



Comparative study on mineral analysis of root and fruit sample of *Parkia biglandulosa* (Wight & Arn.)

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Abstract

Objectives: This study was undertaken to assess the mineral contents of *Parkia biglandulosa* root and fruit sample locally available.

Methods: The mineral analysis of root and fruit sample of *Parkia biglandulosa* using a standard method of Atomic absorption spectrophotometry for the analysis of mineral content in the samples

Results: Mineral element analysis revealed the presence of main, macro and micro elements such as P, K, Na, Ca, Fe, Zn, Mg, Mn and Cu. in root and fruit iron content is more compared to all the minerals.

Conclusion: Our findings provide evidence that the selected plant seeds contain an appreciable amount of minerals and can be included in diets to supplement our daily nutrient needs and to fight against many of the diseases as nutraceuticals.

Keywords: minerals, iron, manganese

Introduction

The medicinal plants have excessive significance mainly due to their nutritive value and remain to be a main basis of remedies as they have been initiated all over human history (Balick *et al.*, 1996) [2]. The plant based beneficial assessment plays great role in plant and human being, so the compounds extracted from the normal plant either through chemical or biotechnology method. (Kumar *et al.*, 2013) [3].

The number of organic compounds required by human beings as added caloric necessities to encounter the requirement for their well-developed actions, fats, carbohydrates and proteins, whereas vitamins and minerals form moderately a lesser portion, plant obtained constituents play a major role in the diet.; their nutritive value is significant (Benton 1972, Indrayan 2000) [4,5].

The mineral nutrition, it plays a pivotal role and is an important aspect in healthy growth of human life. In the medicinal plant, such type of mineral elements is easily available. Around 14 essential elements are important to human health such as major elements (N, P, K, Ca, Mg, Na), micro elements (Cu, Fe, Zn, Mn, Co, Si, Br, and Cr). The insufficiency of those components generates some health difficulties. Normally, human bodies daily want supplementary than 100 milli gram of main nutrients (N, P, K, Ca, Mg, Na) and fewer than 100 milli gram of micro nutrients (Cu, Fe, Zn, Mn, Co, Br, Si, Cr). [Vimala *et al.*, 2015] [1].

Through out the human history plants and its parts have excessive significance owing to their nutritive value and they have been found continue to be a major source of medicines. (Shivraj & Khobragade 2009) [7]. with this preview in this study shows the investigation of mineral analysis of root and fruit samples of *Parkia biglandulosa* (Wight & Arn.)

Methodology

Determination of nutrients in plant material

$$\% \text{ of main nutrients (P, K)} = \frac{\text{Graph PPM}}{10^6} \times \frac{\text{Volume of digested sample}}{\text{Weight of the sample}} \times \frac{\text{Volume made}}{\text{Aliquot taken}} \times 100$$

The mineral analysis of root and fruit sample of *Parkia biglandulosa* using a standard method of Atomic absorption spectrophotometry for the analysis of mineral content in the samples (Gopalan *et al.*, 2004) [6]. Hence, the root and fruit sample of the plant were powdered using mixer grinder and 1.0 g of the root and fruit powder was taken in a silica container and heated in a muffle furnace till there was no evolution of smoke. Then, the container was cooled at room temperature and the ash formed was moistened with concentrated sulphuric acid. It was heated on a heating mantle and the ash obtained was dissolved in 5% hydrochloric acid solution. This

solution was used for determination of various mineral elements such as Main-nutrients (Nitrogen, Phosphorus and Potassium), Micro-nutrients (Calcium and Magnesium) and micro-nutrients (Iron, Manganese, Zinc and Copper) by using an atomic absorption spectrophotometer and measured the main and macro-nutrients in percentage and micro-nutrients in PPM with the help of following formula:

$$\text{Micro nutrients (Fe, Zn, Mn, Cu) in ppm} = \frac{\text{Graph ppm} \times \text{volume of digested sample}}{\text{Weight of the sample}}$$

The total nitrogen in root and fruit extracts were determined by the kjeldahl method. The digested samples were prepared, add distilled water to digested sample mix well and make up the volume to 100ml, take 10 ml of that aliquot in to the kjeldahls digestion flask and to this add 10 ml of 40% NaOH solution. Then, add 10ml of 4% boric acid mixed indicator in 150ml conical flask and placed at condensation collector tube. Allow the content to boil and the evaporated content collected in conical flask, the solution is titrated with standardized sulphuric acid. The titrated values are calculated by using the formula given below

$$\% \text{ of N} = \frac{(\text{B-T}) \times \text{N of H}_2\text{SO}_4 \times 0.014 \times \text{Volume of digested sample} \times 100}{\text{Weight of the sample} \times \text{Aliquot taken}}$$

Results

In mineral analysis of root and fruit samples of *Parkia biglandulosa* reveals the micro nutrients are rich related with the main and macro nutrients in the root sample. In the main nutrients nitrogen percentage is more compared to the phosphorus. Then in macro nutrients calcium percentage is more other than the magnesium. Finally, in micro nutrients iron and manganese content is rich in root sample compared with fruit sample and zinc and copper content is more in fruit sample other than root sample. As shown in the below table 1 and 2

Table 1: Mineral analysis of root sample of *Parkia biglandulosa*

Main Nutrients In %			Macro Nutrients In %		Micro Nutrients In PPM			
Nitrogen	Phosphorus	Potassium	Calcium	Magnesium	Iron	Manganese	Zinc	Copper
N	P	K	C	Mg	Fe	Mn	Zn	Cu
1.19	0.024	0.402	2.40	0.10	318.86	57.05	10.65	4.45

Table 2: Mineral analysis of fruit sample of *Parkia biglandulosa*

Main Nutrients In %			Macro Nutrients In %		Micro Nutrients In PPM			
Nitrogen	Phosphorus	Potassium	Calcium	Magnesium	Iron	Manganese	Zinc	Copper
N	P	K	C	Mg	Fe	Mn	Zn	Cu
6.40	0.101	0.993	0.26	0.084	41.45	8.40	14.20	5.25

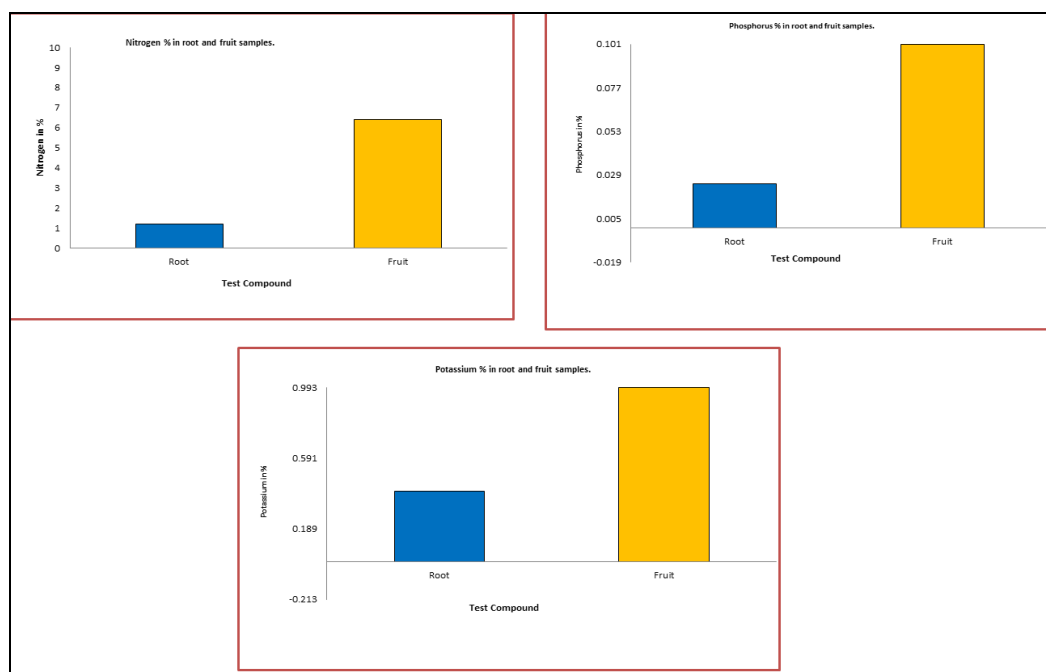


Fig 1: Main nutrients % in root and fruit extracts of *Parkia*

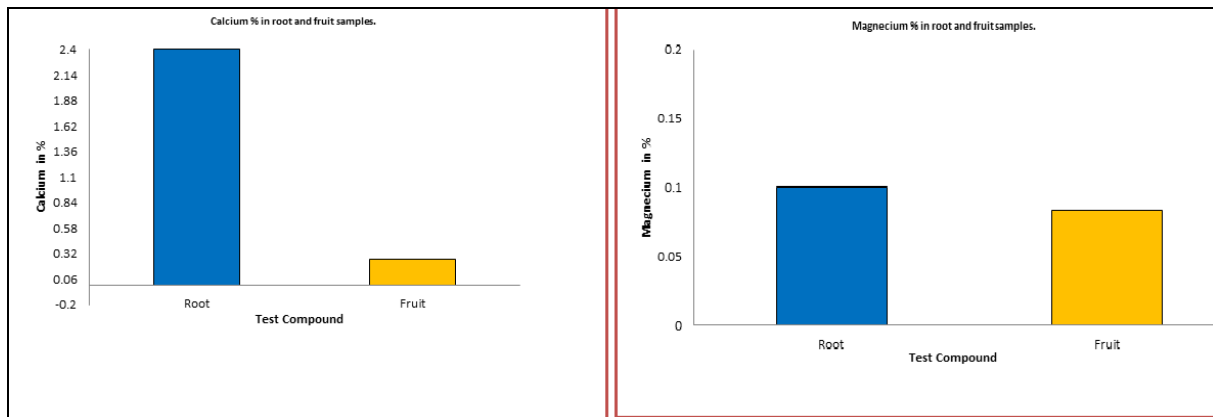


Fig 2: Macro nutrients % in root and fruit extracts of *Parkia biglandulosa*

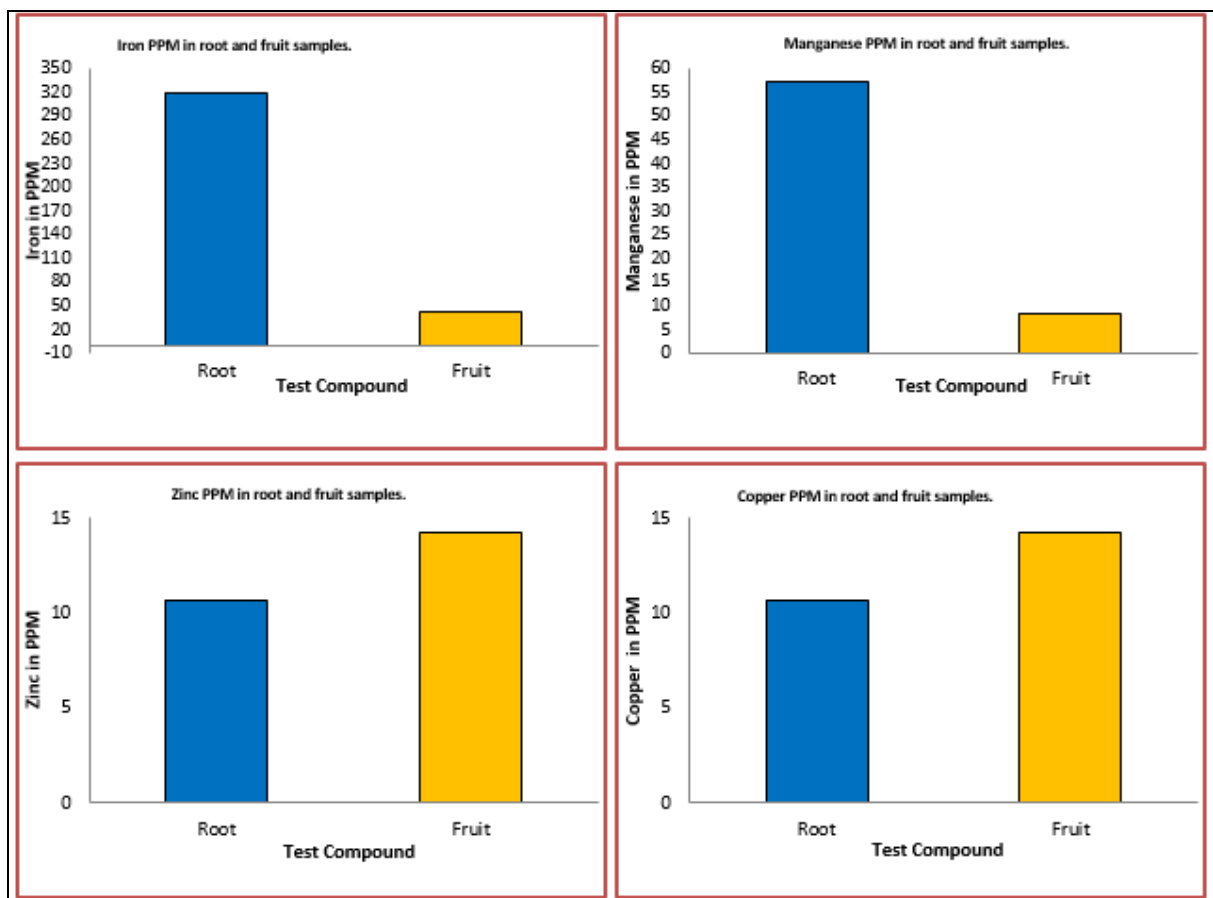


Fig 3: Micro nutrients in PPM of root and fruit extracts of *Parkia biglandulosa*

Conclusion

Minerals are important in the diet because they serve as cofactors for many physiological and metabolic functions. The biological effects of the trace elements in a living system strongly depend upon their concentration and thus should be carefully controlled, especially when herbs and drugs are used in human. Although the plant has good nutritive value and mineral content, which shows that the plant has good medicinal value and extracts can be used in medicinal formulations. These plant seeds might be explored as a viable supplement and a ready source of dietary minerals in human food to fight various diseases.

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