RESEARCH
O&G Forum 2024; 34 – 3s: 128-130

THE COMPARISON OF MINERALS IN CARICA PAPAYA, WRIGHTIA TINCTORIA, ANANAS COMOSUS, AND PONGAMIA PINNATA.

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Abstract
Minerals such as nitrates, potassium, phosphates, magnesium, calcium, sulphates, manganese, copper, zinc, iron, and boron are abundant in plants. It will be more beneficial in many disciplines to know how much of the main minerals, nutrients, enzymes, phytochemical components, and biochemical components are present in the plants. One such area is the cleanup of plants. The technique of controlling pollution with plant material is known as phytoremediation. The quantities of phosphates, sulphates, and chlorides for the plants Carica papaya, Wrightia tinctoria, Ananas comosus, and Pongamia pinnata have been estimated in this study. The estimation of barium chloride method is used to measure sulphates, and a nephelometer Is used to record the concentrations. Potassium chromate is used as an indicator in the titration of silver nitrate, which is used to test chlorides. Ammonium molybdate and stannous chloride are used to determine phosphate levels, and a spectrophotometer is used to record the color intensity. The findings indicate that Ananas comosus has higher sulfate levels while Pongamia pinnata has much lower sulphate levels. Carica papaya and Ananas comosus have higher and equal amounts of chlorides, while Wrightia tinctoria has much lower amounts. Similarly, Carica papaya and Ananas comosus have greater and equal amounts of phosphates, while Wrightia tinctoria has lower amounts.
Key words: Chlorides, Sulphates, Phosphates, Nephelometer, Spectrophotometer, Estimation.

INTRODUCTION
The Wrightia tinctoria, Carica papaya, Pongammia pinnata, and Ananas comosus are the plants that have been chosen for the mineral content investigation.

Wrightia tinctoria:
The Sweet indrajao is the colloquial name for Wrightia tinctoria. This little deciduous tree reaches a height of 10 meters and has smooth, scaly, ivory-colored bark with milky latex. It is dispersed up to an altitude of 1200 meters throughout India. 3, 4 - Seco-lup -20 [29] -en-3-oic acid, lupeol, stigmasterol, and campetosterol, as well as indotin, indirubin, tryptanthrin, isatin, anthranilate, and rutin Triacontanol are among the different chemical compounds that have been isolated from different portions of the plant (Muruganandam AV et al.,) W. tinctoria is an extremely valuable medicinal plant that contains numerous significant chemo-constituents that provide the plant its majority of its traits.

This plant contains a variety of phytocomponents, including 1Hexadecanol, 2-methyl, cyclopropane tetradecanoic acid, 2-octyl-methyl ester, Trilinolein, 2-Myristynoyl pantetheine, 9-Octadecen – 12-ynoic acid, methyl ester, and 2-methyl cyclopropyl-2-octanoic acid. According to Rajani Srivastava et al., geranyl isovalerate, cis-13-Octadecenoic acid, quassin, cis-10-Heptadecenoic acid, 9,12,15-Octadecatrienoic acid 2-phenyl-1, methylester, and docosahexaenoic acid

Carica papaya:
The papaya tree is a member of the Caricaceae family, which is a tiny family with four genera worldwide. There are four species in the genus Carica Linn that are cultivated in India; the most common and well-known of these is Carica papaya Linn. Originating in Southern Mexico and Costa Rica, papaya was then imported as a plantation crop throughout all tropical and subtropical regions, including Australia, Hawaii, the Philippines, Sri Lanka, South Africa, and India (K L Krishna et al.,) Vitamins A, B, and C, as well as proteolytic enzymes like papain and chymopapain, are abundant in it. (Yash Prashar and Tarun Vij). The mature, unripe pulp of Carica papayas was subjected to phytochemical screening, which identified the presence of cardenolides and saponins. Chemical examination also indicated the presence of potassium in significant amounts, along with sodium, calcium, iron, phosphorus, zinc, copper, magnesium, and manganese. The pulp's approximate examination revealed that it contains fiber, moisture, carbohydrates, sugars, and crude protein and fat. According to O.I. Oloyede, all of these findings suggest that the pulp of mature, unripe Carica papayas includes nutrients and mineral elements that may be helpful for nutrition.

Pongamia pinnata:
The medium-sized tree Pongamia pinnata is also referred to as Pongam in Tamil and Indian beech in English. Applications in agriculture and environmental management have been acknowledged (S.R. Arote and P.G. Yeole). The presence of phenols, flavonoids, tannins, saponins, alkaloids, lipids, and fixed oil was identified by phytochemical analysis. According to Yogesh Pounikar et al., the hydroalcoholic extract of K. pinnata has a total phenolic content of 0.952 mg/100 mg, followed by flavonoids (0.640/100 mg). Dibutylphthalate, Oleicacid, 1-Docosene, oxalic acid, allyl decyl ester, 2-Hexyl-1-octanol, Cyclohexane, Cyclopentane,

Sulfurous acid, Benzene dicarboxylic acid, and oxalic acid were all found in the gas chromatography experiments. (Pallaniyandi Krishnamoorthy and R. Anuradha)

Ananas comosus:

The pineapple is a globally recognized perennial tropical plant that bears fruit. It is a member of the family Bromeliaceae, which comprises about 2500 species. It was first grown in South America and subsequently spread to other regions of the world. The complex mixture of several thiol endopeptidases and other substances found in pineapple fruit, stem, and root is known as bromelain. Both fruit and stem bromelain are entirely synthesized and consist of enzyme components (Carolina Varilla et al.).

The most common element in pineapple fruit was potassium, a mineral that is vital for regulating the salt balance in tissues. The second most prevalent element found in pineapple was magnesium, which is necessary for many enzymes, particularly those in the sugar and protein kinase families that catalyze ATP-dependent phosphorylation processes. The third most common mineral in pineapple is calcium. Climate, soil nutrients, harvesting season, and genotypes may all have an impact on the mineral levels (Xin-Hua Lu et al.,)

MATERIALS AND METHODS

Ananas comosus, Pongamia pinnata, Wrightia tinctoria, and Carica papaya were the chosen medicinal plants whose leaves were gathered, completely cleaned with distilled water, shade-dried, and milled into a fine powder. The following tests are then conducted using the powder to ascertain the concentrations of phosphates, chlorides, and sulphates.The estimation of barium chloride method is used to measure sulphates, and a nephelometer is used to record the concentrations. A nephelometer is a specialized, stand-alone device used to gauge dispersed light intensity. Potassium chromate is used as an indicator in the titration of silver nitrate, which is used to test chlorides. At the site of precipitation, the values are noted. Ammonium molybdate and stannous chloride are used to determine phosphate levels, and a spectrophotometer is used to record the color intensity. A spectrophotometer is a device that counts photons, or the amount of light that is absorbed when it enters a sample.

RESULTS

The below **table 1** explains the amounts of sulphates, chlorides and phosphates in the selected plant samples, A- Wrightia tinctoria , B- Carica papaya, C-Pongamia pinnata, D- Ananas comosus.

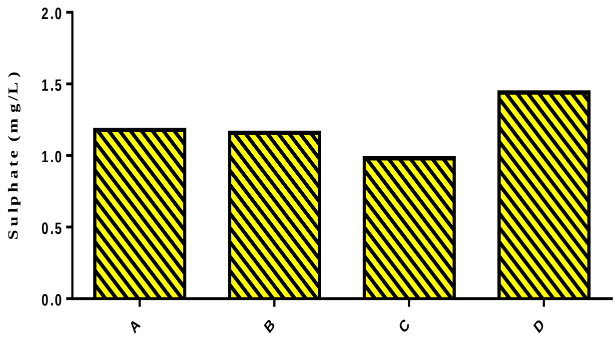

Figure 1. Bar Diagram representing the amounts of sulphates in plants

Table 1 Summary of the results in Mg/L

Chemical parameters	**Results of Test sample Mg/L**			
	Wrightia tinctoria	**Carica papaya**	**Pongamia pinnata**	**Ananas comosus**
Sulphate	1.18	1.16	0.98	1.44
Chloride	0.0099	0.3672	0.26800	0.01985
Phosphate	307,142.85	450,000	364,285.71	450,000

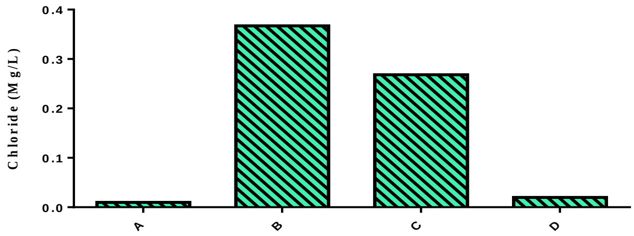

Figure 2. Bar Diagram representing the amounts of Chlorides in plants

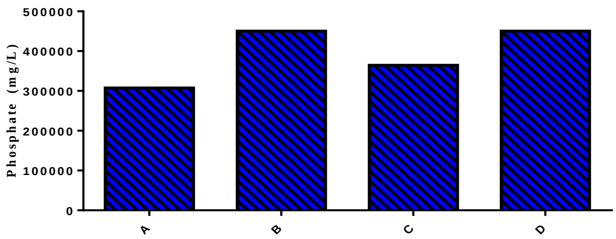

Figure 3. Bar Diagram representing the amounts of Phosphates in plants

DISSCUSSION

Sulphates:

Sulfur is essential for legume crops because it helps with nitrogen fixation and the formation of nodules on root hairs. One of the six macronutrients needed by plants, it can be found in a range of metabolites as well as the amino acids cysteine and methionine (Thomas Leustek et al.,) Through the use of glutathione and its derivatives, it provides defense against oxidative damage. It is necessary for the physiological processes, growth, and development of plants and is a component of various secondary metabolites of plants.

It is a crucial part of plant metabolism, and studying it from several angles is essential to enhancing the general health of plants, their dependent animals, and people (Om Prakash Narayan et al.,)

It is an important aspect of plant metabolism, and improving the overall health of plants, the animals that depend on them, and humans requires research on it from a variety of perspectives (Om Prakash Narayan et al.,)

After N, P, and K, sulfur is the fourth most important plant nutrient worldwide. The sources of sulfur in soils include plant and animal wastes, minerals containing sulfur found in the parent materials from which the soils are formed, and external additions of elemental sulfur or its minerals. Through microbial processes including immobilization, oxidation, reduction, and mineralization of organic materials, sulfur enters biological systems from soil.

After being absorbed by plants, SO4 is reduced to S-containing amino acids and other substances. The majority of other S-compounds in plants get their sulphur from the amino acid cysteine. Additionally, only plants make thiamine, or vitamin B1, from sulfur; neither humans nor other animals can do so. Additionally, vitamin biotin and other S-containing metabolites such as glutathione, glucosinolates, and alliin/allicin are produced by plants. A lack of sulfur in wheat can result in poor baking quality, and in oilseeds, it can cause a decrease in yield and oil content. Humans consume sulfur in the form of the sulfur-containing amino acids (SAAs) cysteine and methionine.

Chlorides:

One of the most crucial electrolytes in blood is chloride. The most prevalent electrolyte in serum, after sodium, is chloride. It plays a crucial function in maintaining electrolyte balance, controlling body fluids, maintaining electrical neutrality, determining acid-base status, and evaluating a variety of clinical diseases. It increases the amount of acid required for digestion, speeds up the movement of muscle and nerve cells, and makes it easier for cells to exchange carbon dioxide and oxygen. The environment's chloride concentration controls the production of flagellin, the main component of flagella, and the transcription of the encoding gene. Other major functions of chlorides in organisms include endosperm germination, motility, and the transport of compatible glycine betaine.

Phosphates:

An essential part of ATP, the plant's energy unit, is phosphorus. Phosphorus is a structural component of ATP, which is formed during photosynthesis and functions from the onset of seedling growth to grain formation and maturity. It is engaged in a number of essential plant processes, including as the transport of nutrients throughout the plant, the processing of sugars and starches, the transfer of energy, and the inheritance of genetic traits from one generation to the next.

The commercial source of phosphate rocks is utilized to make phosphate fertilizers, phosphoric acid, and a few other compounds. In certain applications, phosphate rocks can be employed directly. Phosphatic acid's most significant byproduct is phosphoric fertilizers. Phosphoric acid and its derivatives can be employed directly in the chemical industry or as essential components in the synthesis of several other chemicals needed for toothpaste, dental care, animal nutrition, food, drink, water treatment, and many other applications. The manufacturing of pharmaceuticals also uses high purity phosphate compounds. (Z. Hijran Toama))

CONCLUSION

The amounts of sulphates are greater in Ananas comosus and very less in Pongamia pinnata. The amounts of chlorides are greater in Carica papaya and is very less in Wrightia tinctoria and the amount of phosphates is greater and equal in Carica papaya and Ananas comosus and is lesser in Wrightia tinctoria. Knowing the quantity of essential minerals in plants will be of greater use in various fields as minerals are necessary for both plants and animals and also play an important role in the environment.

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