



Comparison of Potassium content of Moringa Stenopetala and Banana sold at local market in Jimma Town, Oromia, South East Ethiopia

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Abstract

In this study the potassium content of Moringa stenopetala and banana which are available in local market in Jimma town were determined and compared. The samples were purchased from market in March, 2014 and brought to laboratory of Chemistry Department, Jimma university. The sample were ashed in muffle furnace and then digested by 20% HNO₃ on hot plate. The concentration of potassium was determined by using flame atomic absorption spectroscopy. The average concentration of potassium in Moringa stenopetala and Banana were found to be 33625±0.03 mg/kg and 9325 ± 0.03 mg/kg respectively. The potassium content of Moringa stenopetala was found to be 3.6 times potassium of banana. It recommended that Moringa stenopetala is rich in potassium than banana and consumption of Moringa stenopetala is more crucial than banana.

Keywords: Moringa stenopetala, banana, flame atomic absorption spectroscopy.

Introduction

Moringa stenopetala is a smooth barked deciduous tropical plant, a traditional medicinal and nutritional plant in Ethiopia¹⁻³. It is widely distributed in the southwestern part of Ethiopia at an altitude range of about 1100 to 1600 meters^{1, 3}. It is Small tree up to 10 m tall; trunk up to 100 cm in diameter, swollen, bottle-shaped; bark whitish, pale grey, silvery or blackish, smooth; crown strongly branched; young shoots densely pubescent. Leaves alternate, many-flowered panicle up to 60 cm long⁴. The major growing areas are Arbaminch, Negelle and Wellayta Sodo. M. stenopetala is commonly called Shiferaw in Amharic^{1,3}. Moringa stenopetala and related species (Moringa oleifera) and is commonly used in folk medicines as antimalarial, antihypertensive, against stomach pain, antidiabetic, anticholesterol, antispasmodic and to expel retained placenta during birth¹⁻³.

The study conducted on Moringa stenopetala show that its nutrient composition is lower than that of Kale and Swiss chard. When potassium content of compared in (g/100 g dry weight) the raw and cooked of Moringa stenopetala leaves, Kale and raw and boiled Swiss chard are 453 ±11, 311.9 + 36, 404±56, 806.2±38, 1315± 93 and 785±65 respectively. The potassium content of swiss card is highest of moringa stenopetala and kale Abuye C., Urga K., Knapp H., Selmar D., Omwega AM., Imungi JK⁵ and. Study conducted by Abbera M and Kefyalew B⁶ indicates that season and elevation has effect on mineral content moringa stenopetala. The potassium content of moringa stenopetala at mild elevation in dry and rainy season was 36.6 g/kg and 37.9 g/kg respectively and at low elevation in dry and rainy season was 42.0 g/kg and 42.7 g/kg respectively. In many parts of Ethiopia leaves and roots of moringa

stenopetala are used to treat Malaria, Hypertension, cold, asthma stomach problem and diabetes Mohammed A.S.⁷.

Bananas are elliptically shaped fruits "prepackaged" by Nature, featuring a firm, creamy flesh gift-wrapped inside a thick inedible peel. Banana plant grows 10 to 26 feet in height and belongs to the family Musaceae Bananas - The World's Healthiest Food⁸. Study conducted by Anhange etal⁹ reported, that the mineral composition of banana studied indicates banana contain highest concentration of Potassium (78.1±6.58 mg/g) than other mineral such as: Calcium (19.2 mg/g), Sodium (24.3±0.12 mg/g), Iron (0.61mg/g) and Manganese (76.0 mg/g). The appreciable high content of potassium signifies, it will help in the regulation of body fluids and maintained normal blood pressure. Other study conducted by Ho etal,¹⁰ showed that the prominent minerals found in banana are: potassium, calcium, magnesium and phosphorus which are classified as macro nutrients. The concentration of potassium found to be 944.12 g/100 g dry matter. Also other study suggests that banana contribute 2.7% of potassium and has 330.6 g/100 g concentration of potassium¹¹.

Potassium is a very important mineral for the proper function of all cells, tissues, and organs in the human body. It is also an electrolyte, a substance that conducts electricity in the body, along with sodium, chloride, calcium, and magnesium. Potassium is crucial to heart function and plays a key role in skeletal and smooth muscle contraction, making it important for normal digestive and muscular function. In addition potassium is used to treat the symptoms of Hypokalemia which caused due to lack of potassium in the diet and caused by the body losing too much potassium in the intestines or urine. The symptoms of this include: weakness, lack of energy, muscle cramps, stomach disturbances, and irregular heartbeat⁹. Many researcher study

the mineral as well as nutrient composition of Moringa stenopetala and Banana, however the comparison of potassium content of Moringa stenopetala and Banana were not studied. Therefore, this study was conducted to determine and compare the potassium content of Moringa stenopetala and Banana.

Experimental Section: Chemicals and Apparatus: All the chemicals used for the experimental purposes were of analytical grade and used without further purification. The chemicals used for this experimental purpose include: Nitric acid (HNO_3) 20 % (MERCK), Distilled water, Deionised water, standard solution of potassium (analytical grade reagent), oven, mortar and pestle, glove, graduated cylinder, muffle furnace, volumetric flask, balance, and hot plate.

Material and Method

Experimental Procedure: Sampling: Moringa stenopetala and Banana were purchased randomly from local market found in Jimma town and brought to chemistry department in Jimma University. The collected sample was washed and dried in oven.

Sample Collection: The leaf of Moringa stenopetala and the inner part of Banana are ground in mortar and pestle until powdered finely. The sample weighted and placed in oven over night to remove amount of moisture.

Sample preparation: About 1 gram of dried ground sample was placed in oven over night at 105°C . After it cooled exactly 0.5 g of dried sample taken in porcelain crucible and put in muffle furnace. The furnace was switch on and the temperature were raised to 450°C and regulated and the furnace temperature was set at this temperature. The sample was ashed for 4 hour at this temperature. After sample ashed the furnace was switched off and the sample were allowed to cool inside closed furnace

over night. The ashed samples were transferred to 200 mL Erlenmeyer flask. Then 20% nitric acid, HNO_3 (20 mL) were added. Acid treated samples were heated on hot plate for 30 minutes with periodic steering by glass rod. After it cooled the sample were filtered through filter paper in to 100 mL volumetric flask. The content was washed with distilled water till 90 mL of filtrate were collected. The left volume was filled with distilled water Selamdik and Taye¹². Finally the samples were analyzed for potassium by using Atomic absorption spectroscopy in Department of chemistry, Jimma University.

Sample Analysis: Analysis of potassium was carried out using Flame Atomic Absorption Spectrometer (Model Nov AA 300 Analytical Jean) equipped with air/acetylene flame and hollow cathode lamps of potassium. Calibration curves were prepared for potassium by running a range of concentrations of freshly prepared standard solutions in their respective linear ranges. A blank correction was made for potassium prior to sample measurement. Average values of three replicate measurements were taken for the determination. Concentrations of working standards were 0, 0.05, 0.5, 1.0, and 5. The value of correlation coefficient of the calibration graph for the potassium was 0.999. The calibration graph of potassium standard solution is given in figure-1.

Results and Discussion

The potassium concentration of Moringa stenopetala and Banana were determined. The concentration of potassium in Moringa stenopetala and Banana observed in this study was 33625 ± 0.03 and 9325 ± 0.03 mg/kg respectively. It indicated that potassium in Moringa stenopetala was higher than potassium of Banana.

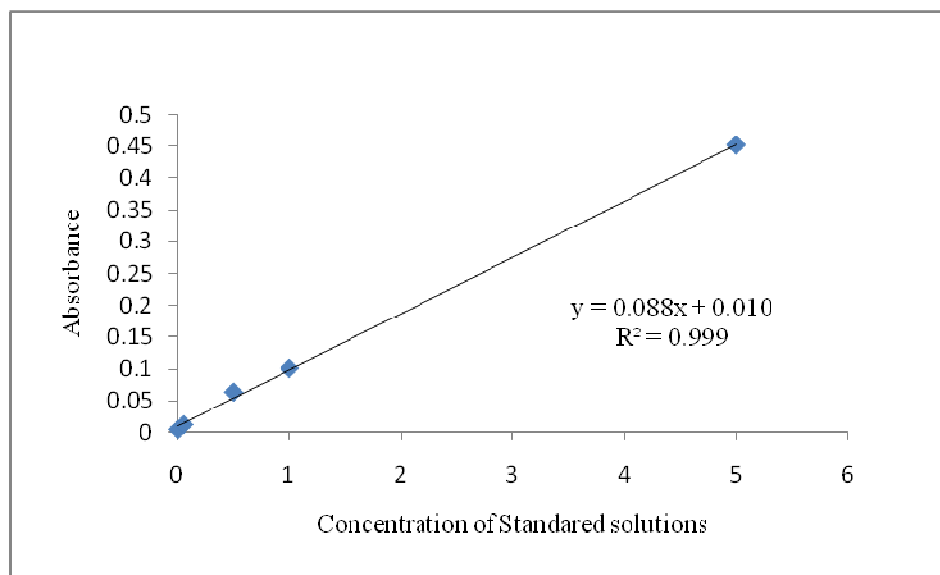


Figure-1.
Calibration curve for potassium standards solutions

The potassium content of *Moringa stenopetala* observed in this study was higher when compared with result (453 mg/100g) reported by Abbera M and Kefyalew B.⁶ and (1324 mg/100g) reported by Mohammed A.S.⁷. But lower than the result (41.9 g/kg) reported by Aberra M.⁶. The potassium content at mild level in dry and rainy season which was 36.6 and 37.9 g/kg and at low level in dry and rainy season which was 42.0 and 42.7 g/kg reported by Abbera M and Kefyalew B.⁶ also higher as compared in this study. These differences between this study and those reported literature is the area where study conducted, altitude and season. This is because as reported by Aberra M. et al⁶ the potassium content of *moringa stenopetala* vary with altitude and season.

Similarly the concentration of potassium in banana determined in this study was higher than the result (330.6 mg/100g) reported by Marisa M¹¹. But lower than the result (78.1 mg/g) reported by Anhwange B. et al⁹. The study conducted by Ho M .etal¹⁰ indicates that potassium concentration in banana was (944.12 mg/100g) which is higher as compared in this study.

According to this study the content of potassium in *moringa stenopetala* is 33625 mg/kg and that of banana is 9325 mg/kg. Potassium content of *Moringa stenopetala* is 3 times than potassium of banana Mohammed A.S., and [Http://pickmyard.workpress.com/tag/moringa-stenopetala](http://pickmyard.workpress.com/tag/moringa-stenopetala)^{7,13}. However in this study it observed the potassium content of *Moringa stenopetala* was 3.6 times than potassium of banana. Hence, *moringa stenopetala* was rich in potassium 3.6 times than banana.

Conclusion

The main objective of this study was to determine and compare potassium content of *Moringa stenopetala* and banana. Potassium is a crucial macro nutrient which typically used for proper functioning cells, tissues, organs maintain intracellular ion for cells, body fluid, reduce blood pressure, and reduce cardio vascular diseases.

This study indicated that concentration of potassium in *Moringa stenopetala* was 33625 mg/kg and that of banana was 9325 mg/kg. This result revealed that *moringa stenopetala* is good source of Potassium. It has 3.6 times than potassium of banana. Since consumption of *moringa* limited to south Nation and Nationalities, the intention of this study is to popularize by studying essential nutrients it have. It is essential to consume 1g of *moringa stenopetala* rather than consuming even 3 g of banana for the body due to its high potassium content.

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