



## A RICH SOURCE OF STIMULATING NUTRIENTS SUCH AS POTASSIUM AND PHOSPHORUS – *FICUS BENGHALENSIS* (L.)

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### ABSTRACT

*Ficus benghalensis* (L.) is a medicinal plant. Its use in diabetes is mentioned in Ayurveda. The aerial roots of the plant are used as a drug. Therefore the metal analysis of aerial roots has been carried out. This data provided some interesting results. These roots have been found to be rich in potassium and phosphorus. Both the metals are stimulating metals. Potassium is equally important in maintaining proper balance of calcium. It also affects insulin secretion thereby playing a role in the treatment of diabetes. Some times high concentration of potassium may lead to calcium deficiencies causing osteoporosis. But in *Ficus benghalensis* calcium and copper are also present in good amounts. Therefore, risk of osteoporosis is minimized. Thus the balance between sympathetic and parasympathetic systems is maintained keeping a person active.

**Key words :** *Ficus benghalensis*, Potassium, Phosphorus, Diabetes, Osteoporosis

### INTRODUCTION

*Ficus benghalensis* Linn. named Banyan tree is commonly called as Vata in Marathi, is a medicinal plant. In Ayurveda, different parts of plant are mentioned to have medicinal properties. Its leaves are used in wound healing<sup>1</sup>. The oil from leaves are used for hair growth<sup>1</sup>. Its bark is useful in biliousness, ulcers, vomiting and vaginal complaints<sup>2</sup>. The leaves are used in treatment of ulcers while the milky juice is aphrodisiac and tonic<sup>1</sup>. The root is useful in gonorrhea and syphilis<sup>1</sup>. It is a drug for birth control<sup>1</sup>. The *Ficus* compounds showed significant antioxidant effects, which may be attributed to their polyphenolic nature<sup>3</sup>. *Ficus benghalensis* bark has an antidiabetic action<sup>4-9</sup>.

The aerial roots are specially used in Ayurveda for the treatment of diabetes, so aerial roots are chosen for chemical screening. Its metal content data have surprisingly shown higher

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percentage of potassium. In this paper, the main emphasis is given to the significance of this higher potassium content of aerial roots in relation with adult onset of diabetes along with osteoporosis.

In the words of Henry Schroeder “minerals are the basic spark plugs in the chemistry of life, on which the exchanges of energy in the combustion of foods and the building of living tissues depend.”<sup>10</sup>

Herbs are also classified as stimulatory and sedative based upon their mineral contents. If the herbs are rich source of potassium, phosphorus and iron, then they are stimulatory herbs. Those herbs rich in calcium and magnesium are sedative herbs.

Aerial roots of *Ficus benghalensis* showed higher percentage of potassium, phosphorus and iron, so it can be considered as stimulating herb.<sup>10</sup>

## EXPERIMENTAL

Atomic Absorption Spectrophotometer used was Chemito 201 Mech. Flame Photometer used was Chemito mech. AR grade hydrochloric acid was used.

Ash of shed dried aerial roots was prepared by taking 1.0 g of sample and keeping it in muffle furnace at 550 °C till constant weight was obtained. The major constituents of ash were determined qualitatively and quantitatively. For the detection of metals, the ash was converted to chlorides and the solution was tested for metals by applying standard procedures. Initially the ash was dissolved in 10% HCl (5.0 mL) and evaporated to dryness on water bath. Again 10% HCl (0.5 mL) was added and evaporated to dryness. The resulting solution was filtered through Whatmann paper (No. 40). The residue was made chloride free (tested with silver nitrate) by giving washings with hot water. The filtrate was diluted to 100 mL and used to estimate metal contents by using standard methods (Table 2).

## RESULTS AND DISCUSSION

Metal analysis of acid soluble ash of aerial roots of *Ficus benghalensis* showed the presence of potassium, phosphorus, sodium, calcium, copper, iron, manganese, zinc, aluminium and lead. Aluminium and lead percentage is negligible, while percentages of potassium and phosphorus were found to be surprisingly high. All the above minerals have nutritional values. These all minerals have their effects on our health, when they are too high or too low. Table 2 shows the percentage of the above metals.

Table 1

Particulars	Percentage
Acid soluble ash	6.75 %
Acid insoluble ash	0.25 %



Table 2

Metal	Method	Percentage (%)
Potassium	Flame photometer	2.3125
Phosphorus	Spectrophotometer	0.2873
Calcium	Flame photometer	0.1115
Sodium	Flame photometer	0.0925
Iron	Atomic absorption spectrophotometer	0.00711
Zinc	Atomic absorption spectrophotometer	0.00257
Manganese	Atomic absorption spectrophotometer	0.00149
Copper	Atomic absorption spectrophotometer	0.00108
Aluminium	Atomic absorption spectrophotometer	0.00511

The aerial roots are used in the treatment of diabetes, wherein potassium also plays an important role. Basically potassium has its effect on the secretion of insulin. Principle function of  $\beta$ -cells is "fuel sensing". They are capable of adapting the rate of metabolism of amino acids, fatty acids and ketone bodies. All these energetic substrates are metabolized and generate ATP which closes  $K^+$  - ATP channel and the raise intracellular  $Ca^{2+}$  concentration, which eventually causes insulin release. Other than ATP, metabolically sensitive  $K^+$  -ATP channel and  $Ca^{2+}$  play essential roles in nutrient induced insulin release.

A person suffers from osteoporosis, due to loss of calcium. Osteoporosis may be due to either low or excess of calcium. The loss of calcium is due to hyperactive parathyroid glands. To cure osteoporosis and reduce parathyroid activity, cells call upon the calcium from bone marrow unless and until it is supplied from outside. This further leads to brittleness of bones. To cure this problem, there should be a balance between activity of thyroid and parathyroid glands. When potassium and phosphorus intake increases, thyroid activity improves. *Ficus benghalensis* contains higher percentage of potassium, which supports thyroid activity. With increased thyroid activity, loss of calcium from bones reduces. Since *Ficus benghalensis* has both, potassium and calcium, in good concentrations, the balance between sympathetic and parasympathetic systems is maintained.<sup>10</sup>

*Ficus benghalensis* has nutritional values as it contains potassium, phosphorus, calcium, sodium, iron, zinc, copper and manganese. The deficiency of these minerals may cause various symptoms and diseases.<sup>10</sup>

Deficiency of potassium can result in fatigue, weakness, muscle cramping, heart arrhythmia and hormonal imbalance.<sup>10</sup>

Too much of calcium results in less absorption of phosphorus. Phosphorus deficiency causes low blood pressure, depression and sedation. Excess of phosphorus causes high blood pressure. It aids absorption of dietary constituents, helps to maintain the blood at a slightly alkaline level, regulate enzyme activity, and is involved in the transmission of nerve impulses<sup>10</sup>.

Calcium is best evaluated in relation to its other co-factors. Hypocalcaemia can cause hyperirritability, sensory disturbances, heart dysfunction, tetany and respiratory failure in extreme cases. Symptoms of hypocalcaemia include excessive thirst, muscle aches, recent memory loss, tendonitis, calcification of cartilages, depression, restless legs, hearing difficulties, constipation, dyspepsia, kidney stones, gall stones and conjunctivitis.<sup>10</sup>

Deficiency of sodium causes adrenal insufficiency leading to hypoglycemia. Sodium deficiency can also cause symptoms of diarrhea, vomiting, profuse sweating, kidney diseases, headaches, confusion, seizures and coma.<sup>10</sup>

Iron deficiency results in sweating, palpitation of the heart, rapid pulse, prolonged sleep, cessation of the menses, aversion to eating and heavy feeling of the body. Lack of iron can lead to a shortened attention span, a reduction in cognitive functions, minimal brain dysfunction and hyperactivity.<sup>10</sup>

Absolute zinc deficiency symptoms are stress, illness, increased thyroid activity, hyper adrenal function, skin lesions, stretch marks, slower healing of wounds, spots on nails, sickle cell anemia, juvenile diabetes, tests disorders and loss of smell.<sup>10</sup>

Copper is an essential constituent of many cellular enzymes such as cytochrome c oxidase, superoxide dismutase, dopamine b hydrolase, lysyl oxidase, etc. a deficiency or excess of copper can disrupt the function of these essential enzymes. Copper deficiency leads to anemia, rheumatoid arthritis, bacterial infections, neurological disorders, cardiovascular disorders, malignancies, etc.<sup>10</sup>

Skeletal abnormalities, postural defects, retarded bone growth, impaired reproductive functions, disturbances in lipid and carbohydrate metabolism, transient dermatitis, change in hair color to brown and abnormalities of pancreas can develop due to manganese deficiency.<sup>10</sup>

Thus, aerial roots of *Ficus benghanesis* (L) can be used to overcome these deficiencies, as these are not only a rich source of potassium and phosphorous but also provides other micronutrients like calcium, sodium, iron, zinc, manganese and copper.

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