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Elemental Analysis of Seeds of Drum Stick (Moringa Oleifera) by Using Different Techniques

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Abstract: For thousands of years, plants have been a significant source of medicine. According to estimates from the World Health Organization (WHO), up to 80% of people still get their medications mostly from traditional remedies like herbs. These plants' elemental composition and the presence of a range of phytochemicals provide them therapeutic potential.

The ability of medicinal plants to prevent or manage disease has been linked to the antioxidant qualities of their contents, which are typically linked to a variety of amphipathic molecules collectively known as poly-phenolic compounds. The food business and preventative healthcare are becoming more interested in the creation and assessment of natural antioxidants derived from medicinal plant components. Moringa oleifera is one of the herbs that shows promise. This tree's leaves, fruits, blossoms, and immature pods are all edible and are consumed as a highly nutritious vegetable in many places, especially Hawaii, India, the Philippines, and several African countries. Because of the chemical components of M. oleifera, it is utilized in underdeveloped countries as a substitute for imported food supplements to treat and prevent malnutrition, particularly in new-borns and nursing mothers.

Traditional medical systems have employed drum stick seed extract5. As a result, support has been provided for the metal analysis of seeds of M.oleifera. To determine the metal content, the finely ground fruit and seeds of M. oleifera were examined. Several common methods, including Colorimetry, Kjheldal's Method, Atomic adsorption spectrophotometer, and Flame photometry, were used to analyse a material[12]. It was noted that while zinc, copper, iron, and manganese were found in considerable amounts, phosphorus, nitrogen, and calcium were detected in small amounts. It was shown that the fruits of C. Equisetifolia have higher concentrations of Zinc, Copper, Iron, Arsenic and Manganese than the seeds of P. Longifolia.

According to research currently available, seeds of M. oleifera may be a good source of zinc, iron, manganese, & copper.

Keywords: Seed of M. Oleifera, Drum sticks, Kjheldal’s method, Flame Photometry and Atomic Colorimetry, Absorption Spectrophotometer.

I. INTRODUCTION:

There are a number of insightful evaluations available on M. oleifera's ethno botanical applications. It has been discovered that Moringa is a good source of antioxidants and polyphenols. There have been reports of phytochemicals in its roots, flowers, fruits, and seeds, including quercetin, beta-sitosterol, beta-sitosterol, ascorbates, vanillin, and omega fatty acids[21]. Particularly in the leaves, phenolic and flavonoids have been discovered; these substances possess a range of biological properties, such as immunomodulatory, anti-diabetic, anti-carcinogenic, hepato-protective, and thyroid status control[18]. Furthermore, trace components necessary for human health can be found in leaves[17]. For example, trace elements such as iron, zinc, magnesium, and selenium are critical for metabolism, and claims of a link between oxidative illnesses and trace element status are driving interest in these elements. On the other hand, a recent study found that dried M. oleifera leaves have extremely high levels of lead—352.0 mg/L. Determining the mineral makeup of M. oleifera leaves—which are commonly eaten by both people and animals—is therefore crucial[6].

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II. MATERIALS AND METHODS

After washing, the M. oleifera seeds were allowed to air dry. For the one-gram sample of M. oleifera, ash was created separately in a silica crucible, and it was maintained at 600 degrees Celsius in a muffle furnace until the crucible's weight remained constant. Through qualitative and quantitative examination, the main components of ash were identified. For the purpose of determining the metal content, ash was dissolved in 5.0 millilitres of 10% HCl to turn it into chloride. The treated ash was then filtered through Whatmann filter paper No. 40.
$AgNO_3$ and then cleaned in hot water. Using gravimetric analysis, the percentage of ash that was acid soluble and insoluble was determined. Using Kjheldal's approach and a Perkin Elmer 3110 Atomic Absorption Spectrophotometer, a 100 ml filtrate was used for the quantitative measurement of metals. Estimates of nitrogen and phosphorus were made using a photometric colorimeter made by Systronics. The Madiflame model 1278 flame photometer was used to measure metals belonging to the first and second groups, namely the alkali group and the alkaline earth metal. The outcomes were displayed in Tables Nos. 1 and 2.

Sr. No.	Particulars	Seeds	Flowers
1.	Acid soluble ash	4.90 %	3.73%
2.	Acid insoluble ash	0.21 %	0.11%

Table 1: Gravimetric analysis of samples

Sr. No.	Element	Method	Percentage	
			Seed	Flower
1	Mn	Atomic Absorption Spectrophotometer	123.7 ppm	10 ppm
2	Fe	Atomic Absorption Spectrophotometer	223.6 ppm	122 ppm
3	Zn	Atomic Absorption Spectrophotometer	218.1 ppm	45.0 ppm
4	Cu	Atomic Absorption Spectrophotometer	14.10 ppm	121.0 ppm
5	Pb	Atomic Absorption Spectrophotometer	200 ppm	310 ppm
6	Ca	Atomic Absorption Spectrophotometer	0.077%	15 %
7	As	Atomic Absorption Spectrophotometer	0.02%	0.04%
8	K	Flame Photometry	249 ppm	255 ppm
9	P	Colorimetric method	0.05%	0.09%
10.	N	Kjheldal's method	0.40 %	0.34%

Table 2: Elemental analysis by various techniques

III. RESULTS AND CONCLUSION:

Activating substances facilitate a multitude of enzymatic reactions; these agents are often relatively small-concentration elements. Herbs are divided into two categories based on the amount of minerals they contain: sedatives and stimulants. Stimulatory herbs include larger percentages of potassium, iron, and phosphorus, whereas sedative herbs are thought to be those with high calcium and magnesium content. Common elements like calcium, potassium, iron, phosphorus, manganese, zinc, and copper were found in the seeds and flowers of M. Oleifera.

It was discovered that while calcium, phosphorus, and nitrogen are minor components, potassium, zinc, manganese, and iron are present in significant amounts. The M. oleifera sample is recommended in traditional and folk medicines due to its richness in manganese, iron, zinc, and potassium. Potassium's effect on insulin secretion makes it an essential component of diabetic treatment. A zinc deficiency manifests as disease, stress, elevated thyroid activity, hyper adrenal hyperplasia, skin lesions, stretch marks, delayed wound healing, and nail spots.

The maximum allowable amount of Arsenic is exceeded in the samples, although the presence of dangerous elements like lead and arsenic in M. oleifera flower seems to be within acceptable bounds. According to our findings, plants meant for human food require harmful metal monitoring and quality assurance.

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