



Comparative Studies of Millets from North & South Karnataka through Atomic Absorption Spectrometer

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ABSTRACT:

Six millets medicinal plants underwent the necessary multi-element analysis using an ATOMIC ABSORPTION SPECTROMETER. to comprehend the elemental analysis of millets, a medicinal plant, gathered in Dharwad and Mandya Districts, two North and South Karnataka areas.

Millets were chosen for the current experiment. The samples were thoroughly evaluated, and the specific weight percent of the elemental concentration was determined from a nano-microphoto taken with an ATOMIC ABSORPTION SPECTROMETER. In all of the collected MILLETS, it was calculated that the elemental contents of O, C, P, Mg, Mn, K, Cu, Fe, Hg, Zn, and Pb were all within the WHO's permissible limit values. According to SEM morphology, the examined Millets include small, irregularly shaped particles with an average diameter of 200 nm to 1 μ m.

1. Introduction

The environment's natural resources, medicinal plants play a significant part in traditional medicine and are advised as DIY remedies. With the help of various indigenous medical systems, including Herbal, Siddha, and Unani, the development of Indian Traditional Medicinal Plants raised, spread, and was successful during the period 2500 to 500 BC. The Vedas and other religious texts provide information on how our forebears were also taught how to further process as well as remove the medicinal qualities from the plants, and they utilised this understanding to produce the processed product on a big scale. In India, there are close to 4 million different kinds of medicinal plants, yet only 50% of them have been studied for their potential as effective medicines. Trace, major, minor, and heavy elements are essential for a healthy person's biological activity in both medicinal plants and the human body. In view of the WHO's acceptable limitations, it is crucial to research baseline data on the types of elemental contents present in the medicinal plants of a certain location or region. The WHO and Department of AYUSH ("Ayurveda, Yoga and Naturopathy, Unani, Siddha, and Homoeopathy"), which is part of the "Ministry of Health and Family

Welfare", also emphasized on the enactment of rules and the raising of standards in the fields of quality control as well as standardised practices for the manufacture of medicinal plant drugs. The WHO estimates that between 75 and 80 percent of people worldwide rely on medical plant-based pharmaceuticals for their primary healthcare, and that between 60 and 65 percent of Indians use traditional, folk, Ayurvedic, and herbal medicinal plant treatments to treat a variety of illnesses. Considering the aforementioned concerns, the current research examines nano-micromorphological activity and elemental analysis using MILLETS [Medicinal plants], specifically **Finger Millet, Pearl Millet, Foxtail Millet, Little Millet, Kodo Millet, & Proso Millet** collected from different places of, Dharwad & Mandya Districts of North & south Karnataka regions using mapping, through a non-destructive technique/ method

SAMPLE COLLECTION of Millets [Medicinal plants] like Finger Millet, Pearl Millet, Kodo Millet, Proso Millet, Foxtail Millet, & Little Millet collected from different places of Dharwad & Mandya Districts of North & South Karnataka regions respectively, Fresh and mature Millets are used for analysis purposes.



2. Study Area

In North & South Karnataka Sample are collected from Dharwad & Mandya region respectively there are several varieties of ores to choose from, soil quality varies with ingredients & colour also which may affect yield, in these region most commonly available elements are O, C, P, Mg, Mn, K, Cu, Fe, Hg, Zn, Pb East, respectively. It encompasses two districts in its geographic scope. The current research includes the districts of Dharwad and Mandya.

3. Sample Preparation

To remove sand, dust, and clay, the collected millets samples were washed in distilled water. The cleansed samples were then dried for 30 days at room temperature in an airtight laboratory. The dried millets from the plants were mechanically ground into a fine powder using a mixer grinder before being kept in an airtight container after being sieved with mesh measuring 355 μm . The elemental analysis of 10 mg of fine powder was performed.

4. Data Analysis

AAS is an analytical technique for counting the number of metal atoms or ions in a sample. Metals make up around 75% of all chemical elements on earth. Metal content in a chemical may sometimes be beneficial, but it can also be dangerous (poisons). As a consequence, finding the metal content is crucial in many applications, which we will go over in more detail in this article. Let's just state for the moment that it has applications in toxicology, environmental testing, and quality control, to mention a few.

The essential components of AAS may be explained using the following. To begin, there are specific wavelengths of light that can be absorbed by any atom or ion. In a mixture of nickel (Ni) and copper (Cu), for instance, light at the Cu frequency is absorbed only by Cu atoms or ions. Absorption of light at a specific wavelength is related to the density of the ions or atoms involved.

The electrons in an atom can exist in a number of different energy states. Energy (photons) can be absorbed by the atom, and the electrons can transition from their ground state to an excited state if the atom is exposed to light of a sufficiently high frequency. In this

stage, electrons undergo a change in response to the radiant energy they absorb. Since the electrical structure of each element is unique, the radiation absorbed is also a unique and quantifiable property of each element.

A realistic quantitative analysis, an atomic absorption spectrometer employs these core notions. The 4 basic parts of a conventional atomic absorption spectrometer are as follows: the atomization system, the light source, the detection system and the monochromator.

The material, which can be either "liquid or solid, is atomized using a flame or a graphite furnace in a typical experiment. When exposed to light, often from a hollow-cathode lamp, atoms in their free state undergo electronic transitions from the ground state to excited electronic states. As the radiation energy produced by the lamp is composed of excited atoms of the element whose identity must be validated, the wavelength that the atomized sample absorbs is a great fit. The noise level is lowered by inserting a monochromator between the sample and the detector. The intensity of the light beam is translated into absorption" data by the detector.

AAS analysis can be performed on solid samples, doing so typically necessitates the use of more expensive graphite furnaces, which use controlled electrical heating rather than a direct flame to bring the sample to the appropriate temperature for analysis. AAS is also frequently used only for studying metal atoms. The primary explanation for this is that metals often only have one emission and absorption line that is sharp, intense, and clear.

5. Results And Discussion

Results of millets from two distinct locations in North and South Karnataka are compared using a graph that shows components in the first column, the kind of millets in the 1st row, and the WHO/FAO ("Food and Agriculture Organization") acceptable limits in the final row of Table 1. The coarse grain size of MILLETS was discovered to be between 200 nm and 1 μm , and almost all Millets exhibited the round surface morphology of the millet family. From Table 1, it can be seen that the vital elements, such as Phosphorus (P), which is in a better range and plays a crucial function, are then discovered to have larger content in all MILLETS. The body needs the mineral phosphorus to create proteins that help cells and tissues grow and repair as well as to construct bones and



teeth. Additionally, phosphorus affects how the body functions. Processes [carbohydrates](#), or sugars. Additionally, it supports biological processes that utilise magnesium (Mg), which is a complement to calcium and an essential mineral for maintaining blood levels of insulin. Magnesium (Mg) is present in the body. With the addition of another crucial ingredient, potassium (K), the risk of suffering a heart attack is significantly reduced. Similar to how the other elements work, iron, copper, and zinc are supplemental elements that aid in the production of hemoglobin in the blood. The current research focused on harmful substances such Mercury [Hg] and Lead [Pb] that are present in Mercury, although availability was determined to be far lower than the WHO-permitted levels. Effects of **MERCURY** exposure on health. After exposure to various mercury compounds by ingestion, skin absorption, or inhalation **NEUROLOGICAL AND BEHAVIOURAL DISORDERS** may be seen. Insomnia, tremors, neuromuscular effects, memory loss, migraines, and cognitive and motor dysfunction are among the symptoms. Lead poisoning may result in anaemia, weakness, renal, and brain damage. Lead poisoning can be lethal at high enough concentrations. Pregnant women who are exposed to lead risk endangering their unborn child because the chemical can cross the placental barrier.

6. Conclusion

Specifications of Various Millets & Medicinal Use

SLNO	BOTANICAL NAME	LOCAL NAME	PART	MEDICINAL USE
1	PENNISETUM GLAUCUM	PEARL	GRAIN	Beneficial in treating stomach ulcers, Heart health benefits, assistance with bone formation and repair, and a lower risk of cancer Beneficial for diabetes, Beneficial in Preventing Gall stones, Anti-allergic properties
2	PANICUM SUMATRENSE	LITTLE	GRAIN	When regularly taken, helps manage blood sugar levels. It revealed decreased triglyceride levels, higher HDL cholesterol, and lower LDL/VLDL cholesterol levels. Reduces risk of Heart Attack, Rich in Anti-oxidants.
3	ELEusine COROCANA	FINGER	GRAIN	This lowers cholesterol levels and lowers blood sugar by removing extra liver fat. A very good natural source of iron is ragi. It is helpful for those with anxiety, despair, and insomnia (sleepless nights). Ragi may help with migraines as well. Ragi is also recommended to lactating mothers

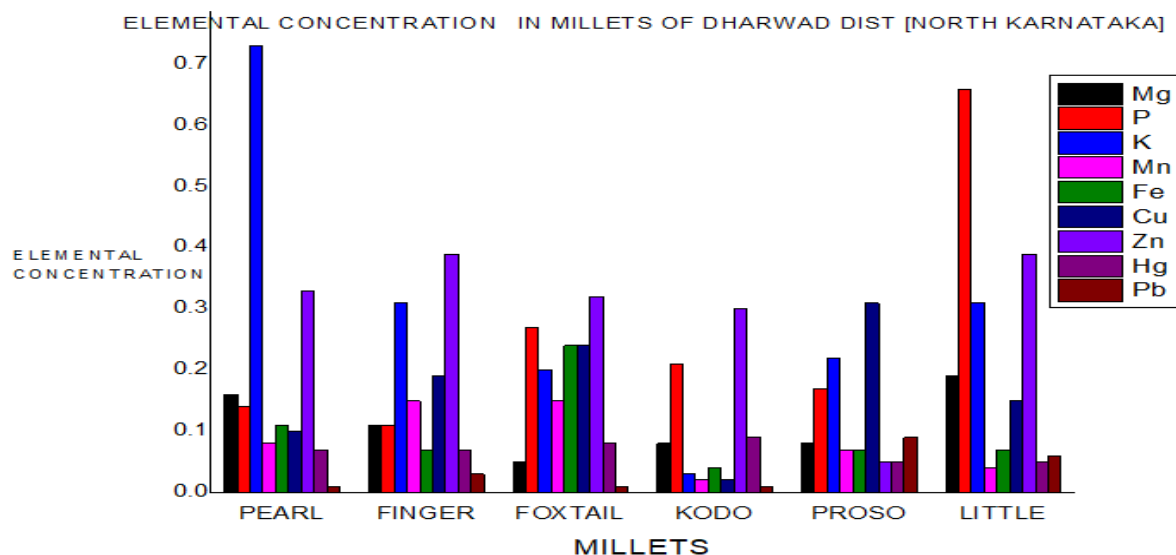
The results from AAS & SEM –EDX are comparable same from the present results, MILLETS shows that Finger Millet, Pearl Millet, Kodo Millet, Little Millet, Foxtail Millet, & Proso Millet collected from different places sample contains higher concentration of Mg, P, K, Mn, Fe, Cu, Zn various elements as compared to the normal grains in two districts. Additionally, according to the SEM study, the plant's surface morphology is amorphous and semicrystalline with grains that are 200 nm in size. The investigation shows that the surface morphology and its relationship to grain size are crucial for treating illnesses as soon as possible. The elemental concentrations of P, Mg, Mn, K, Cu, Fe, Hg, Zn, and Pb that were examined are below the WHO/FAO permitted limits. The data provided in the current work Magnesium (Mg), which is a supplement to calcium and helps to regulate and maintain the blood level of insulin, is found in the greatest quantity in Graph 1. Highest concentration of Phosphorus (P) which is in better range & play an important role. The body needs the mineral phosphorus to create proteins that help cells and tissues grow and heal as well as to construct bones and teeth. Additionally, phosphorus affects how the body functions. Processes [carbohydrates](#), or sugars. The graph shows that the likelihood of suffering a heart attack is significantly reduced at the highest potassium (K) content.



SLNO	BOTANICAL NAME	LOCAL NAME	PART	MEDICINAL USE
4	SETARIA ITALICA	FOXTAIL	GRAIN	Iron and calcium-rich foxtail millets support the health of bones and muscles. Vitamin B1 in foxtail millet is abundant, preventing a number of neurological conditions. Foxtail millet is low in carbohydrates, high in protein, and devoid of gluten.
5	PANICUM MILIACEUM	PROSO	GRAIN	Magnesium, which is rich in proso millet, lowers blood pressure and lowers the risk of stroke, heart attack, and atherosclerosis. The high fibre content of millet contributes to lowering cholesterol.
6	PASPASUM SCROBICULATUM	KODO	GRAIN	Strong antioxidants may be found in impressive amounts in kodo millets. The phenolic compounds in this little millet lower LDL or bad cholesterol, promote heart health, lower blood pressure, and shield against many chronic illnesses. Additionally, these antioxidants work to stop free radicals from harming cells and tissues and creating a variety of cancers by protecting them from damage.

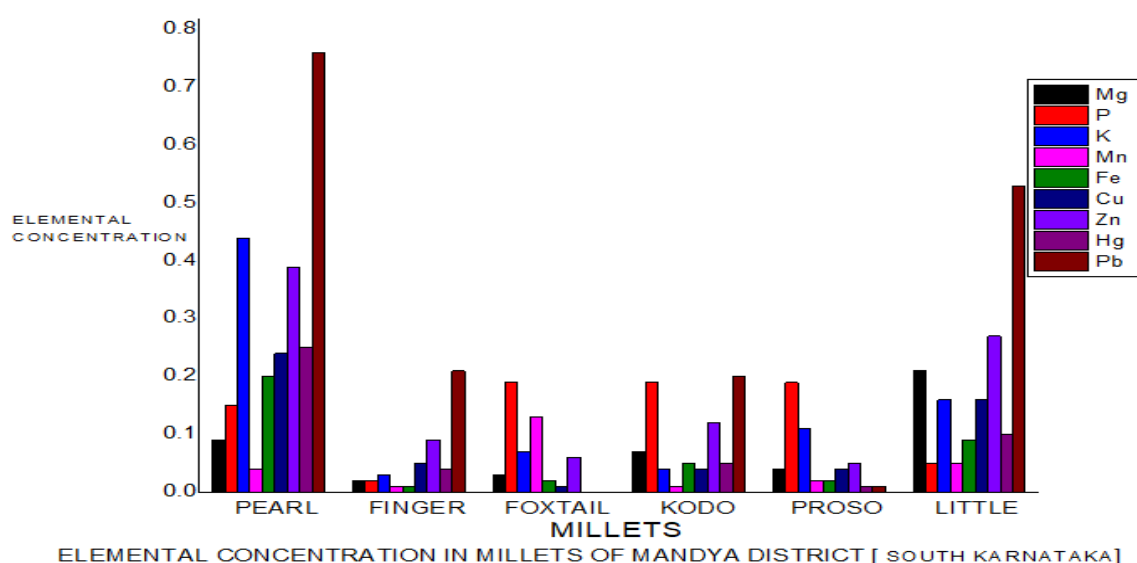
INFORMATION OF ELEMENTAL CONCENTRATION IN MILLETS SELECTED FROM DHARWAD

LOCATION	MILLETS	Mg	P	K	Mn	Fe	Cu	Zn	Hg	Pb
DHARWAD	PEARL MILLET	0.16	0.14	0.73	0.08	0.11	0.10	0.33	0.07	0.01
	FINGER MILLET	0.11	0.11	0.31	0.15	0.07	0.19	0.39	0.07	0.03
	FOXTAIL MILLET	0.05	0.27	0.20	0.15	0.24	0.24	0.32	0.08	0.00
	KODO MILLET	0.08	0.21	0.03	0.02	0.04	0.02	0.30	0.09	0.01
	PROSO MILLET	0.08	0.17	0.22	0.07	0.07	0.31	0.05	0.05	0.09
	LITTLE MILLET	0.19	0.66	0.31	0.04	0.07	0.15	0.39	0.05	0.06



INFORMATION OF ELEMENTAL CONCENTRATION IN MILLETS SELECTED FROM MANDYA

LOCATION	MILLETS	Mg	P	K	Mn	Fe	Cu	Zn	Hg	Pb
MANDYA	PEARL MILLET	0.09	0.15	0.44	0.04	0.20	0.24	0.39	0.25	0.76
	FINGER MILLET	0.02	0.02	0.03	0.01	0.01	0.05	0.09	0.04	0.21
	FOXTAIL MILLET	0.00	0.19	0.07	0.13	0.00	0.01	0.06	0.00	0.00
	KODO MILLET	0.07	0.19	0.04	0.01	0.05	0.04	0.12	0.05	0.20
	PROSO MILLET	0.04	0.19	0.11	0.02	0.02	0.04	0.05	0.01	0.01
	LITTLE MILLET	0.21	0.05	0.16	0.05	0.09	0.16	0.27	0.10	0.53





FINGER MILLET



This lowers cholesterol levels and lowers blood sugar by removing extra liver fat. Natural iron may be found in abundance in ragi. It is helpful for those with anxiety, depression, and insomnia (sleepless nights). Ragi may help with migraines as well. Ragi is also recommended to lactating mothers

KODO MILLET



Strong antioxidants may be found in impressive amounts in kodo millets. The phenolic compounds in this little millet lower LDL or bad cholesterol, promote heart health, lower blood pressure, and protect against many chronic illnesses. Additionally, these antioxidants work to stop free radicals from harming cells and tissues and creating a variety of cancers by protecting them from damage.

LITTLE MILLET



When regularly taken, helps manage blood sugar levels. It revealed decreased triglyceride levels, higher HDL cholesterol, and lower LDL/VLDL cholesterol levels. Reduces risk of Heart Attack, Rich in Anti-oxidants.

PROSO MILLET



Magnesium, which is abundant in proso millet, lowers blood pressure and lowers the risk of stroke, heart attack, and atherosclerosis.

The high fibre content of millet contributes to lowering cholesterol.

FOXTAIL MILLET



Iron and calcium-rich foxtail millets support the health of bones and muscles. Vitamin B1 in foxtail millet is abundant, preventing a number of neurological conditions.



Foxtail millet is low in carbohydrates, high in protein, and low of gluten.

PEARL MILLET



Helpful in the treatment of stomach ulcers Heart health benefits, as well as bone formation and repair lowered risk of cancer

Beneficial for diabetes, Beneficial in Preventing Gall stones, Anti-allergic properties

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