bracts is whiter and lighter in colour than the outer surface. The bracts, on the whole, have a glaucous appearance[13]. Only one of the bracts will open at a time, and they will recur as they fade. The male flowers have compound tepals that are around 3.5–4.5 centimetres in length and 1.2 centimetres in width. These tepals can be white, cream, yellowish, or purple in colour. They emerge in two rows, with approximately 20 blooms on each bract. The anthers of stamens frequently turn pink prior to dehiscence, and their length is almost identical to that of the perianth during the process of dehiscence. A significant geotropic curvature is exhibited by fruits, and bunches of fruit are asymmetrical when carried in a subhorizontal orientation, but they are compact when carried in a vertical orientation. When they reach maturity, the fruits take on angular, subcircular shapes[14]. Their length can range anywhere from 8 to 13 centimetres, and their diameter can be anywhere from 1.5 to 3.0 centimetres. The fruit becomes a noticeable acumen that is roughly 0.6-1.5 centimetres in length at the top, then it narrows into a pedicel that is approximately one centimetre in length at the base. As the fruit reaches its full maturity, the pericarp is around 2 millimetres thick and a brilliant yellow colour[15].

On the other hand, the pulp can range in colour from white to cream yellow to yellow. A smooth or minutely tuberculate appearance can be found on the seeds, which also have an inconsistent

angulation pattern (Cheesman, 1948). The seeds are approximately three millimetres tall and six to seven millimetres long. The wild banana plant, along with its typical flower, bract, and fruit plant features, is depicted in Figure 1[16,17].

Figure 1: *Musa acuminata* aerial parts

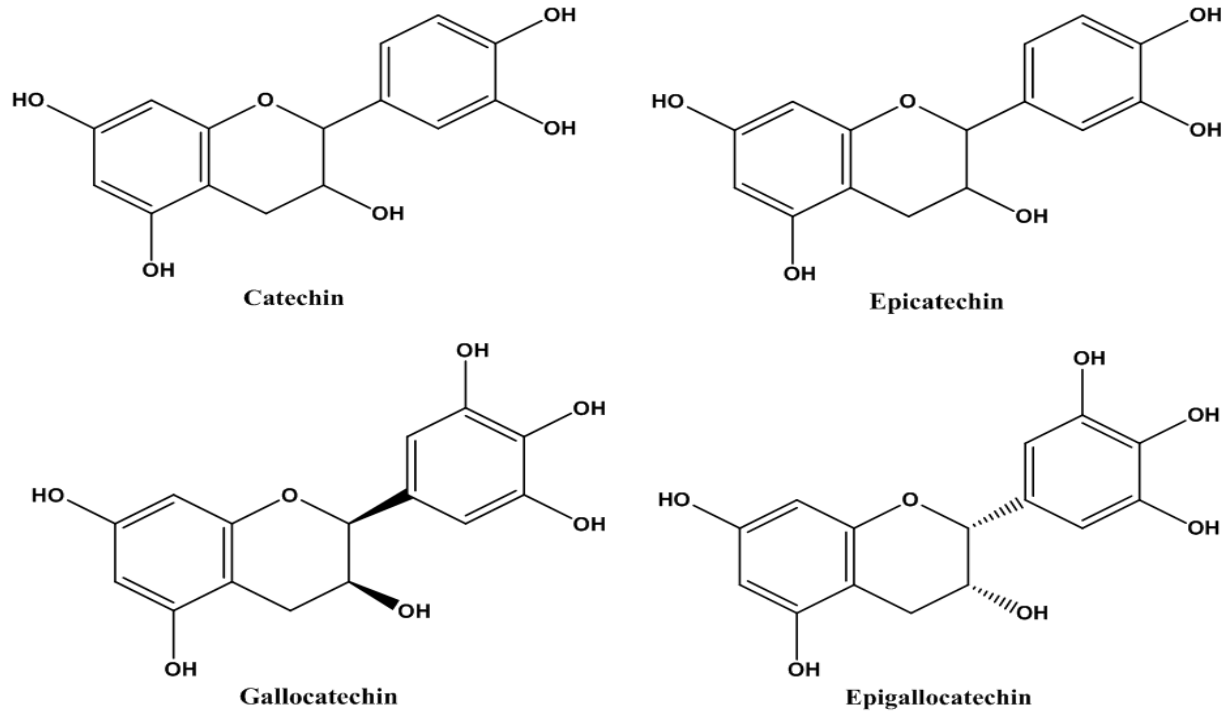
Phytochemistry of *Musa acuminata*

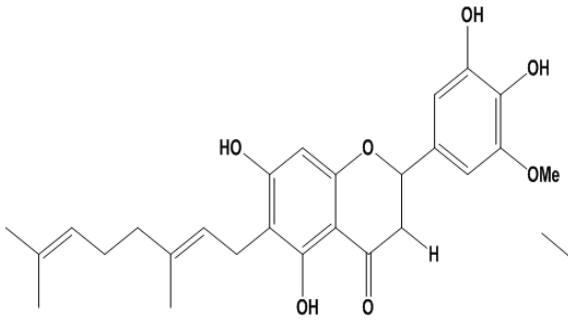
Studies on the phytochemistry of *Musa acuminata* have uncovered a wide range of substances, including as alkaloids, fatty acids, tannins, terpenoids, anthocyanins, and terpenoids, as well as

the fruit, peel, flower, leaf, pseudostem, and rhizome of the plant[18]. There is a list of the chemicals that may be found in various parts of the *Musa acuminata* plant, and it is reported that the phytochemical concentration changes depending on the extraction method that is used[19].

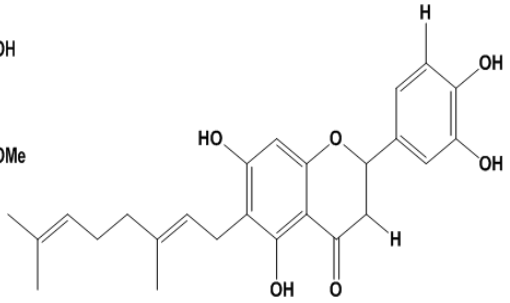
The extraction of novel chemical compounds from plants, which continue to be an important source of bioactive molecules, is accomplished by the application of a multidisciplinary approach that incorporates ethnobotanical, phytochemical, and biological testing techniques. Numerous Musa species have been discovered to contain a variety of bioactive compounds, including dopamine, N-acetyl serotonin, rutin, apigenin glycosides, myricetin glycoside, naringenin glycosides, kaempferol-3-Orutinoside, and others.

The aerial parts of *Musa acuminata* contain a variety of flavonoids, including Catechin, Epicatechin, Gallocatechin, Epigallocatechin, Podocarpus flavone, Heveaflavone, 5,7-dihydroxy-4,6,8-trimethoxyflavone, 5,6-dimethoxy 4,7,8- trimethoxyflavone, 3-o methyl-5-hydroxy diplacone, 3-o methyl-5-o methyl diplacone, Mimulone, Diplacone, and many more shown figure 2 [20,21].

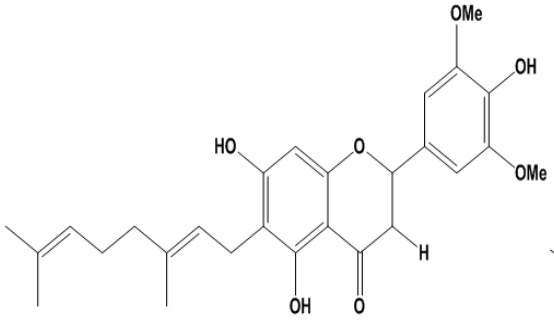




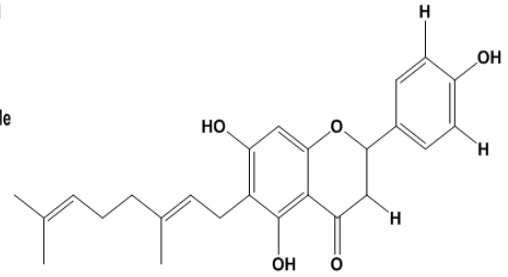
3-o methyl-5-hydroxy Diplacone



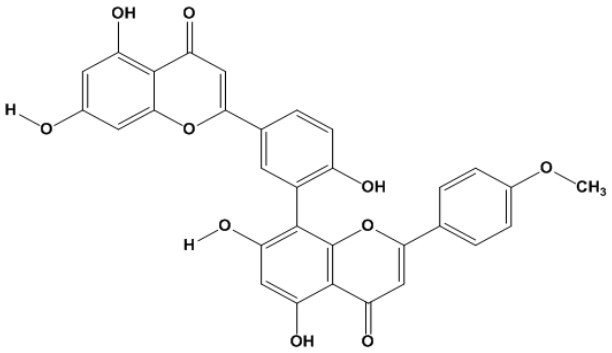
Diplacone



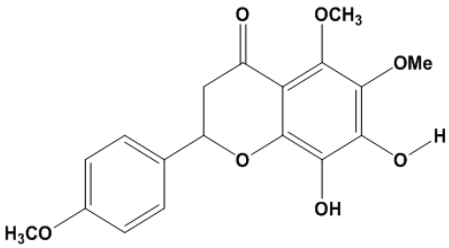
3-o methyl-5-o-methyl diplacone



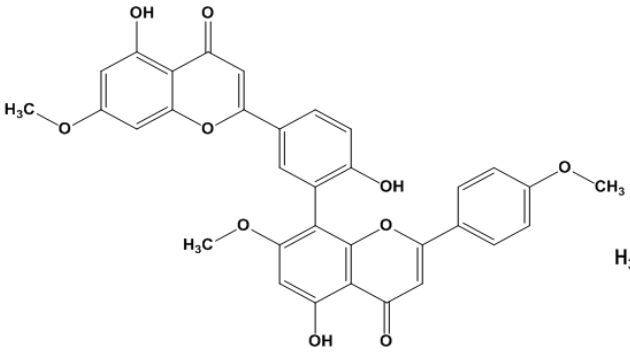
Mimulone



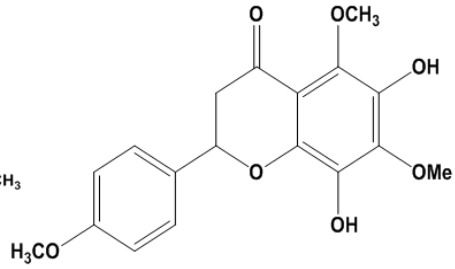
Podocarpusflavone



5,7-dihydroxy-4,6,8-trimethoxyflavone



Heveaflavone



5,6-dimethoxy-4,7,8-trimethoxyflavone

Figure 2: Flavonoids isolated from the *Musa acuminata*

Saponins present in *Musa acuminata* are Protopanaxadiol, protopanaxatriol, Gypsogenin, Gypsogenic acid, Quillaic acid, Hederagenin etc present in *Musa acuminata* aerial parts shown figure 3[22].

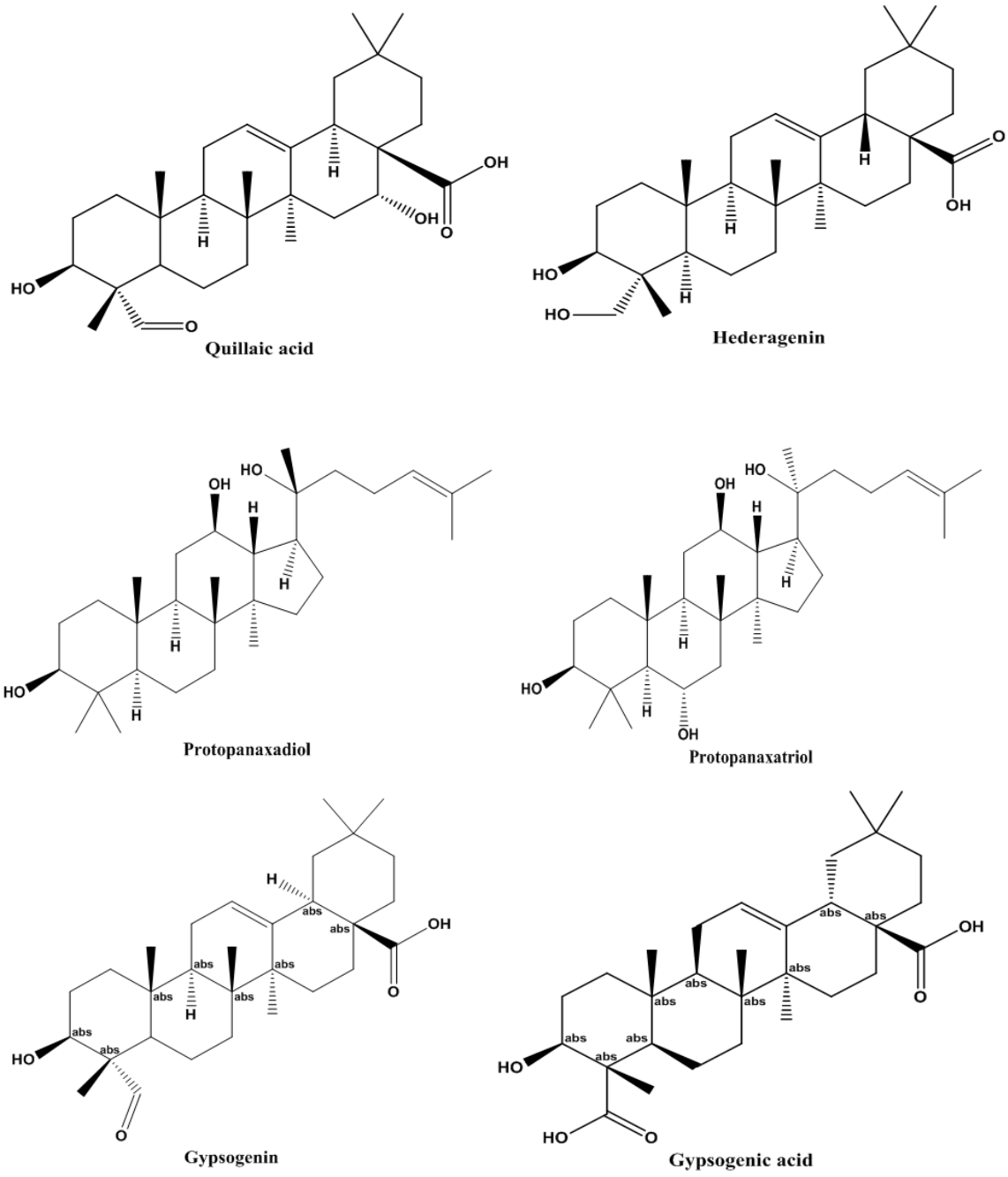


Figure 3: Saponins isolated from the *Musa acuminata*

Cardiac glycosides isolated from *Musa acuminata* are Cardenolide, Bufadienolide, Isocardenolide, Digitoxigenin, Digoxigenin, Gitoxigenin, Strophanthidin, Ouabagenin etc present in aerial parts of *Musa acuminate* shown in figure 4[23].

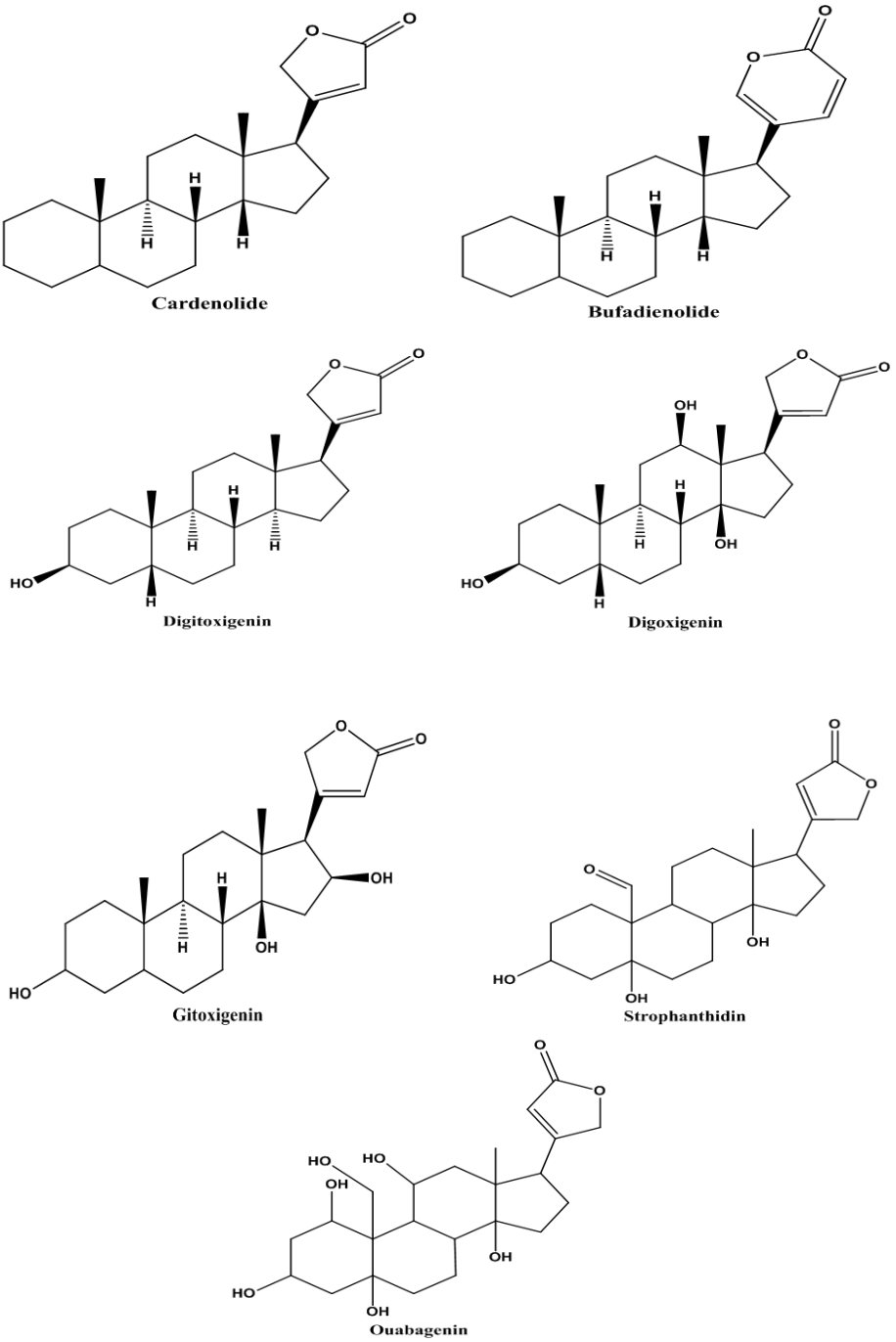


Figure 4: Cardiac glycosides isolated from the *Musa acuminata*

Indole Alkaloids are the major alkaloids with therapeutic importance in the *Musa acuminata*. These includes Tryptamine, Serotonin, Physostigmine, Harmine, Canthionone, Ajmalicine, Catarantine, Tabersonine etc present figure 5[27].

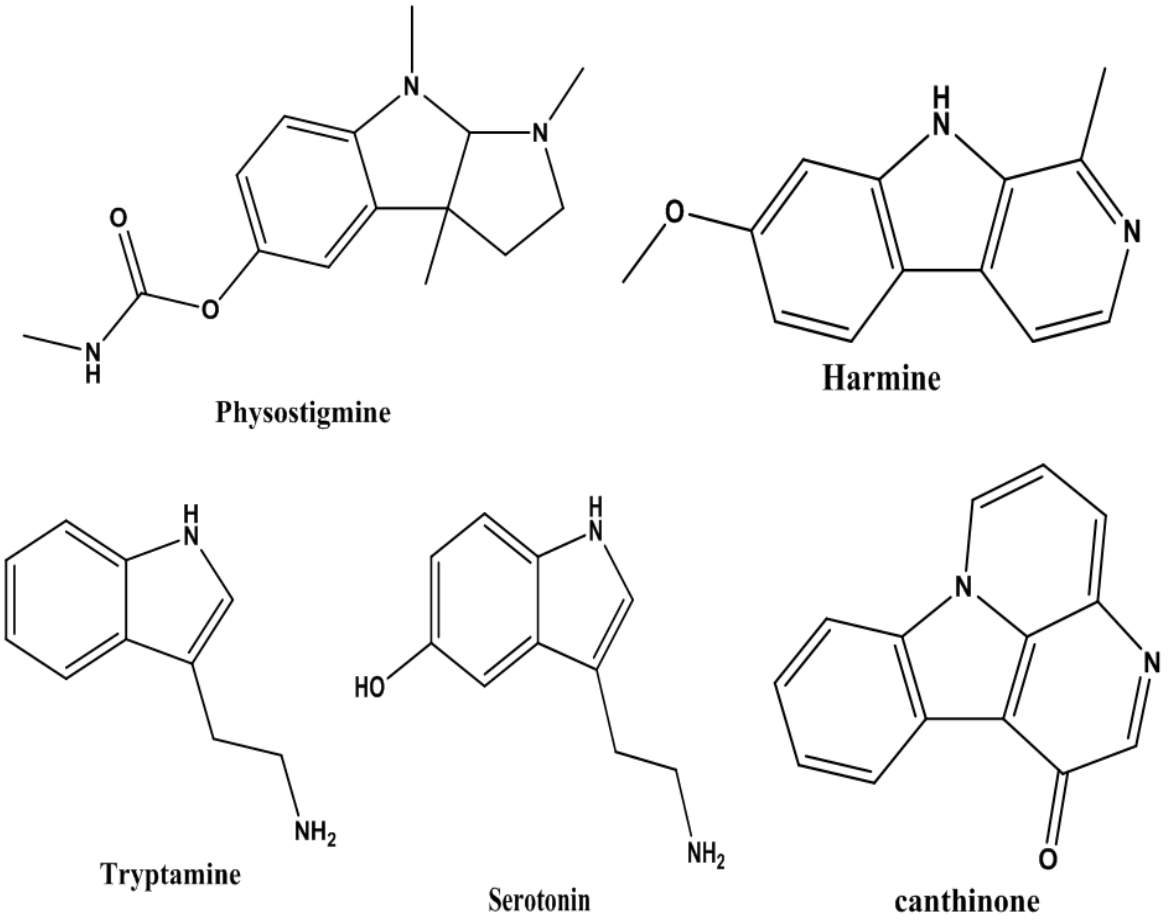


Figure 5: Indole alkaloids isolated from the *Musa acuminata*

Phenolic acids are active metabolites that enable the *Musa acuminata* majorly in the antifungal, antioxidant activities. Hydroxybenzoic acid derivatives like (gallic acid, vanillic acid, syringic acid), hydroxycinnamic acid derivatives like (p-coumaric acid, caffeic acid) present figure 6[28].

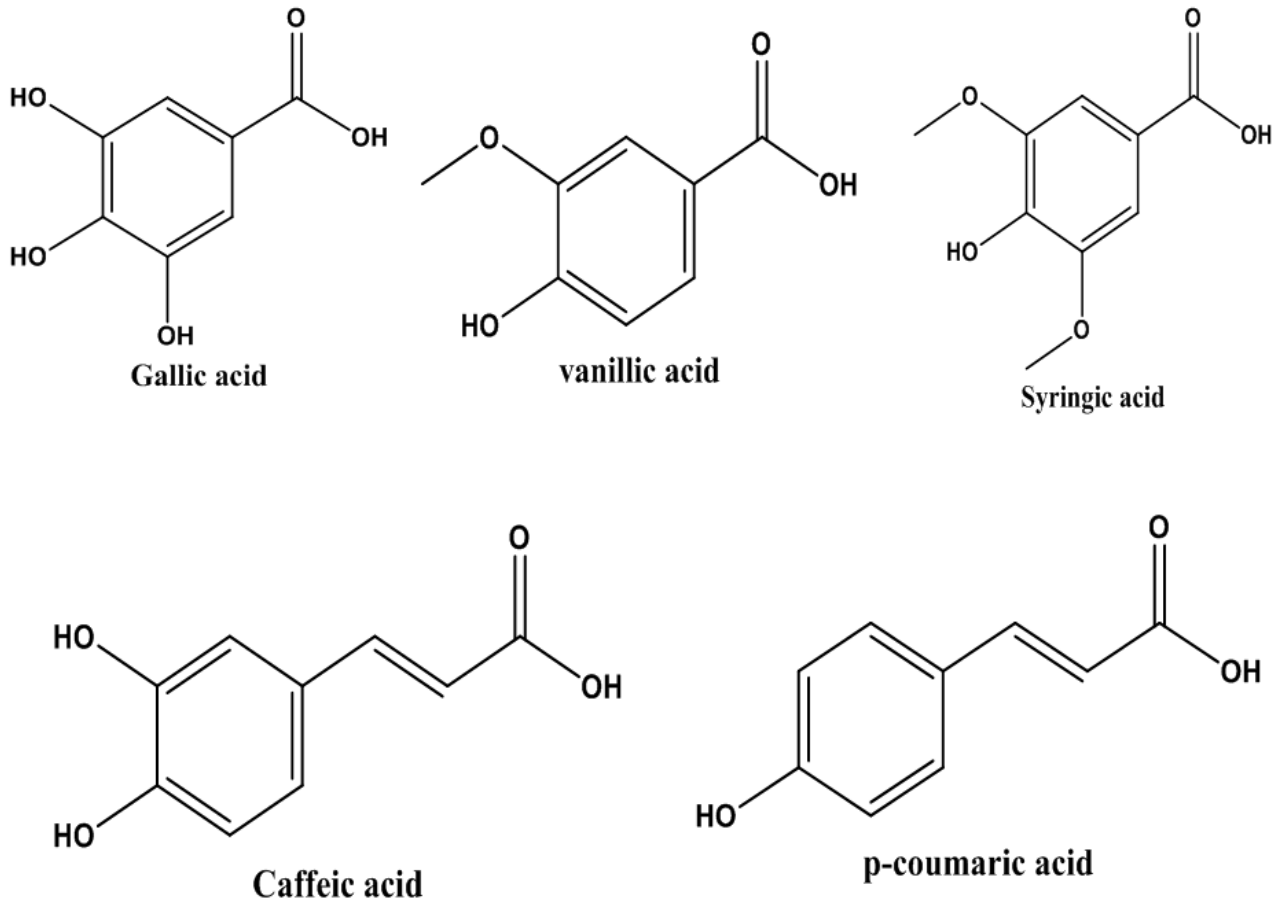


Figure 6: Phenolic acids isolated from *Musa acuminata*

Miscellaneous compounds that are isolated from the *Musa acuminata* are Norepinephrine, dopamine, L-tryptophan, pectin, acyl steryl glycosides, triterpenes, arginine, aspartic acid, glutamic acid, leucine present Figure7[24-26].

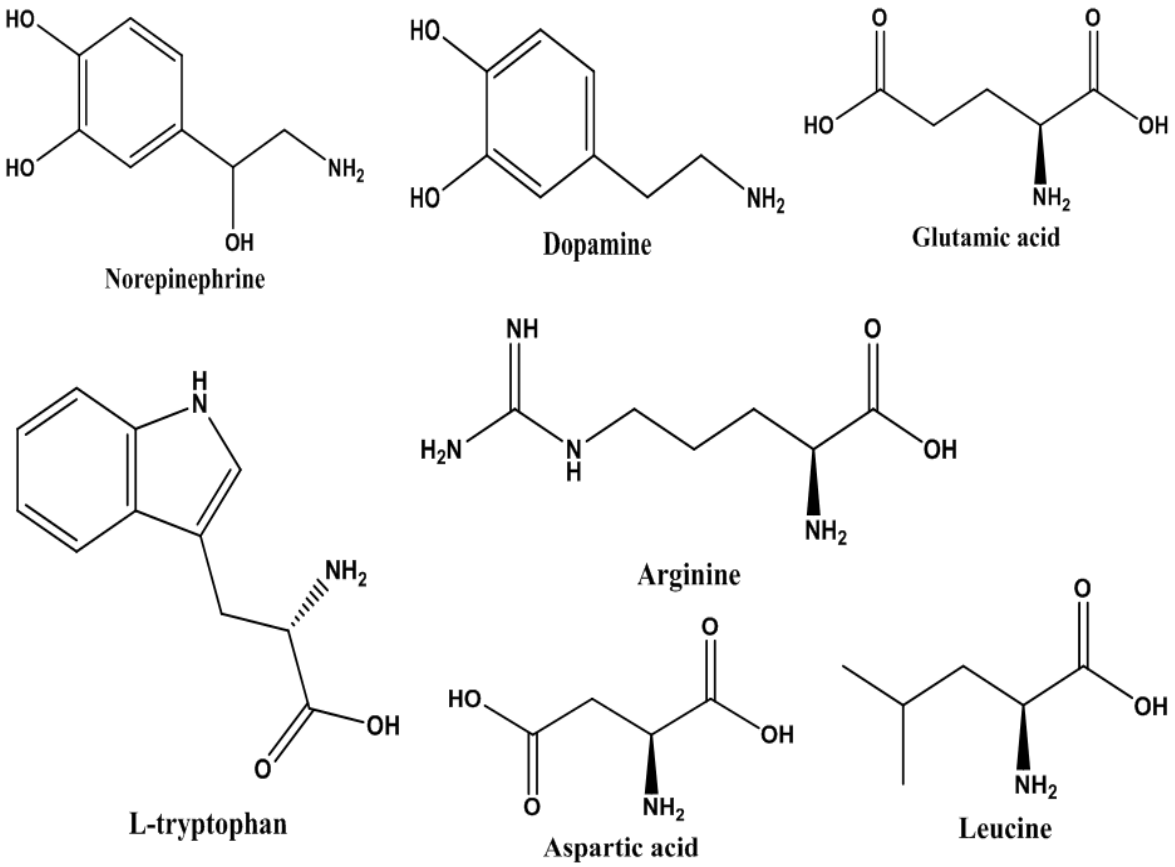


Figure 7: Miscellaneous compounds isolated from *Musa acuminata*

Pharmacological activities of *Musa acuminata*

Antioxidant property

V Balajee *et al* showed The antioxidant properties of *Musa acuminata* were evaluated using two assays: the 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical assay and the hydrogen peroxide (H2O2) assay. A new working solution was made for each test by diluting the stock solution of DPPH with methanol until it reached a final concentration of 20 µM. In a 96-well plate, 200 µL of the DPPH working solution was mixed with *Musa acuminata* extract at several doses (10, 20, 30, 40, and 50 µg/mL). In this work, the antioxidant activity was evaluated using the hydroxyl radical scavenging assay, following the method established by Halliwell et al. There was a preparation of 1 mL of reaction mixture containing 100 µL of 28 mM of 2-deoxy-2-ribose.

Afterwards, extracts of *Musa acuminata* were applied at different doses (10-50 µg/mL). At all concentrations studied, the standard had the highest antioxidant activity, whereas the banana peel extracts under study produced findings that were comparable to it in the DPPH free radical scavenging experiment[29]. At a dosage of 10 µg/mL, the rasthali extract exhibited the greatest antioxidant capacity (64.31%) among the banana cultivars. At doses of 20, 40, and 50 µg/mL, respectively, the combined extract of red banana and rasthali displayed lower antioxidant properties (74.97%, 86.31%, and 86.31%), compared to the 1:1 ratio extract. However, at a concentration of 30 µg/mL, the red banana extract exhibited a greater antioxidant capacity (82.05%) compared to the other kinds. Both the standard and the extracts' antioxidant activity increased as their concentrations dose[30]. The antioxidant activity of the banana peel extracts that were studied ranged from 48.76% to 89.9%, according to the H2O2 assay. At doses of 10, 20, 30, and 40 µg/mL, the rasthali peel extract exhibited the maximum antioxidant property (64.31%, 73.52%, 81.54%, and 85.49%), surpassing the standard. At a concentration of 50 µg/mL, the rasthali extract outperformed the other kinds in terms of antioxidant activity (89.18%), but it was lower than the norm. Both the standard and the extracts' antioxidant activity increased as their concentrations rose[31].

Anti microbial property of *Musa acuminata*

Anhita *et al* the *Musa acuminata* has been demonstrated to possess antibacterial properties. After being washed under running water for five minutes, the *Musa acuminata* was then cut into pieces of varying sizes, such as a fruit peel measuring 0.5 centimetres by 1 centimetre and a meristem measuring 0.5 and 0.5 centimetres by 1 centimetre. When the samples had been exposed to the sun for a period of four days, they were then pulverised into a powder and combined with a variety of methanol and ethanol solutions[32]. On the other hand, 85% ethanol was used for antimicrobials, whereas 50% methanol was used for the investigation of phytochemicals. The disc diffusion method was utilised in order to evaluate the effective antibacterial activity. One hundred microliters of bacterial solution was distributed using a glass spreader that was bent at a 90-degree angle[33]. Before placing them on top of Nutrient Agar Media, sterile filter paper discs of 5 millimetres in diameter were loaded with 10 microliters of plant extract at concentrations of 10, 20, and 50 milligrammes per millilitre. To determine the zone of inhibition,

the plates were incubated at 37 degrees Celsius for a period of twenty-four hours. Alkaloids, flavonoids, and a great number of other secondary metabolites are among the numerous that can be found in abundance in bananas[34]. Different phyto-compounds, such as alkaloids, flavonoids, and others, were found in the methanol solution that was extracted from the wild Musa fruit peel and meristem. The solution contained fifty percent methanol. When compared to the secondary metabolites that were found in both types of wild Musa, phenol was found to be the most prevalent. Using a very low concentration of ten milligrammes per millilitre, the results showed that the ethanol extract of fruit peel *Musa acuminata* exhibited very little to no antibacterial effect. All of the *Musa acuminata* fruit peel extract concentrations that were examined (10, 20, and 50 mg/ml) did not produce any inhibitory zones that measured 0 millimetres in the laboratory[35].

Anti inflammatory activity of *Musa acuminata*

Apriasari et al The ability to reduce inflammation was demonstrated. In their experimental study, the researchers employed a control group technique that consisted solely of post-testing. Twenty male Rattus norvegicus (Wistar) were given MASE gel three times a day in varying concentrations: 0% (control), 25%, 37.5%, and 50%. This was done after injuries were made to the left buccal mucosa of the rats[36]. On the third day, a sample was collected from each mucosal incision in order to conduct an immune histochemical analysis of the expressions of TNF-α and NF-κB. The use of 50% MASE led to the lowest expression of TNF-α, which was measured at 6.40 ± 1.14. On the other hand, the control group displayed the highest expression, which was measured at 13.20 ± 1.79. In addition, when comparing the therapy groups, there was not a statistically significant difference ($p > 0.05$) found between them[37]. There was a significant difference in the expression of NF-κB between the control group, which had the highest expression at 13.20 ± 1.30, and the group that got the 50% MASE therapy, which had the lowest expression at 6.40 ± 1.14. The group that received treatment with MASE at a 50% concentration exhibited a noteworthy decrease in NF-κB levels when compared to the other treatment groups ($p < 0.05$)[38]. When MASE is administered to a mucosal lesion, there is a reduction in the expression of TNF-α and NF-κB, regardless of the concentration present. By far

the most powerful anti-inflammatory impact was produced by fifty percent of the MASE solution[39,40].

Anticancer activity of *Musa acuminata*

An investigation was conducted to determine the antioxidant, anticancer, and total phenol and flavonoid activities of ethanol extracts derived from three different plants: Cucurbita maxima, *Musa acuminata*, and Phoenix dactylifera. In terms of overall phenolic contents, the ethanol extract of banana fruit had 342 µg/mL of gallic acid equivalents[41]. On the other hand, the ethanol extract of molasses contained 1424 µM of flavonoids, with rutin being the most abundant among them. This is in comparison to the total flavonoids. Both HeLa and EACC cell lines were used to conduct the in vitro evaluation of the anticancer activities. At a concentration of 90 percent, the ethanol extract of date seeds had the most potent inhibitory impact against the HeLa cell line. On the other hand, the ethanol extract of pumpkin seeds demonstrated the most potent inhibitory action against EACC at a dosage of 100µg/ml. The reducing power, the DPPH scavenging activity, and the ABTS were the three methods that were utilised in order to determine the antioxidant activity. In terms of DPPH scavenging activity, the ethanol extract of date seeds was found to be 84%, while the ethanol extract of banana fruit was also found to be 84%. The ability of ethanol extracts of date seeds (98%), banana peel (95%), date molasses (95%), and fruit (95%), to scavenge for ABTS was investigated. In the date fruit extract, the ethanol extract, and the molasses extract, the reducing power was found to be 871 µg/mL GAE, 833 µg/mL GAE, and 873 µg/mL GAE, respectively. The results of the sensory assessments that were performed on four different formulations that were made from the plants that were investigated revealed that all four of the formulations were favourably received. Pumpkin seeds, banana peel, and dates were all discovered to have ethanol extracts that showed promise as potential novel antioxidants and anticancer agents. Dates were also found to contain such extracts. The formulations that were developed have the potential to be utilised on a daily basis as dietary supplements[42].

In further experiment was conducted on male mice to investigate the radioprotective and anticancer properties of an extract derived from banana peels. Sixty adult male mice weighing 18–g were randomly assigned to one of six groups: (1) the control group, which served as the

norm; (2) the group that had an Ehrlich tumour implanted; (3) the group that was exposed to a single dose of 3.0 Gy of gamma rays; (4) the group that was given 300 mg/kg/day orally for three weeks as a banana peel extract; (5) the group that had both the tumour and the banana peel extract implanted, 300 mg/kg/day orally for three weeks; and (6) the group that received a dose of 3.0 Gy of gamma radiation in addition to 300 mg/kg/day over the course of three weeks. It was necessary to take blood samples from mice that had been anaesthetized and had finished their experiments in order to evaluate the biochemical parameters. Malonaldehyde, Carcinoembryonic Antigen, Full Blood Count, Electrophoretic Assay, and Molecular Analysis are among tests that are performed. The findings showed that the extract from banana peels was able to reduce the detrimental effects of the alterations that occurred in both the irradiation and the tumour groups. A significant reduction in the levels of carcinoembryonic antigen and malonaldehyde was observed in both the group that had the tumour implanted and the group that had been irradiated, with a level of significance of $p \leq 0.05$. As a result of the protein fraction and western blotting data, it shows that the addition of banana peels extract has a substantial influence on the radiation dose. This is demonstrated by a twenty percent increase in polymorphism when compared to the radiation treatment that did not reflect variety. In addition, there was a discernible increase in the amount of P53 expression when the compound dosage consisted of irradiation in conjunction with banana peel extract[43].

Antidiabetic activity of *Musa acuminata*

Musa acuminata is a plant that is not only highly acclaimed for its therapeutic properties but also possesses a remarkable nutritional capacity. The pulp of bananas has been shown to offer potential anti-diabetic properties, according to certain research. The purpose of this study was to investigate some of the difficulties associated with diabetes as well as the potential anti-diabetic effects of *Musa acuminata* peels and their fractions[44]. Orally administered doses of extract (100, 200, and 400 mg/kg/day), fractions (50 and 100 mg/kg/day), and a vehicle were administered to a total of six groups of rats that had been infected with diabetes by alloxan. The extract was administered for a period of 21 days, while the fractions were administered and administered for a period of 7 days[45]. *Musa acuminata* has the ability to lower plasma glucose levels by utilising glucose in the periphery and creating hepatic glycogen. This is in addition to

the fact that it can improve body weight and reduce diabetes consequences such as dyslipidemia, peripheral neuropathy, and nephropathy[46]. Additionally, it decreases the catabolism of proteins. When it comes to the management of diabetes and the repercussions of diabetes, *Musa acuminata* serves as a protective function[47].

Traditional uses of *Musa acuminata*

The banana plant, also known as *Musa acuminata*, naturally grows in tropical and subtropical regions. The therapeutic properties of *M. acuminata* have been the subject of a significant amount of investigation over the course of the past few decades. According to traditional medical practices, the entire plant, including the fruits, peel, pseudostem, corm, blooms, leaves, sap, and roots, is utilised for the treatment of a wide range of ailments[48]. *M. acuminata* has been used to treat a wide variety of disorders, including dysentery, bronchitis, fever, cough, allergy infections, sexually transmitted diseases (STDs), and even some non-communicable diseases, according to the literature that was evaluated. There is a wide variety of therapeutic actions that can be attributed to *M. acuminate*[49]. These effects include those against diabetes, cancer, hypolipidemia, immunomodulation, and microorganisms, including HIV. Research in phytochemistry and pharmacology, which are given in this review, has provided evidence that supports the traditional application of different parts of *M. acuminata* for the treatment of a variety of diseases and disorders[50]. This article presents a comprehensive analysis of the biological effects of *M. acuminata* extracts, along with a correlation of the probable processes and phytochemicals involved. The purpose of this analysis is to provide effective intervention choices for the prevention and management of sickness[51].

Conclusion and future prospects

In order to collect all of the information that is currently accessible for *Musa acuminata*, we made use of Pubmed, Scopus, Web of Science, Science Direct, J-Gate, and Google Scholar. In addition, through the use of library research, publications that were published in journals that were subjected to peer review, local periodicals, unpublished materials, theses, and ethnobotanical textbooks were consulted. *Musa acuminata* plant parts contain a wide variety of phytochemicals, which may explain the medicinal benefits of these plant parts and the reason

why they have been used traditionally to treat a wide variety of ailments. Animal models with specific pathological conditions have demonstrated that the *Musa acuminata* plant is useful as a therapeutic agent. This lends credence to the fact that indigenous communities all over the world make use of this plant. Nobody has ever claimed that the *Musa acuminata* plant is poisonous, despite the fact that numerous individuals from all over the world have consumed various components of the plant for a considerable amount of time. *M. acuminata* fruits, according to the results of a proximate analysis, include vitamin C as well as minerals such as potassium and magnesium, which can assist in meeting the daily requirements that are suggested through consumption. Additionally, they can be utilised as a component in the production of functional foods. The use of *M. acuminata* plant parts for the treatment of a wide variety of ailments has been practiced for a long time in traditional medicine, and this practice may be supported by the high variety of phytochemicals that are found in the plant. Using animal models with specific pathological conditions, researchers have demonstrated that the *M. acuminata* plant is useful as a therapeutic agent. This lends credence to the fact that indigenous cultures all over the world make use of this plant. Nobody has ever claimed that the *Musa acuminata* plant is poisonous, despite the fact that numerous individuals from all over the world have consumed various components of the plant for a considerable amount of time.

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