

NOVEL CHARACTERIZATION OF PLANT LEAVES

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ABSTRACT

The leaves are the typical plant is the site of photosynthesis for the plant. The experiment was designed to evaluate the conductivity, concentration, pH-values and temperature of few medicinal plant leaves in the form of powder using distilled water. The distilled water hydrogen ion concentration was neutral [pH 7.0] while the average pH-values of sample code in decreasing order *FR* [7.81], *FB* [7.74], *MN* [7.22], *SY* [6.36], and *EU* [5.95]. The results indicated that the *EU* sample was shown lowest pH-value. There was a significant difference in the pH – values of investigated samples. The temperature increases the conductivity of samples decreases gradually for *FR* and *SY* but temperature increases the conductivity of *MN* sample increase. The concentration of the samples increases conductivity also decreases up to 80 µg/mL later it is increased for *MN*, *FR*, *SY* and *EU*. The conductivity of leaves was responsible for the biological activity. There was a positive significant ($p < 0.05$) relationship between the conductivity of the investigated samples.

KEYWORDS: Conductivity, Concentration, Leaves, pH-values, Temperature.

INTRODUCTION

In recent years traditionally used medicinal plants produce a variety of compounds. Plant research has increased all over the world and immense potential of medicinal plants used in various traditional system. The antibacterial properties of Indian medicinal plants have been increased. Plants are showing variation in their habitat and morphology. It becomes a major part of further development of biodiversity.^[1]

The electrical conductivity of a water solution is a measure of how much material is dissolved in the water. Electrical conductivity is an important for electrochemical water quality parameter. The electrical conductivity can be expressed as Siemens per centimeter (S/cm) measured between the opposing faces of 1cm cube of liquid at a specific temperature. The charge on ions in solution facilitates the conductance of electrical current and the conductivity of the solution is proportional to its on concentration. The conductivity depends on the value of the pH, concentration of ions and the temperature. Chemical composition of the sample water determines its conductivity.^[2]

A previous study has been made widely on curry leaves from its stem up to its bark. This review gathers variety of idea from multifarious research which has been done on curry leaves and provides a better cognizance of its therapeutic and non-therapeutic properties.^[3] *Eucalyptus* trees are used for several fields, the genus *Eucalyptus*

native from Australia, belongs to the Myrtaceae family and comprises more than 800 species. This genus is known to be a rich source of bioactive natural products.^[4] *Ficus benghalensis* trees have vast traditional role indigenous system of medicine. The genus *Ficus* comprises of nearly 1000 species with greatest diversity. The leaves, bark are considered to be very effective in diabetes.^[5] *Ficus religiosa* commonly known as Peepal tree is a large widely branched tree. It has a heart shaped leaves. It is one of the most versatile plant having a wide spectrum of medicinal activities.^[6] *Mangifera indica* trees are one of the most important sources of medicines. The World Health Organization (WHO) has listed 21,000 plants, which are used for medicinal purposes around the world. More than 30% modern pharmacological drugs are derived directly or indirectly from plants.^[7] *Syzygium cumini* trees a polyembryonic species of family Myrtaceae. The leaves of *Syzygium cumini* trees are a very rich source of antioxidants and have numerous health benefits. The bark contains a good amount of lignin.^[8]

In this investigation author present a technique that can be employed for the measurement of the conductivity, concentration, pH-values and temperature of few medicinal plant leaves such as *Ficus religiosa* [*FR*], *Ficus benghalensis* [*FB*], *Mangifera indica* [*MN*], *Syzygium cumini* [*SY*] and *Eucalyptus* [*EU*] in the form of powder have been studied using diffusion method.

MATERIALS AND METHODS

Materials

The list of plant leaves with family name was shown in Table.1. The leaves extract from *Ficus religiosa* [FR], *Ficus benghalensis* [FB], *Mangifera indica* [MN], *Syzygium cumini* [SY] and *Eucalyptus* [EU] of the plants by biological method from the Botanical garden of Rayalaseema University, Andhra Pradesh, India. All the specimens in this study were air dried in shade at room temperature 28⁰ C for 10-14 daya. The dried leaves were ground into fine powder. Sample powder stored in polyethylene bags. The weight of the sample weighted using digital balance. The different weights of the sample powder were dissolved in 100ml water. At the end of the 48 hours the extracts were distilled and prepared for different concentrations.

Table 1: List of plant leaves with family.

| S.No | Botanical Name | Family | Species | Genus | Code |
|------|-----------------------------|---------------|--------------|------------------|------|
| 1 | <i>Ficus religiosa</i> | Moraceae | religiosa | Ficus | FR |
| 2 | <i>Ficus benghalensis</i> | Moraceae | benghalensis | Ficus | FB |
| 3 | <i>Mangifera indica</i> | Anacardiaceae | indica | Mangifera indica | MN |
| 4 | <i>Syzygium cumini</i> | Myrtaceae | cumini | Syzygium | SY |
| 5 | <i>Eucalyptus citridora</i> | Myrtaceae | citridora | Eucalyptus | EU |

RESULTS AND DISCUSSION

The properties of substances like concentration, conductivity, pH-values and temperature are an important in many advanced biological and engineering applications such as heat exchangers. The distilled water hydrogen ion concentration pH 7.0 was neutral. The average pH-values of sample in decreasing order FR [7.81], FB [7.74], MN [7.22], SY [6.36], and EU [5.95]. The results indicated that the EU sample was shown lowest pH-value. There was a significant difference in the pH –values of investigated samples were shown in Fig.1. FR [7.81] value implies tha antacid potentials present which will be caused by biological infective resistance to human beings. Plant leaves were shown based on pH-values in their habit and habitat. These are the remarkable factors for generation of plant diversity in ecological system. The concentration of the samples increases conductivity also decreases upto 80 µg/mL later it is increased for MN, FR, SY and EU were shown in Fig.2. In case of FB concentration of the sample increases the conductivity decreases upto 80 µg/mL and increased at 100 µg/ml later it is decreased. This biological effect is more significant for pharmaceutical applications were shown in Fig.3. Leaves composition of minerals (Zn, Cu, Fe etc.) causes high conductivity.^[9]

Conductivity measurements are temperature dependent. The temperature dependence of biological sample was shown in Fig.4 to Fig.6. The temperature increases the conductivity of samples decreases gradually for FR and SY but temperature increases the conductivity of MN sample increase. Temperature increases conductivity of samples EU and FB decreases upto 50 ⁰C later it is decreased. The multiple benefit of *Ficus religiosa* [FR] made it a true miracle of nature and highly used plant in

Experiment

Resistance and current is measured by using Kithely-2700 Model. Conductivity is measured with a probe and a meter. A voltage is applied between the two electrodes in the probe immersed in the sample water. The drop in voltage caused by the resistance of the water is used to calculate the conductivity per centimetre. The conductivity (C) is the inverse of resistivity (R) is determined from the voltage (V) and current (I) values according to Ohm's law.

$$V = IR, C = \frac{1}{R} = \frac{I}{V} \text{ (mho)}$$

The units of conductivity are Siemen per centimeter (S/cm).

Ayurvedic medicine. Based on the availability of primary information like pharmacology of different extracts, standardization of the extracts, identification and isolation of activity of modern drugs development with the compounds isolated from *Ficus religiosa*. It can be used for different pharmaceutical product. It is one of the most versatile plant having a wide range spectrum of medicinal activities were shown in Fig.5. The traditional medicines role in the solution of health problems is invaluable on a global level. Medicinal plants continue to provide valuable therapeutic agents in modern and traditional medicine.^[10] In Ayurvedic medicine curry leaves are believed to have several medicinal properties such as anti-diabetic, antioxidant, antimicrobial, anti-inflammatory, anti-carcinogenic and hepato-protective properties. Decoction of leaves may improve eyesight.^[11] Conductivity techniques are generally used in industry. pH –values of the leaves are shown variation in their habit and habitat. The diffusion technique enables the measurement of the electrical properties of liquids. It shows a major part of development of biodiversity. The systematic study is required for identification and documentation of plant provide significant way for the the herbal medicinal plants. Conductivity has been suggested that drinking water quality can be checked effectively. Leaves composition may causes high conductivity. Conductivity techniques are generally used in industry. Biological effect is more significant for pharmaceutical applications. The diffusion technique enables the measurement of the electrical properties of any liquids.

The scientific study have been carried out on various plant materials of marketable drugs have entered the evidence based on therapeutics. The interest toward the

herbal medicines have increased based on their ability to treat various diseases. Concentration, Conductivity, Temperature and pH-values levels was responsible for the higher biological activity for generation of plant diversity of specific ecological areas. Traditionally available few medicinal plant leaves such as *Ficus religiosa*, *Ficus benghalensis*, *Mangifera indica*, *Syzygium cumini* and *Eucalyptus* in the form of powder have been used for diabetic and various ayurvedic medicines.

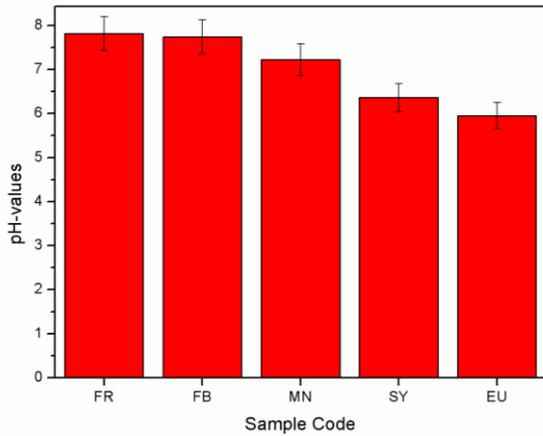


Fig 1: pH-values of leaves sample code.

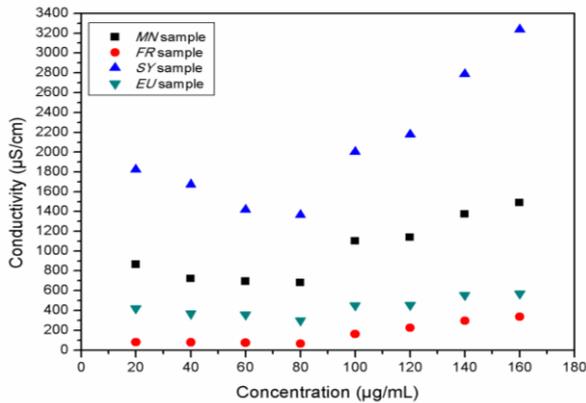


Fig 2: Concentration versus conductivity of the leaves sample.

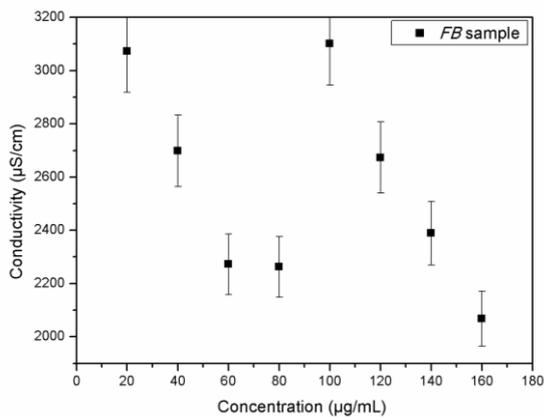


Fig 3: Concentration versus conductivity of FB sample.

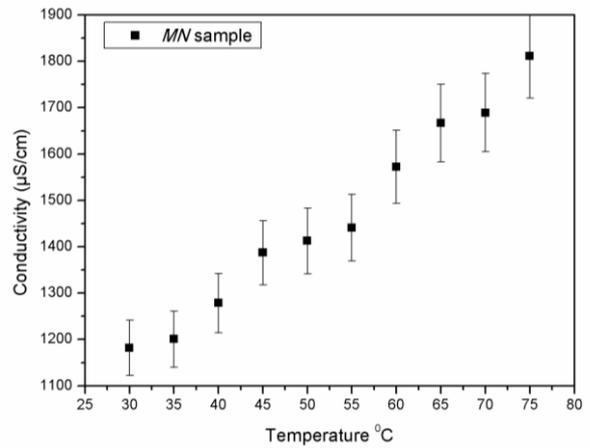


Fig 4: Temperature versus conductivity of the MN sample.

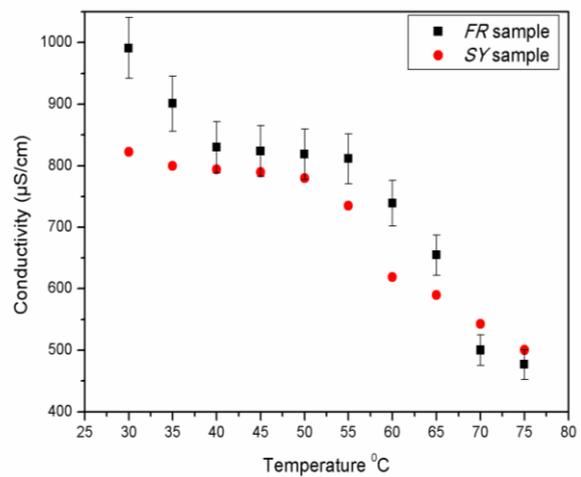


Fig 5: Temperature versus conductivity of the FR and SY sample.

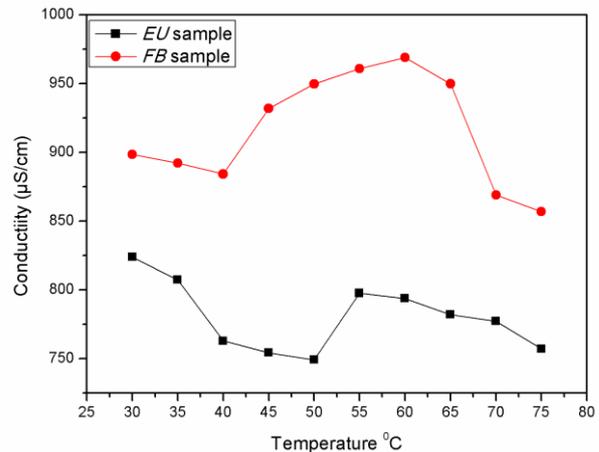


Fig 6: Temperature versus conductivity of the EU and FB sample.

CONCLUSION

Conductivity has been suggested that drinking water quality can be checked effectively by measuring the conductivity of the water. Concentration of the sample increases the conductivity decreased. This biological

effect is more significant for pharmaceutical applications. Leaves composition of minerals causes high conductivity. The diffusion technique enables the measurement of the electrical properties of liquids. Conductivity techniques are generally used in industry. pH –values of the leaves are shown variation in their habit and habitate. It shows a major part of development of biodiversity. Concentration, Conductivity, Temperature and pH-values levels was responsible for the higher biological activity for generation of plant diversity of specific ecological areas. The systematic study is required for identification, documentation of plant and cataloguing may provide significant way for the promotion of the traditional knowledge of the herbal medicinal plants.

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