NOVEL CHARACTERIZATION OF FEW MEDICINAL PLANT LEAVES

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Abstract: The experiment was designed to evaluate the conductivity, pH-values and transmission percentage of traditionally used medicinal plant leaves in the form of powder using distilled water with varied physicochemical characteristics. The distilled water hydrogen ion concentration [pH] was neutral [pH 7.0] while the average pH-values of sample code in increasing order *TG* [7.13], *IB* [7.22], *NM* [7.43], *BK* [7.45] and *NR* [7.98]. The results indicated that the *NR* sample as shown highest pH- value. There was a significant difference in the pH-values of different samples. The temperature increases conductivity increases. Concentration of the sample increases conductivity also increases by conductivity levels was responsible for the biological activity higher in *NR* than the rest of the samples. There was a positive significant ($p < 0.05$) relationship between the conductivity of the different samples.

Key words: Conductivity, leaves, pH-values, transmission %, wavelength.

1. INTRODUCTION

The leaves are the typical plant of photosynthesis. In recent years traditionally used medicinal plants produce a variety of compounds of known therapeutic properties. Antibacterial properties of Indian medicinal plants have been increased [1]. Plants are showing variation in their morphology, and habitat are remarkable factors for generation of plant diversity in specific ecological areas. It becomes a major part of further development of biodiversity. *Azadirachta indica* leaves possessed good anti bacterial activity, confirming the great potential of bioactive compounds and is useful for rationalizing the use of this plant in primary health care [2]. *Murraya koenigii* was one of the medically beneficial plants which have been used many centuries ago by our ancestors [3]. The bioactive components in curry leaves are oxalic acid, resin, carbazole alkaloids and have significant pharmacological activities [4]. Conductivity of a substance is the ability or transmits heat or power to conduct. The electrical conductivity (EC) can be expressed as reciprocal of ohms (mhos) measured between the opposing faces of 1 cm 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 concentration. The Conductivity depends upon the value of the pH, concentration of ions and the temperature of measurement which has been dissolved in the water to form ions. Chemical composition of the sample water determines its conductivity. Conduction is the transfer of energy from energetic particles of a substance to the adjacent less energetic ones as a result of interactions between the particles [5].

In the present article, the authors present a technique that can be employed for the measurement of the conductivity, pH-values and transmission % of traditionally used Indian medicinal plants leaves such as *Azadirachata indica* [*NM*], *Millettia pinnata* [*IB*] , *Murraya koenigii* [*BK*], *Morinda pubescens* (*J. E. Smith*) *var*. *pubescens* [*TG*] *and Vitex Negundo Linn* [*NR*] have been studied using diffusion method.

2. MATERIALS AND METHOD

The sample were extracted from *NM, IB*, *BK, TG and NR* of the medicinal plant leaves by biological method from the Botanical garden of Rayalaseema University, A.P., India. All the specimens in this study were air dried in shade at room temperature 28 ^{0}C for 10-15 days. 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 100 ml water. At the end of the 72 hours the extracts were distilled and prepared for different concentrations.

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 centimeter. The units of conductivity are Siemens per cm (S/cm). The conductivity (G) is the inverse of resistivity (R) is determined from the voltage (V) and current (I) values according to Ohm's law

$$= \quad h = = (h)$$

Resistance and current is measured by using multimeter (KITHELY-2700 Model). For % transmission was measured by colorimeter.

3. RESULTS AND DISCUSSIONS

The physical properties of substances are an important subject in many advanced engineering applications. Conductivity measurements are temperature dependent. The characterization of conductivity, pH-values, concentration and transmission percentage of leaves samples were presented in table 1 &2. The temperature dependence of biological sample was presented in table-1. If the temperature increases, conductivity

also increases up to maximum 55 ^{0}C and declined after, because of the electrical current is transported by the ions in solution as shown in fig.1 to fig.3. The conductivity increases as the concentration of ions also increases. In the distilled water hydrogen ion concentration pH was neutral [pH 7.0] while the average pH-values of sample in increasing order [*TG* 7.13], [*IB* 7.22], [*NM* 7.43], [*BK* 7.45] and [*NR* 7.98]. The results indicated NR has high pH (7.98) value implies it has antacid potentials present which will be caused by biological infective. This kind of activity in general found to be rheumatic reluctance for many orthopedically pains. Based on the pH-values the *NR* plant leaves are showing variation in their morphology and these are remarkable factors for generation of plant diversity in specific ecological areas. It becomes a major part of further development of biodiversity. Environmental conditions plant genetics and capacity of the plants to regenerate itself in natural sites [6]. The average pH-values of the medicinal plant leaves were shown in fig.4. Concentration of the sample increases conductivity also increases by conductivity levels was responsible for the biological activity higher in *NR* than the rest of the samples. There was a positive significant ($p < 0.05$) relationship between the conductivity of the different samples shown in fig.5 to fig.9. Fig.10 shows transmission % of leaves sample with variation of wavelength. Maximum absorption found at 550 nm. Table-2 has shown the conductivity of the leaves sample with variation of concentration. In research observed that NR has hypo-protective activity. In fig.5 very high peak may be special character due to antacids component [7]. The curry leaves have chemical diversity in treatment of dementia syndrome. In fig.1, *BK* curve indicates very large and widened flat elevated portion has special significant compare to *NR* and *TG* due to minerals present such as ZN, Cu, and Fe causes' high conductivity [8]. Fig.2, *NM* reveals the significant when temp. Varies the conductivity decreases. The fig-3 the plot indicates special peak upright. Crude decoction of derived leaves *IB* was evaluated for it anti microbial effect. The extracts of neem when used as medicinal plant, could be useful for the growth inhibition of the carcinogenic bacterium [9]. The neem tree is duly valued worldwide for its hardiness, medicinal properties, and nutritional value. *NM (*leaf, bark and seeds) are known to contain antibacterial and antifungal activities against different pathogenic microorganisms. In recent times, focus on plant research has increased

all over the world and immense potential of medicinal plants used in various traditional systems has been highlighted. 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 [10]. The fresh leaves are burnt with grass as a fumigant against mosquitoes. Decoction of leaves may improve eyesight [11]. Based on the pH-values of the plant leaves are showing variation in their habit and habitats are remarkable factors for generation of plant diversity in specific ecological areas. Concentration of the sample increases conductivity also increases. A conductivity level was responsible for the biological activity higher in *NR* than the rest of the samples. There was a positive significant relationship between the conductivity of the different samples. Maximum absorption found at 550 nm in all the investigated samples. *NM*, *BK*, *IB*, *TG* and *NR* have been

used for antipyretic, diabetic and various ayurvedic medicines.

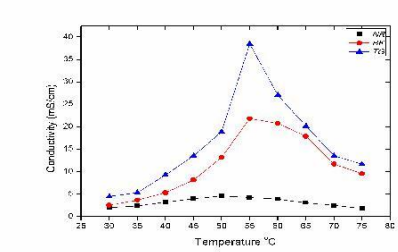

Fig.1: Temperature vs.conductivity of the *NR*, *BK* and *TG* samples

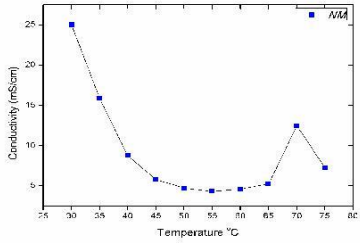

Fig.2: Temperature vs. conductivity of the *NM*

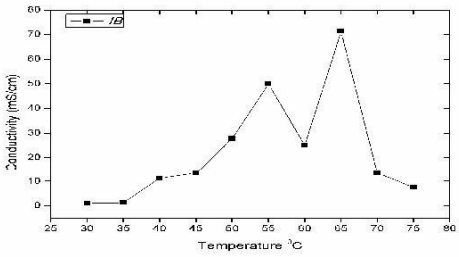

Fig.3: Temperature vs. conductivity of the *IB*

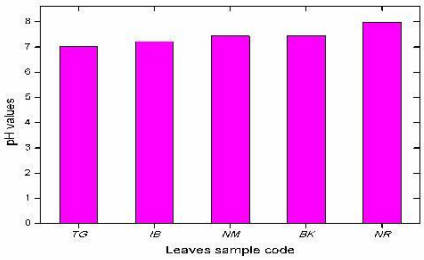

Fig.4: pH - values of the leaves sample

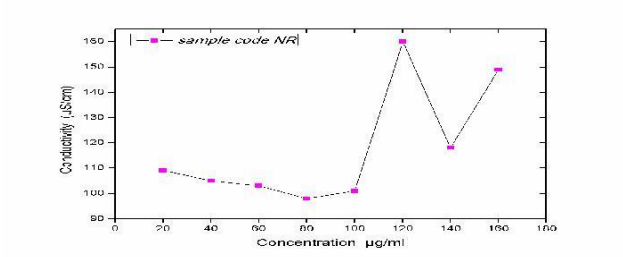

Fig.5: Concentration vs. Conductivity of *NR*

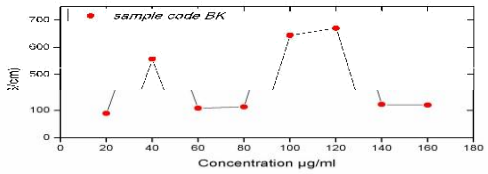

Fig.6: Concentration vs. Conductivity of *BK*

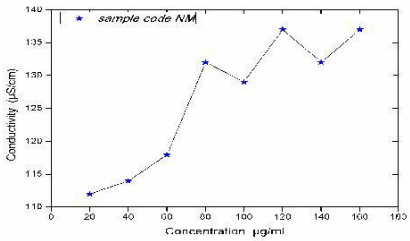

Fig.7: Concentration versus Conductivity of *NM*

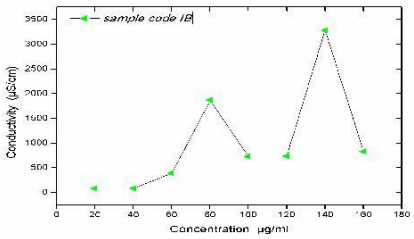

Fig.8: Concentration vs. Conductivity of *IB*

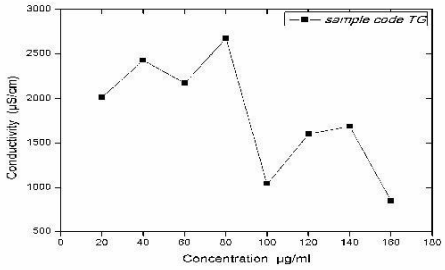

Fig.9: Concentration versus Conductivity of *TG*

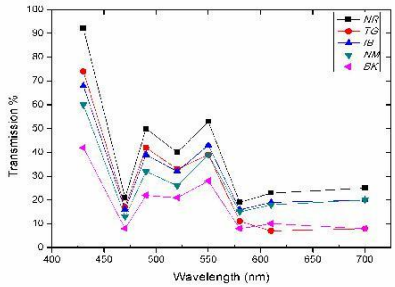

Fig.10: Transmission % of leaves sample with variation of wavelength.

Table-1: Temperature vs. conductivity of the leaves sample

Temperature ^{0}C	Conductivity (mS/cm)				
	NR	BK	*TG*	*IB*	*NM*
30	1.976	2.501	4.424	1.020	25.000
35	2.304	3.584	5.263	1.234	15.873
40	3.184	5.263	9.259	11.363	8.771
45	3.937	8.130	13.513	13.513	5.780
50	4.545	13.157	18.867	27.777	4.716
55	4.202	21.833	38.461	50.000	4.310
60	3.875	20.739	27.027	25.000	4.608
65	3.030	17.857	20.118	71.428	5.235
70	2.439	11.662	13.513	13.513	12.500
75	1.760	9.528	11.627	7.633	7.299

Table-2: Concentration vs. conductivity the leaves sample

Concentration µg/ml	Conductivity (µS/cm)				
	TG	*IB*	*NM*	BK	*NR*
20	2012.00	82.00	112.00	89.00	109.00
40	2427.00	80.00	114.00	557.00	105.00
60	2171.00	389.00	118.00	108.00	103.00
80	2673.00	1866.00	132.00	113.00	98.00
100	1041.00	735.00	129.00	645.00	101.00
120	1600.00	741.00	137.00	671.00	160.00
140	1686.00	3277.00	132.00	122.00	118.00
160	849.00	835.00	137.00	120.00	149.00

4. CONCLUSIONS

The diffusion method enables the measurement of the electrical properties of liquids inaccessible by classical high-accuracy techniques. Conductivity measurements are widely used in industry. Conductivity is also used to monitor the buildup of dissolved ionic solids in evaporative cooling water systems and in boilers. The pH-values of the *NR* plant

showing variation in their habit.This research will go a long way in the scientific exploration of medicinal plants for the benefit of man and is likely to decrease the dependence on synthetic drugs.

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