

Banana Peel: Pharmacological Activities: A Review

Archana Thomas

Dept. of Pharmaceutical Chemistry, St James College of
Pharmaceutical Sciences, Chalakudy, Kerala

K. Krishnakumar

St James Hospital Trust Pharmaceutical Research Centre
(DSIR Recognized), Chalakudy, Kerala

Abstract: *Herbal medicines are an important part of healthcare throughout the world. Herbal medicines have been widely utilized as effective remedies for the treatment and prevention of multiple health conditions. Plants have the ability to synthesize a wide variety of chemical compounds that are used to perform important biological functions. Musa sapientum is a popular fruit consumed worldwide, and various parts of the plantain and banana is used for the treatment of many disease. This review article focuses to study about the pharmacological activities of the plant Musa sapientum.*

I. INTRODUCTION

Musa sapientum which is commonly called banana is an herbaceous plant of family Musaceae, a popular fruit consumed worldwide. It is originated from tropical region of Southern Asia. The plant is cultivated for its fruits and to a lesser extent for production of fibres. Considering the nutritional activities, it is one of the leading food crops with high source of minerals, vitamins, flavonoids, carbohydrates, phenolic compounds, dietary fibre, proteins, essential amino acids, polyunsaturated fatty acids etc. The potassium (78.1), calcium (19.20), sodium (24.30), iron (0.61), manganese (76.20), bromine (0.04), radium (0.21), strontium (0.03), zirconium (0.02) and niobium (0.02 mg g⁻¹) were found in the banana peel. The percentage concentration of protein, crude lipid, carbohydrate and crude fibre were 0.90, 1.70, 59.00 and 31.70 (mg g⁻¹) respectively. Soluble fibres are known to lower serum cholesterol and help reduce the risk of colon cancer. Bioactive compounds like alkaloids, flavonoids, anthocyanins, tannins, phlobatannins, glycosides, and terpenoids were found in banana peels, and these compounds have been reported to exert various biological and pharmacological effects such as antibacterial, antihypertensive, antidiabetic, and anti-inflammatory activities. Antioxidant compounds and high amount of micronutrients were found also found in the peels of genus Musa. The presence of various bioactive compounds suggests that the peels possess various medicinal properties and may be useful as immune-stimulant. Once the peel is removed, the fruit can be consumed both as cooked and uncooked form and the peel is generally discarded. Because of

the removal of the banana peel, there is significant amount of organic waste being generated. The peels are used as feedstock on small farms for cattle, goats, pigs, poultry, rabbits, fish and several other species as they have some nutritional value. Banana peel can also be used as a feed additive in aquaculture to improve fish growth and disease resistance. Various parts of plantain and banana have been studied for various uses: the flowers in bronchitis, dysentery and on ulcers; cooked flowers are given to diabetics; the astringent plant sap in epilepsy, leprosy, fevers, acute dysentery and diarrhea; young leaves are placed as poultices on burns and other skin afflictions; the roots are given to digestive disorders, dysentery and other ailments; banana seed mucilage is given in diarrhea in India.

II. PHARMACOLOGICAL ACTIVITIES

WOUND HEALING

Unripe banana peel contains leucocyanidin, a flavonoid that induces cell proliferation, accelerating the healing of skin wounds. The study was conducted in Wistar rats were divided into two groups of 60 animals each: the control group (gel without the active ingredient) and experimental group (4% Musa sapientum peel gel). A surgical wound was made on the back of each animal. The wound was cleaned daily with 0.9% saline, and treated with 4% gel or natrosol gel (control), and covered with gauze. Animals from both groups were sacrificed; the tissue from the wound site was removed

together with a margin of normal skin for histological analysis. The use of 4% unripe *Musa sapientum* peel Gel on surgical wounds in rats resulted in increased number of polymorphonuclear cells on day 7, reduced wound contraction and vascular proliferation, as well as increased concentration of collagen fibers on day 21.

ANTIBACTERIAL

Ighodaro evaluated antibacterial activity of banana peel extract against human pathogenic bacteria (*M. paradisiaca*) and found that banana peel extract showed inhibition against *Staphylococcus aureus*, *Escherichia coli*, and *Proteus mirabilis*. The banana extract also showed highest antibacterial activity against both *S. aureus* and *M. catarrhalis* followed by *E. aerogenes*, *S. pyogenes*, and *K. pneumoniae* and no effect against *E. coli* and *C. albicans*. Suraj et.al. has found that the banana peel also produce antibacterial activity against *P. gingivalis* and *A. actinomycetemcomitans*. This result opens new avenues of researches on clinical isolates of all periodonto pathogens with different varieties of banana and its extracts. The antibacterial effect of aqueous extract of fresh yellow banana peels against yeast is also found by the well-agar diffusion method.

ANTIDIABETIC

It was found that banana flowers, leaves, pseudostems, roots, stalks, and peels (*M. paradisiaca* (Linn.)) have antidiabetic effect. Fresh banana peel was sequential extraction using solvents with decreasing polarity. The ethyl acetate and petroleum ether extracts (EBP and PBP) were chosen for the evaluation of antidiabetic activity in alloxan-induced diabetic mice. The EBP and lupenone had significant antidiabetic activity. The banana peel could be utilized as a natural source of antidiabetic food, health care or drug. Lupenone have potential to develop as an anti-diabetic drug.

ANTI-INFLAMMATORY

Nitric oxide (NO) is a potent mediator causing inflammation in many organs. NO synthesized in high amounts by activated inflammatory cells possesses cytotoxic properties for killing bacteria, virus or tumor cells. In anti-inflammatory study conducted by Ruangnoo et al found that the water extract of fresh ripe peel exhibited the most potent NO-inhibitory activity than indomethacin as positive control. It can be used as anti-inflammatory drug and also this extract possessed low total phenolic content and low antioxidant activity.

ANTIOXIDANT

Antioxidant compounds in food play an important role as a health protecting factor. Phenolic compounds present in the peels can act as antioxidants. The antioxidant activity of the extracts were evaluated by hydroxyl radical scavenging activity, lipid peroxidation assay, estimation of vitamin C, peroxidase, catalase etc.

ANTI-PSORIASIS

Psoriasis is an autosomal, dominantly inherited dermatosis, caused by acceleration in the life cycle of skin cells results in development of thick, scaly white skin patches or plaques. The banana peels contain natural anti-inflammatory antiseptic and cooling properties that can help alleviate or reduce the severity of the symptoms. Nithya et.al performed MTT assay to study the antipsoriatic activity and it depicts that the extract possessed significant inhibits activity on the proliferative of HaCaT cell lines. This shows that *Musa Mysore AAB* could be considered as an effective source of anti-psoriatic bioactive compounds.

III. CONCLUSION

There has been an increase in demand for the herbal medicine all over the world. The side effects associated with allopathic drugs are remarkably necessities the need of herbal drugs. A large number of studies have revealed that peel has wide therapeutic actions such as anti-inflammatory, antidiabetic, wound healing, antibacterial, antioxidant and anti-psoriasis activities. Further study is needed to characterize the active constituents responsible for the biological activities.

REFERENCES

- [1] Anhwange BA. Chemical Composition of *Musa Sapientum* Peels; *Journal of Food and Technology*. 2008, 6 (6): 263-266.
- [2] Sib Sankar Giri, Jinwoojun, Venkatachalam Sukumaran, Se Chang Park; Dietary administration of banana (*musa acuminata*) peel flour affects the growth, antioxidant status, cytokine responses, and disease susceptibility of Rohu, Labeo Rohita; *Journal Of Immunology Research*, 2016, 1: 1-11.
- [3] Ehiowemwenguan, G, Emoghene AO, Inetianbor JE. Anti-bacterial and Phytochemical Analysis of Banana Fruit Peel. *IOSR Journal of Pharmacy*, 2014, 4(8): 18-25.
- [4] Atzingen DA, Gragnani A, Veiga DF, Abla LE, Cardoso LL, Ricardo T, Mendonça AR, Ferreira LM. Unripe *Musa Sapientum* peel in the healing of surgical wounds in rats; *Acta Cirurgica Brasileira* 2013, 28 (1): 33-38.
- [5] Ighodaro OM. Evaluation study on Nigerian species of *musa paradisiaca* peels: phytochemical screening, proximate analysis, mineral composition and antimicrobial activities. *Researcher*. 2012; 4: 17-20.
- [6] Kapadia SP, Pudakalkatti PS, Shivanaikar S. Detection of antimicrobial activity of banana peel (*Musa paradisiaca* L.) on *Porphyromonas gingivalis* and *Aggregatibacter actinomycetemcomitans*: An in vitro study. *Contemp. Clin. Dent*. 2015 6(4): 496-449.
- [7] Mohammad Zafar Imam, Saleha Akter. *Musa paradisiaca* L. and *Musa sapientum* L. : A Phytochemical and Pharmacological Review. *Journal of Applied Pharmaceutical Science*, 2011, 1(5): 14-20.
- [8] Vijayakumar S, Presannakumar G, Vijayalakshmi NR. Investigations on the Effect of Flavonoids from Banana,

- Musa paradisiaca L. on Lipid Metabolism in Rats. J. Diet. Suppl. 2009; 6(2): 111-123.
- [9] Pathompong Phuaklee, Srisopa Ruangnoo, Arunporn Itharat. Anti-inflammatory and antioxidant activities of extracts from Musa Sapientum Peel; J Med Assoc Thai, 2012, 95(1): S142-146.
- [10] Mohamad Sabry, Abd El-Baky Fatma L. Ahmed. Antioxidants of some fruits and vegetables peels extract and its effects on lipids profile in diabetic rats; Med. J. Cairo Univ, 2010, 78(2): 757-764.
- [11] M Sathy. Assaying the antioxidant activity of banana peel. American Journal of Biochemistry and Molecular Biology, 2014, 4(3): 122-129.
- [12] Nithya Durga E, Mahesh Kumar. Anti-psoriatic activity of musa mysore aab (poovan banana) peel extract using human keratinocyte cell line. International Journal of Science and Research, 2015, 4(3): 614-626.
- [13] Sampath Kumar KP, Debjit Bhowmik, Duraiavel S, Umadevi M. Traditional and medicinal uses of banana; Journal of Pharmacognosy and Phytochemistry, 2012, 1(3): 51-83.
- [14] Mishra Alok, Akman Ibrahim (2010), 'Information Technology in Human Resource Management: An Empirical Assessment', *Public Personnel Management*, 39, No. 3

IJIRAS