

NUTRITIONAL ANALYSIS OF FRUIT PULP OF *MORINGA OLEIFERA* LAM., FROM SUPER MARKET OF GULBARGA DISTRICT, KARNATAKA, INDIA

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ABSTRACT

Moringa oleifera is a native of north India. It is found throughout the tropical region of the country. The plant is used for medicinal and high nutritional purposes. The flowers and fruits are used as vegetable. The fruit has highly nutritious with high contents of protein, carbohydrates and various minerals. The present study revealed that the nutritional analysis of fruit pulp of *M. oleifera* from Super Market of Gulbarga district. There is no such type of work performed in the region of the Gulbarga district. The study reported the proximate analysis of moisture, dry matter, ash, crude fiber, crude protein, crude fat, carbohydrates and mineral. The standard protocols were AOAC method, Anthrone's method, Lowry's method, AAS and others. It was found, after the nutritional analysis of the fruit pulp of *Moringa oleifera*, that it has the high amount of energy, carbohydrates, protein, calcium and potassium content. It can be used as regular diet to strengthen the immunity.

Keywords: *Nutrients, Elements, Gulbarga District, Moringa oleifera*

INTRODUCTION

Hennueberg and Stohmann established the Weende analysis or proximate analysis or nutritional analysis in 1865 based on routine analysis of animal feedstuffs by Weende experiment in Weende station of Germany. These nutrients are very essential for the physiological functions of human body. Such nutrients and chemicals like carbohydrates, proteins and fats play an important role in satisfying human needs for energy and life processes. Each plant has its own nutrient composition besides having pharmacologically and nutritionally important phytochemical (Thimmaiah, 1999). According to recent UN nutritional value reports that nearly 900 million people of the world still facing starvation problem. About two billion people are suffering from malnutrition especially poor women and children (FAO, 2010; FAO, WEP, IFAD, 2012; FAO, 2013). *Moringa oleifera* is a native of north India. It is found throughout the tropical region. *Moringa oleifera* is used against asthma, as antidiabetic, antibacterial, anti inflammatory and antioxidant (Chumark *et al.*, 2008). The phytochemical screening of *Moringa oleifera* leaves revealed presence of alkaloids, flavonoids, glycosides, terpenoids, tannins, saponins and steroids (Jaya Gupta *et al.*, 2014). *Moringa oleifera* is very common and useful vegetable throughout the Gulbarga district. Until there is no phytochemical or nutritional analysis carried out in the pulp from the studied area. Hence, in this study the nutritional analysis of fruit pulp collected from Gulbarga district has been done.

MATERIALS AND METHODS

Collection and storage of sample: The healthy fruits of *Moringa oleifera* were collected in clean polythene bags from the supermarket of Gulbarga district in month of April and May 2019. They were washed in running tap water and the cover of fruit was peeled up, then shed dried. Shed dried fruit pulp sample was ground and made powder then kept under the air tight bottle for further analysis.

Methods used for Nutrients and Elemental analysis: Various protocols were followed for the estimations of nutrients and minerals contents in the fruit pulp of *Moringa oleifera*. The estimations of moisture carried out by air oven method, ash by gravimetric method and nutritive value or Energy by

Research Article

Standard protocols of AOAC (2000) methods, crude fiber by Gravimetric method and crude fat by Ether extract method (Udo and Oguwele, 1986), carbohydrates by Anthrone's Method (Hedge and Hofretier, 1962), Crude protein by Lowry's method (Lowery *et al.*, 1951) and Mineral analysis by AAS (Ojeka and Ayodele, 1995). All the tests carried out in triplets, values thus obtained by calculating the average of three experiments and data was presented as mean \pm SEM along with the standard deviation (STDEV).

RESULTS AND DISCUSSION

Moringa oleifera is used to treat various diseases. The leaves and fruit are used as vegetable. Fruit is sold in the market as vegetable. The proximate analysis of nutritive contents of fruit pulp of *Moringa oleifera* is illustrated in Table 1. The result obtained from chemical analysis of fruit pulp of *Moringa oleifera* is given in Figure 1. The results here include carbohydrates ($146.0 \pm 0.09\%$) content which is highest, crude fat content ($96.8 \pm 0.19\%$), moisture ($72.62 \pm 0.09\%$), ash ($31.8 \pm 0.21\%$), crude fiber ($17.9 \pm 0.24\%$) and lowest amount of crude Protein ($17.0 \pm 1.6\%$). Finally, the total consumed energy in Kcal/100g present in the fruit pulp was calculated in *Moringa oleifera*. The nutritive value was greatest in fruit pulp of *Moringa oleifera* 154.68 ± 0.16 (Kcal/100g). The elemental analysis in the fruit pulp of *Moringa oleifera* is shown in Table 2. It shows the macronutrients such as Potassium (58.104 mg/100g), Calcium (23.904 mg/100g) and Magnesium (02.846 mg/100g) which are higher than the micronutrients contents Aluminum (1.119 mg/100g) and other Cadmium (0.0060mg/100g).

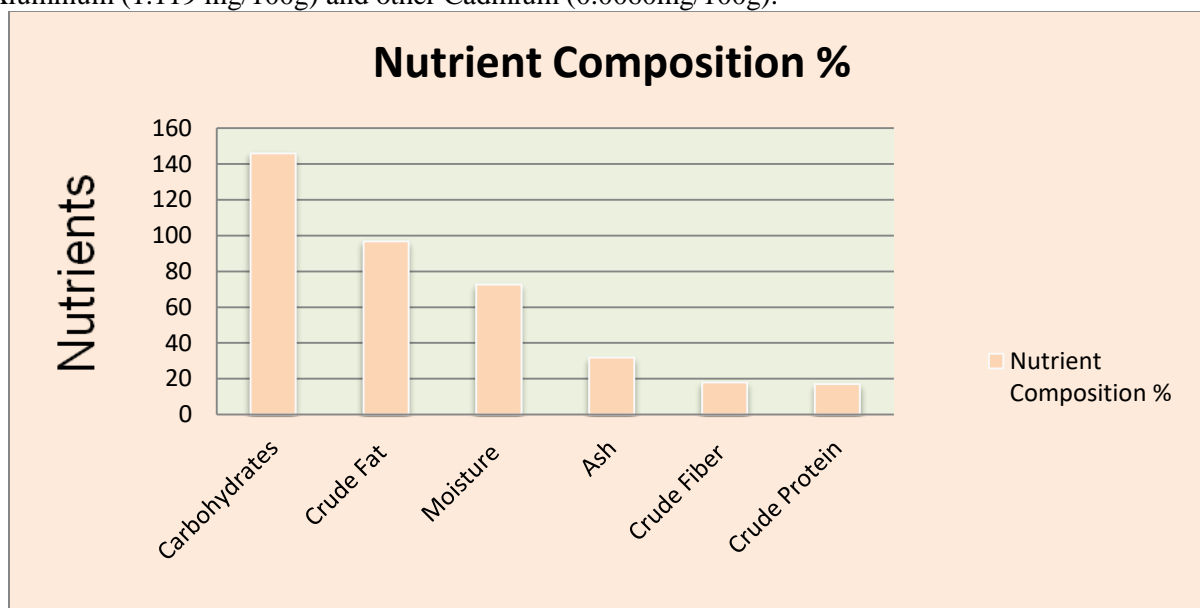


Figure 1: Nutrients contents in fruit pulp of *Moringa oleifera*

Table 1: The nutritional analysis of *Moringa oleifera* of fruit pulp

Nutrients	Nutrient Composition %
Moisture	72.62 \pm 0.09 %
Ash	31.8 \pm 0.21 %
Carbohydrates	146.0 \pm 0.09 %
Crude Protein	17.0 \pm 1.6 %
Crude Fat	96.8 \pm 0.19 %
Crude Fiber	17.9 \pm 0.24 %
Nutritive value or Energy (Kcal/100g)	660.71 \pm 0.09 (Kcal/100g)

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	Elements	Elements Composition (mg/100g)
Macro-elements	Potassium (K)	58.104
	Calcium (Ca)	23.904
	Magnesium (Mg)	02.846
Micro-elements	Cadmium (Cd)	0.0060
	Manganese (Mn)	0.0481
	Iron (Fe)	0.736
	Zinc (Zn)	0.190
	Copper (Cu)	0.075
	Chromium (Cr)	0.013
	Molybdenum (Mo)	0.104
	Aluminum (Al)	1.119

The literature review revealed that, the leaf extract of *Moringa oleifera* has total protein, amino acid, vitamins, minerals, total fat and crude fiber (Abbas *et al.*, 2018). The leaves of *Moringa oleifera* have the antimicrobial activity used for various diseases. The study also shows the analysis of different secondary metabolites such as tannins (8.22%), saponins (1.75%), alkaloids (0.42%) and phenols (0.19%). The plant *Moringa oleifera* used to treat the many diseases like typhoid fever, diarrhoea, high blood sugar, hypertension, gastro intestinal disorder (Ojiako, 2014). The secondary metabolites of saponin has the property to precipitate and coagulate red blood cells therefore due to the existence of saponin in *Moringa oleifera* it is used to stop the bleeding and treat the wounds (Okwu and Sustain, 2004). The secondary metabolite like alkaloid in the leaves of *Moringa oleifera* used to treat the various diseases such as malaria, cold, cough, hypertension, diabetes and cancer (Akpuaka, 2009). The literature survey included total 120 species of tropical and subtropical edible plants, among which *Moringa oleifera* has the highest micronutrients and antioxidants property. The diets with rich proportion of *Moringa oleifera* improve the conditions of HIV/AIDS patients (Ray-Yu Yang *et al.*, 2006). The nutritional analysis of leaves and stems of *Moringa oleifera* has vital antioxidants, antibiotics, nutrients, minerals and vitamins. It is used with multipurpose herbal plants to treat various diseases found in human beings, worldwide (Ahmad Faizal Abdull Razis *et al.*, 2014). The nutritional value of *Moringa oleifera* have richest source of Vitamins A, B, C, D, E, K and minerals K, Mg, Ca, Mn, Zn, Cu, and Fe. Therefore it used to treat various diseases. However, the present study proved that, the fruit pulp of *Moringa oleifera* contains highest amount of carbohydrates, protein and energy.

Conclusion

Moringa oleifera is well-known vegetable all over world. It is commonly found in tropical and subtropical region of the India. The study reveals that *Moringa oleifera* fruit pulp has highly nutritive values and medicinal values. The phytochemical tests of the fruit pulp has highest amount of energy, carbohydrates, calcium and potassium. So, it is proposed that *Moringa oleifera* should be used as vegetable regularly in the diet and to improve the immunity in the human beings.

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