

## Determination of Rutin in *Musa* Leaves by High-Performance Liquid Chromatography- A Step Towards Sustainability

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The *Musa* sp. commonly known as banana, belongs to the family Musaceae, and is one of the most widely distributed and consumed fruit in tropical and subtropical countries<sup>1</sup>. Nutritionally, it is one of the world's leading food crops with high content of minerals, vitamins, carbohydrates, flavonoids, and phenolic compounds<sup>3</sup>. All parts of the banana plant, like fruits, inflorescences, pseudo stem as well as the leaves can be used. Banana leaves have a wide range of applications because of their large size, flexibility, and waterproof nature. They are used for cooking, wrapping and serving food and also as decorative elements in traditional ceremonies. However, apart from the traditional uses, the leaves of the banana are an undervalued commodity with a limited commercial value, and can be considered as an agricultural industry by-product and waste<sup>4</sup>. Because banana leaves are widely available in large quantities, they can be used as a source of raw materials for the green technology industry. Rutin, a flavonoid, is naturally present in banana plants and has several commercial properties<sup>5</sup>. Rutin has several important pharmacological properties, which are beneficial to health and has powerful antioxidant properties<sup>2</sup>. However, rutin cannot be used efficiently because of the high price. To reduce the cost of producing rutin, it is important to find a rich source, which is widely available and inexpensive. Therefore, the present study aims to report a methodology for extraction, and quantification of rutin from three different varieties of *Musa* sp., namely Malbhog (*Musa paradisiaca*, AAB), Chini champa (*Musa paradisiaca*, AAB) and Bhimkol (*Musa balbisiana*, BB), by using High Performance Liquid Chromatography (HPLC). Of the three varieties studied, Bhimkol variety showed the highest content of rutin with a crude methanolic extract of 387 mg, containing 11% of rutin, from 1 g of dried banana leaf powder. The results indicated that banana leaves, a food industry by-product and agricultural waste, has the potential for use as an inexpensive and new source of rutin.

**Keywords:** Banana leaves, Extraction, HPLC, Quantification, Rutin.

### References

- <sup>1</sup>Apriasari, M. L., & Suhartono, E. 2014. Bioactive compound and antioxidant activity of methanol extract mauli bananas (*Musa* sp) stem. **International Journal of Bioscience, Biochemistry and Bioinformatics**. 4: 110.
- <sup>2</sup>Habtemariam, S., & Varghese, G. K. 2015. Extractability of rutin in herbal tea preparations of *Moringa stenopetala* leaves. **Beverages**. 1: 169-182.
- <sup>3</sup>Imam, M. Z., & Akter, S. 2011. *Musa paradisiaca* L. and *Musa sapientum* L.: A phytochemical and pharmacological review. **Journal of Applied Pharmaceutical Science**. 1: 14-20.
- <sup>4</sup>Padam, B. S., Tin, H. S., Chye, F. Y., & Abdullah, M. I. 2014. Banana by-products: an under-utilized renewable food biomass with great potential. **Journal of food science and technology**. 51: 3527-3545.
- <sup>5</sup>Yingyuen, P., Sukrong, S., & Phisalaphong, M. (2020). Isolation, separation and purification of rutin from Banana leaves (*Musa balbisiana*). **Industrial Crops and Products**. 149: 112307.

Graphical abstract

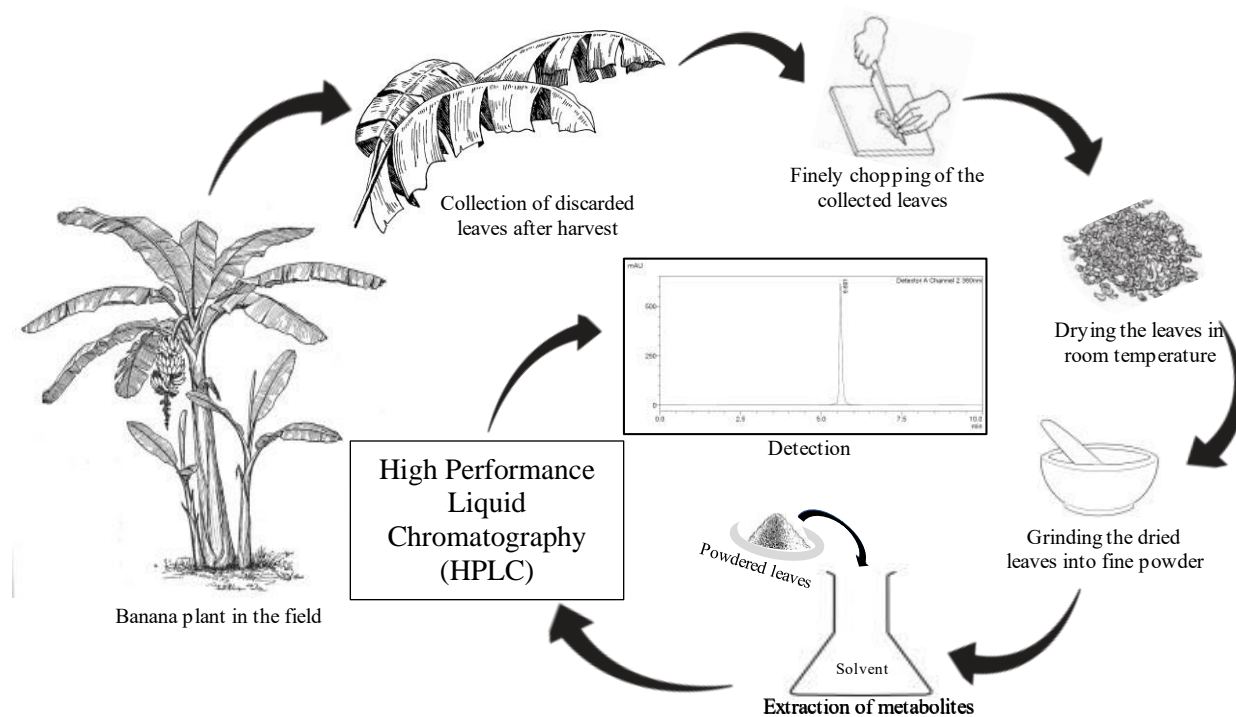


Figure: Graphical representation of the methodology followed in the study.