



## Phytochemical Analysis and Flame Photometric Studies of Hexane and Chloroform leaf extracts of *Inula Recemosa*

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### ABSTRACT:

*Inula Recemosa* is one of the medicinal plants in Indian medicinal tradition. In this present study a phytochemical analysis was carried out on Hexane and Chloroform leaf extracts of *Inula Recemosa*. The studies revealed the presence of phytochemical constituents like Glycosides, Alkaloids, Quinones, Terpenoids and steroids in Hexane extract and Glycosides, Flavonoids, Quinones, Carbohydrates, Terpenoids and Steroids in Chloroform extract. A Flame photometric method was successfully employed for the quantitative determination of Sodium, Potassium and Calcium in leaf powder of *Inula recemosa* and the results showed the presence of good quantity of minerals (Na, K and Ca) in the leaf powder of the plant.

**KEY WORDS:** *Inula Recemosa*, Phytochemical analysis, Phytochemical constituents and Flame photometry.

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### INTRODUCTION

*INULA RECEMOSA* commonly known as Pushkaramoola (Fig. 1) is a genus: *INULA*(L) of the *ASTERACEAE* family. This plant is native to the temperate and alpine western Himalayas of India, China, Afghanistan, Kashmir, Nepal, Pakistan. [1,2] The roots are widely used locally in indigenous medicine as an expectorant and in veterinary medicine as a tonic. It has also been introduced as an ornamental plant and medicinal herb in many countries.[3,4] It is a common perennial herb with a height extending from 0.5 to 1.5 meters. The stem is groove, rough and hairy. The leaves of these plant are large elliptical, and 3 to 6 cm long with 2-3cm breadth having long petioles. The fruits being slender achenes ,0.4cm long be whiskered with 0.75cm meters long pappus hairs. The flowers are bright yellow in colour with many in heads,0.5-1cm in diameter. Literature survey reveals that plant consists of various Phytochemical constituents which have been used for various medicinal values.[5] The plant extract and its isolated active constituents show promising activity against abdominal pain, acute enteritis, bacillary dysentery, expectorant and tonic. [6] Native Americans use this plant for treatment of tuberculosis[7] . Root powder is reportedly hypoglycemic and hypocholesterolemic in human subjects [8]. It brought about a beneficial improvement in ST-T changes in ECG of patients with Ischemic heart disease (IHD). [9] Combination therapy of *Inula racemosa* with other plants and extracts has also shown substantial biological activities. It is anti-anginal and hypolipidemic when used in combination with guggulu in patients with Ischemic heart disease [10]. It exerts cardioprotective effect in

isoproterenol induced myocardial ischemia in rats when used in combination with drugs Terminalia arjuna and Commiphora mukul[11]. It reduced corticosteroid induced hyperglycaemia in mice when used with Gymnema leaf extract [12].

Biological Activity of Different extracts of Inula racemose exhibits Adrenergic  $\beta$ -Receptor Blocking Activity[13], Antibacterial Activity[14], Mosquito Larvicidal Activity[15], Antifungal Activity[16], Anti-Inflammatory Activity[17,18], Analgesic Activity[19], Cytotoxic Activity[20-23], Adaptogenic Activity[23], Hepatoprotective Activity[24,25], Anti-Allergic Activity[26-28], Antioxidant Activity[29], Antiasthmatic Activity[30], Antimutagenic and Antiapoptotic Effects[31], Hypoglycemic Activity[32-38], Cardioprotective Activity[39-42]. In this present study we studied about phytochemical constituents and Flame photometric determination of minerals like Sodium, Potassium and Calcium present in extracts of leave powder of Inula Recemosa which was not reported early.



Figure. 1:

### **NATURAL HABITAT:**

Among the 20 species of Inula occurring wild in India, five are consider to be of economic value. Of these I. racemosa has gained some prominence as a medicinal and aromatic plant and is now grown on a small scale in Lahaul valley in northwestern.

### **MATERIALS AND METHODS**

#### **Collection of Samples**

Healthy plants of Inula racemosa were collected from Uttarakhand, India. The leaves were cleaned to eliminate dust particles from leaves and the leaves were dried in air current. Then Finally the leaves were grinded we got a powder of leaves.

## **PREPARATION OF PLANT EXTRACT**

The leaves of *Inula recemosa* were shade dried, powdered and extracted using two different solvents such as HEXANE, CHLOROFORM In a Soxhlet apparatus. we got the extract from the plant material by using two different solvents, the extraction is done with the 5-6 cycles with each solvent. The solvents was evaporated on water bath, finally we got the crude material of the plant.

## **QUALITATIVE ANALYSIS OF PHYTOCHEMICALS**

For preliminary phytochemical screening, standard assays were performed in different extract of *Inula recemosa*. Phytoconstituents such as Glycoside, Saponins, Alkaloids, Flavonoids, Quinones, Carbohydrates, Terpenoids, Steroids.

## **QUALITATIVE ANALYSIS OF PHYTOCHEMICALS**

### **Test for Glycosides:**

5ml of each extract was treated with 2ml of  $\text{CH}_3\text{COOH}$  in a test tube and a drop of ferric chloride solution was added to it. This was carefully underplayed with 1ml of conc.  $\text{H}_2\text{SO}_4$ . A brown ring at interface is appeared, it indicates the presence of glycosides in it.

### **Test for Alkaloid:**

Take small amount of extract was treated with 3-5 drops of wagner's reagent it turns to reddish colour, so it indicates the presence of alkaloids.

### **Test for Flavonoid:**

To a portion of dissolved extract, few drops of 10% of ferric chloride solution is added. A green colour is observed, it indicates the presence of flavonoids.

### **Test for Quinone:**

A small amount of extract was treated with conc. HCL. A yellow precipitate is observed, indicates the presence of Quinones.

### **Test for Carbohydrates;**

The Aqueous ethanol extract of (0.5 g ms in 5ml of  $\text{H}_2\text{O}$ ) was added to boiling Fehling's solution (a+b) in a test tube, a colour solution is observed. It indicates the presence of carbohydrates.

### **Test for Terpenoid:**

To 0.5gms of extract was added to 2ml of chloroform. 3ml of conc  $\text{H}_2\text{SO}_4$  was carefully added, it turns to reddish brown colour. it indicates the presence of Terpenoids.

**Test for Steroid:**

To 1ml of extract was treated with 2ml of chloroform and equal amount of conc.H<sub>2</sub>SO<sub>4</sub> was added . it turns to red colour . it indicates the presence of sterols and steroids.

**Table-1:Phytochemical test carried out the INULA RECEMOSA leave extract in two different solvents.**

S.no	Phytochemical Tests	HEXANE	CHLOROFORM
1.	Glycoside	+	+
2.	Alkaloid	+	-
3.	Flavonoid	-	+
4.	Quinone	+	+
5.	Carbohydrates	-	+
6.	Terpenoid	+	+
7.	Steroid	+	+

**FLAME -PHOTOMETRY ANALYSIS**

To the Estimation of SODIUM, POTASSIUM, CALSIUM in plant material by using flame photometry.

**PRINCIPLE:**

In a flame photometer source of light is not required since it is the measured constituent of the sample that is emitting the light. The energy that is needed for the excitation is produced by the burning of acetylene or natural gas in the presence of air or oxygen. The most sensitive part of the instrument is the aspirator and the burners. The gases play an important role in the aspiration and while making the aerosol. The air sucks up the sample and passes it into the aspirator where the bigger drops condense and could be eliminated. The monochromator selects the suitable wavelength of emitted light. The usual optical filters could be used. The emitted light reaches the detector. This is a photomultiplier producing electrical signal proportional to the intensity of emitted light.

When a solution of sodium and potassium samples were sprayed into a flame, droplet of sample will be formed and get converted into fine residue by the thermal energy of flame and finally into formation of neutral free sodium/potassium ions. These neutral free atoms are converted into excited state atom again by thermal energy of flame. The excited state atoms return to the ground state with emission of radiation of specific wavelength. Wavelength of radiation emitted is the

characterization of a particular element in the sample and the intensity of radiation emitted depends on the concentration of element in the sample.

## PREPARATION OF SOLUTIONS

### Stock NaCl Solution( 1000ppm Na):

1. Take 0.254gm of analytical grade NaCl.
2. Quantitatively transfer the weighed sample to a volumetric flask of 1 dm<sup>3</sup> capacity and add sufficient distilled water to dissolve it.
3. Make up the 1000ml volumetric flask up to the mark.
4. Now pipette out the 10ml of 1000ppm NaCl solution and transfer into 100ml volumetric flask and make up with the distilled water to the 100ml V. flask up to the mark finally we get the 100ppm solution of NaCl.

### Stock KCl solution(1000ppm K):

1. Take 1.908gm of analytical grade KCl.
2. Quantitatively transfer the weighed sample to a volumetric flask of 1 dm<sup>3</sup> capacity and add sufficient distilled water to dissolve it.
3. Make up the 1000ml volumetric flask up to the mark.
4. Now pipette out the 10ml of 1000ppm KCl solution and transfer into 100ml volumetric flask and make up with the distilled water to the 100ml V. flask up to the mark finally we get the 100ppm solution of KCl.

### Stock CaCO<sub>3</sub> solution(1000ppm Ca):

1. Dissolve 2.497gm CaCO<sub>3</sub> in approx., 300ml distilled water and add 10ml conc. HCL dilute to 1000ml. The same solution is 1400ppm as CaO
2. Now pipette out the 10ml of 1000ppm CaCO<sub>3</sub> solution and transfer into 100ml volumetric flask and make up with the distilled water to the 100ml V. flask up to the mark finally we get the 100ppm solution of CaCO<sub>3</sub>.

## OBSERVATION TABLE

Concentration (mcg/mL)	% Flame Intensity		
	Na	K	Ca
10	10.36	10.05	30.13
20	24.68	23.28	60.07

40	58.49	49.04	120.09
60	68.60	67.80	180.09
80	87.48	86.17	241.13
100	97.96	99.36	298.59
<b>Unknown</b>	<b>11.49</b>	<b>95.68</b>	<b>168.91</b>

Based on the above table when the unknown solution is introduced to the flame the flame colour is changed. The change of flame indicates the presence of different alkali metals present in it.

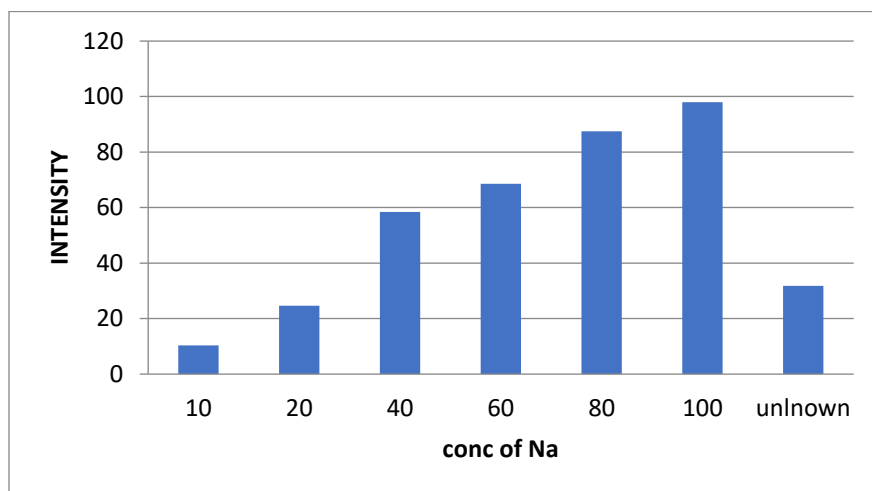
Here Orange colour indicates the presence of **CALCIUM (Ca)**.

Violet colour indicates the presence of **POTASSIUM (K)**.

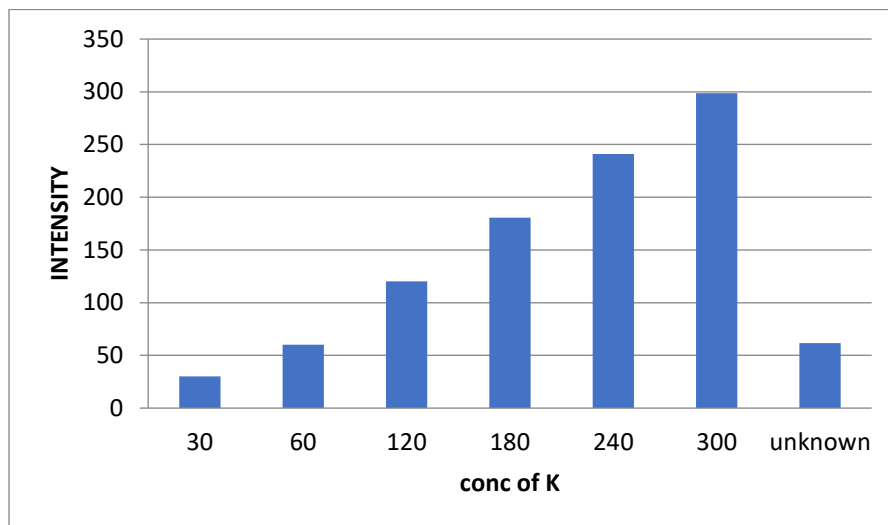
Red colour indicates the presence of **SODIUM (Na)**.

A graph drawn between the concentration and Intensity to the NaCl, KCl, CaCO<sub>3</sub>

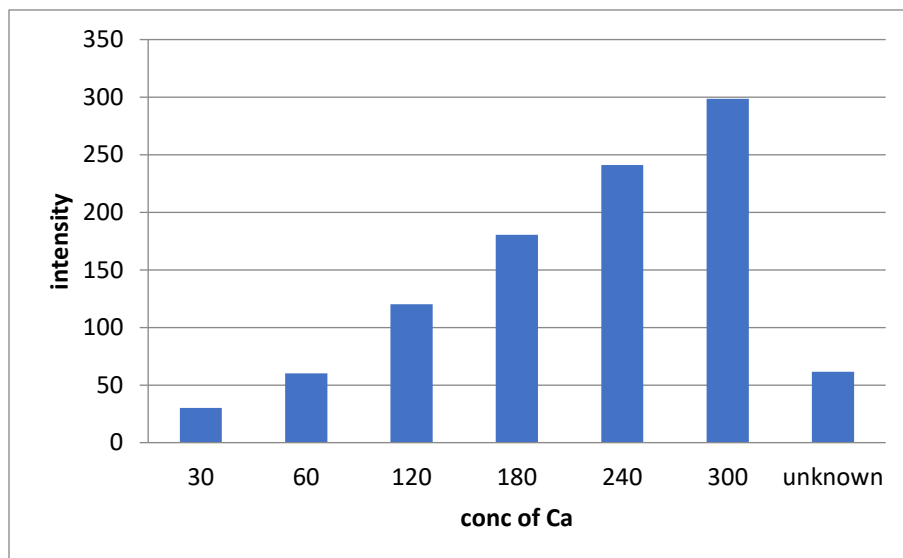
**Graph-1**



**Graph-2**



**Graph-3**



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