

**DETERMINATION OF CHEMICAL
CONSTITUENTS FROM THE FRUIT, STEM
AND FLOWER OF
MUSA SAPIENTUM L. VAR. *PARADIFIACA*
(SHWE NI)**

Moe Tin Khaing, Pa Pa San, Nyo NyoWin

27.2.2020

Outlines

- 1. Abstract**
- 2. Introduction**
- 3. Objectives**
- 4. Materials and Methods**
- 5. Results and Discussion**
- 6. Conclusion**
- 7. References**

Abstract

This research was conducted to evaluate the mineral compositions and some nutritional values present in *Musa sapientum* L. var. paradifiaca (Shwe ni) which has many applications in the traditional medicine and stem, flower, unripe and ripe fruit of this species were collected from Kyauk-se area, Myanmar . Chemical analyses were carried out not only on the fresh samples but also on the dried samples except ripe fruit. The investigation of moisture, ash and the nutritional values such as protein, carbohydrate and fiber contents were performed by their respective methods. Minerals constituents such as calcium (Ca), iron (Fe), potassium (K), magnesium (Mg), sodium (Na) and zinc (Zn) of *Musa sapientum* were determined by atomic absorption spectrometer (AAS) and phosphorus (P) was examined by UV visible spectrophotometer. Fresh ripe fruit is a rich source of potassium (417.4 mg/100g), fair sources of magnesium (40.4 mg/100g) and calcium (17 mg/100g) where as iron, sodium, magnesium and zinc indicate as minor constituents.

Introduction

Banana

one of the most important fruit

green cooking bananas

ripe cooking bananas

ripe dessert bananas

Medicinal Uses

Fruit

- **has a mild laxative property**
- **used to cure diarrhea, dysentery**
- **heal the intestine lesions**
- **is a remedy of constipation in children**
- **a part of diets of children suffering from malnutrition**

Core of the stem

- **useful in stomach upset and diabetes**
- **the extract of core of the stem is useful in dissolving the stones in the kidney and urinary bladder**
- **reducing the weight**

Roots and seeds

- **are useful in the treating of digestive disorders**

Peel and pulp

- **have both antifungal and antibiotic components**

inflorescence

- **mixed with coconut oil and spices is used for flushing the urinary blocks**

Flowers

- **used to treat dysentery, ulcers, and bronchitis**
- **Cooked flowers are considered a good food for diabetics crude**

sap

- **has astringent qualities**
- **used to treat a wide variety of ailments, including leprosy, hysteria, fever, digestive disorders, hemorrhage, epilepsy, hemorrhoids, and insect bites.**

fulfill 23% of the daily needs of potassium



decreasing the blood pressure



reducing the risk of stroke



preventing the muscle spasms



reduce the worm problems in the kids

Pharmacological activities

- **antidiarrhoeal activity**
- **antiulcerative activity**
- **antimicrobial activity**
- **hyperglycemic activity**
- **hypocholesterolaemic activity**
- **antipertensive activity**
- **antioxidant activity**
- **diuretic activity**
- **wound healing activity**
- **anti-allergic activity**
- **antimalarial activity**
- **anti-snake venom activity**

Botanical Description

Family Name

- **Musaceae**

Botanical Name

- ***Musa sapientum* L. var. *paradifiaca***

Common Name

- **Red banana**

Myanmar Name

- **Shwe ni (or) Shwe hngyet pyaw**

Flowering Period

- **Flowers in September/October**

Fruiting period

- **Fruits in January/February**



Stem



Inflorescence



Flower



Habit



Peeled Unripe Fruits



Ripe Fruits

Objectives



To determine mineral contents of stems and flowers of *Musa sapientum*

To determine mineral contents of unripe fruit and ripe fruit of *Musa sapientum*

To determine nutritional composition of stem and flower of *Muse sapientum*

To determine nutritional composition of unripe fruit and ripe fruit of *Musa sapientum*

Materials and Methods

Sample Collection

Four parts of *Musa sapientum* L. var. *paradifiaca* (Shwe ni) such as stem, flower, unripe and ripe fruits of fresh samples were collected from Kyaukse, a dry zone of Myanmar. To get the dried samples, fresh samples were oven dried at 60 °C for two days. Both of fresh and dried sample were utilized in the chemical analyses.

Determination of Chemical Constituents

Mineral contents of (Shwe-ni) Ca, Fe, K, Mg, Mn, Na, Zn, P were determined by using Atomic Absorption Spectrophotometer (Model No.AA-6200), (SHIMADZU, Japan) and UV visible spectrophotometer

In the determination of fiber content, (2) g of defatted meal cake was used in the process of acid hydrolysis to obtain the residues. Then boiling, filtering and washing and drying and ignition were done. The contents of the crucible were cooled and weighed. Heating, cooling and weighing were repeated until a constant weight was obtained.

Digestion of sample was carried out in the first step and the determination of protein contents was performed by Kjeldahl method . The banana sample was burnt in a ash-dish in the oven at 550°C and ash was determined by difference weighing.

Determination of Water soluble carbohydrate was carried out by phenol-sulphuric colorimetric method. Absorbances were measured at 490 nm using UV-visible Spectrophotometer (Model 1601). A standard curve was plotted by the absorbances of the standard solution against the concentration in mg per cm³. Using this standard curve, the concentration of glucose in the sample was calculated.

Results and Discussion

Mineral contents of stems and flowers of *Musa sapientum*

Parameters	Fresh stem (mg/100g)	Dried stem (mg/100g)	Fresh Flower (mg/100g)	Dried Flower (mg/100g)
Calcium (Ca)	34.50	387.70	56.30	439.10
Iron (Fe)	6.80	1.00	5.20	12.70
Potassium (K)	396.30	5005.40	735.60	3651.50
Magnesium (Mg)	1.90	233.20	55.90	458.90
Manganeses (Mn)	0.30	1.50	3.20	24.90
Sodium (Na)	14.20	18.70	11.10	16.00
Zinc (Zn)	1.70	4.10	2.10	11.00
Phosphorus (P)	38.90	49.70	32.60	475.00

Mineral contents of unripe fruit and ripe fruit of *Musa sapientum*

Parameters	Fresh unripe fruit (mg/100g)	Dried unripe fruit (mg/100g)	Fresh ripe fruit (mg/100g)	Literature value (mg/100g)
Calcium (Ca)	46.50	59.10	17.00	6.00
Iron (Fe)	6.30	5.80	6.20	0.30
Potassium (K)	493.40	1299.60	417.40	400.00
Magnesium (Mg)	55.40	161.50	40.40	34.00
Manganese (Mn)	1.70	5.20	0.50	0.40
Sodium (Na)	14.80	13.20	3.60	1.00
Zinc (Zn)	0.60	2.30	0.70	0.20
Phosphorus (P)	24.80	99.80	-	-

Nutritional composition of stem and flower of *Muse sapientum*

Parameter	Fresh (%)	Dried (%)	Fresh (%)	Dried (%)
Moisture	96.46	11.87	87.31	10.61
Ash	20.23	6.43	13.07	5.66
Protein	5.74	9.57	3.27	11.68
Carbohydrate	-	6.91	-	4.15
Fibre	-	0.31	-	0.14

Nutritional composition of unripe fruit and ripe fruit of *Musa sapientum*

Parameter	Fresh unripe fruit (%)	Dried unripe fruit (%)	Fresh ripe fruit (%)	Literature value (mg/100g)
Moisture	60.09	13.82	78.67	-
Ash	4.90	4.65	7.20	-
Protein	6.07	2.61	2.31	1.20
Carbohydrate	-	38.40	19.8	23.20

Conclusion

Among the examination for mineral constituents of *Musa sapientum* L. var. *paradifiaca* (Shwe ni) stem, flower, unripe fruits of fresh and dried samples were utilized and only fresh sample was applied for ripe fruit. Potassium was found as their main mineral constituent and the data obtained were (369.30 mg/100 g), (735.60 mg/100 g), (439.40 mg/100 g) and (417.40 mg/100 g) respectively. Then calcium, magnesium and phosphorous were followed by significant extent. The percentages of protein content in fresh and dried samples of stem, flower, unripe and ripe fruits were obtained as 5.74%, 3.27%, 6.07% and 2.31 % for fresh sample and 9.57%, 11.68% and 2.61 % for three dried sample. Dried stem and flower have higher phosphorus, calcium, magnesium and potassium contents than the dried unripe fruit. In the comparison of carbohydrate, dried unripe fruit had five to nine times (38.40 %) of the level of carbohydrate of other two dried samples and they were 6.91 % for stem and 4.15 % for flower. Fresh ripe fruit of *Musa sapientum* L. var. *paradifiaca* (Shwe ni) from Kyaukse area contained high potassium (417.40 mg/100 g) and low sodium (3.60 mg/100 g) content and therefore it was consistent with the literature value and therefore it could be suitable as the food supplement for potassium deficiency and for the reduction of the blood pressure.

References

- Aye Mya Nyein, 2004. "A study on Morphology and Uses of the Some Members of Family Musaceae", M.Res. (Thesis)
- Marisa M. Wall, 2006. *Journal of Food composition and Analysis* , 19, 2006, 434-445.
- M.Z. Imam, S. Akter, "*Musa paradisiaca* L. and *Musa sapientum* L.: A Phytochemical and Pharmacological Review", 2011. *Journal of Applied and Pharmacological Review*", *Journal of Applied Pharmaceutical Science* 01(05)14-20, 2011.
- M. M. Ngozi, O.N. Helen, 2016. "Mineral Compositions of Three Musa Species at Three Stages of Development", *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)* Vol 15, Issue 6, 118-125
- Romon V. Valmayor, S.H. Jarmaluddin, B. Silayoi, Sikusumon, L.D.D. Danh, O.C. Pascua and R.R.C. Espino, "Banana Cultivar names and Synonyms In Southeast Asia International Newtork for Improvement of Banana and Plantain", Asia and the Pacific Office.
- S.A. Zomo, S.M. Ismail, M. Sahah Jahon, K. Kabir and M.H. Kabir, 2014. "Chemical Properties and Shelf Life of Banana (*Musa sapientum* L.) was Influenced by different Pasthanharvest Treatments", *A Scientific Journal of Krishi Foundation, The Agriculturists* 12(2): 6-17
- The Wealth of India, 1962. *A Dictionary of India Raw Materials and Industrial Products Raw Materials Vol.VI. L-M Council of Scientific Industrial Research New Delhi*
- Kumar, K.P.S., Bhowmik, D., 2012. "Traditional and Medicinal Uses of Banana", *Journal of Pharmacognosy and Phytochemistry Science*, Vol 1, Issue 3.
- Imam, M.Z. and Akter, S., 2011. "*Musa paradisiaca* L. and *Musa sapientum* L.: A Phytochemical and Pharmacological Review", *Journal of Applied Pharmaceutical Science*, Vol 01, Issue 05. PP 14-20.

Thank you