PHARMACOGNOSTIC EVALUATION OF SELECTED MEDICINAL PLANTS

Liminophila repens and Capparis brevispina

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Abstract:

Aim and objective: Evaluation pharamcognostical of *Liminophila repens and Capparis brevispina*

Material and methods: in the present experiment *Liminophila repens and Capparis brevispina* was evaluated for its pharmacognostical characters.in present day scenario it is very important that to evaluate the medicinal plants for its identy and purirty.the above selected plants were macro, mico and powder microscopically evaluated.

Results and discussion: the Macroscopical characters of both plants different and will help to identifying them. Their micro and powered microscopical characters provides that thje are from similar families but specifically differed with the other species

Conclusion: this pharmacognistical evaluation give the broad information about identification and standardization of above plants

Key words: *Liminophila repens and Capparis brevispina* ,Pharmacognistiacal

1. Introduction

. According to the World Health Organization, the macroscopic and microscopic description of a medicinal plant is the first step towards establishing the identity and degree of purity of such materials and should be carried out before any tests are undertaken. The term Pharmacognosy was coined by Seydler, a German scientist, which has root from the greek word Pharmakon' a drug and gignoso, to acquire knowledge is actually deals with the structural, physical, chemical and biological properties of crude drugs along with their history, method of cultivation and its.[1-2] Standardization can be done by correct identification and evaluation of organoleptic characters like colour, odour, taste, ash and material content, and the fluorescent studies of powdered drug are of utmost importance to distinguish the different varieties of the plant. From the extensive literature survey we selected three medicinal plants i.e., *Limnophila repens* and *Capparis brevispina* and we made an attempt to distinguish the plant parts through pharmacognostic studies as per WHO Guidelines.[4-5]

2. COLLECTION, IDENTIFICATION, AUTHENTIFICATION:

We collected fresh and disease free whole plants of *Limnophila repens* and *Capparis brevispina* in the month of September-2017 from the Tirumala hills, Tirupati, Chittor District, and Andhra Pradesh. The plant was identified with the help of Plant Taxonomist Dr. K. Madhava Chetty, Assistant Professor, Department of Botany at Sri Venkateswara University, Tirupati and voucher specimen was preserved in Department of Botany, Sri Venkateswara Universiy.

3. MACROSCOPIC EVALUATION OF SELECTED PLANTS

3.1 Materials and Methods

In organoleptic evaluation, various sensory parameters of the plant material, such as weight, colour, odour, and taste of the leaves were recorded. It includes conclusions drawn from studies resulted due to impressions on organs of senses.

4. MICROSCOPIC AND POWDER MICROSCOPIC EVALUATION OF SELECTED PLANTS

. The selected plant materl is subjected to microscopic and powder micop using the standard procedure [3, 4, 5, 6]

4.1 Quantitative microscopy of selected plants

Quantitative microscopical analyses of selected plant material leaves had been carried out as well as following variables have been determined using the standard procedure. [7, 8, 9,10]

5. Proximate Analysis of Selected Plants (Physico chemical parameters)

Proximate evaluation helps to established specific standard regarding dried crude drugs to prevent batch-to-batch variance and to assess their quality. Their analyses additionally provide a concept concerning the nature of phytoconstituents found. Proximate analysis of *Limnophila repens* and *Capparis brevispina* plants powders had been performed utilizing strategies recommended in the WHO quality control of herbal materials by subjecting these to several determinations such as

a. Total Ash [11]
b. Acid-insoluble ash[12]
c. Water soluble ash [13]
d. Alcohol soluble extractive value[12]
e. Water-soluble extractive value [12,13]
f. Loss of moisture content [12,13]

6. Results and discussion

Table 1: Organoleptic chatracters of selected plants

liminophila repens				Capparis brevespina		
Part	Leaf	Stem	Root	Leaf	Stem	Root
Colour	Green	Green	Buff	**Buff**	Buff	Buff
Shape	elliptic – oblong	Characteristic	Conical	**Conical**	Cylindrical	Cylindrical
Size	1-2.5 x 0.4-1.2 cm	Odourless	Characteristic	**Characteristic**	Odorless	Odorless
Base	Narrowed	Much branched	Characteristic	**Characteristic**	Characteristic	Characteristic
Margin	Serrate	Vertical	Downwards	**Downwards**	Fibrous	Fibrous
Apex	Sub acuminate	Glabrous	Smooth	**Smooth**	Rough	Rough

Figure 1: Macroscopic microscopic and powder microscopic characteristics of *Limnophila repens* leaf

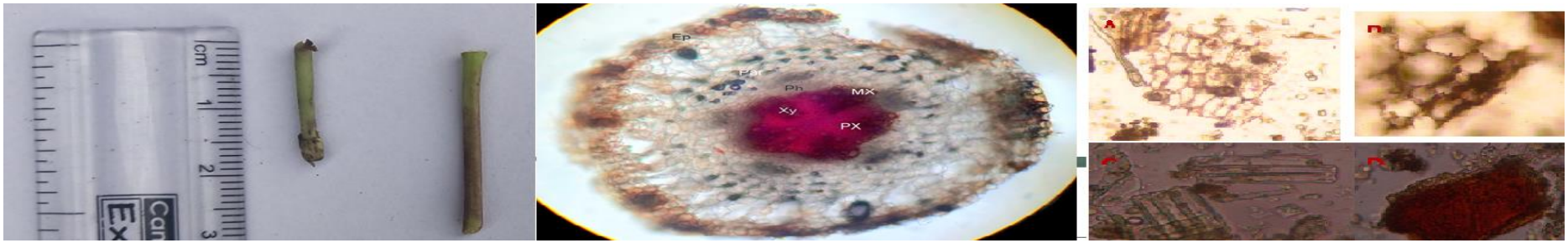

Figure 2: Macroscopic microscopic and powder microscopic characteristics of *Limnophila repens stem*

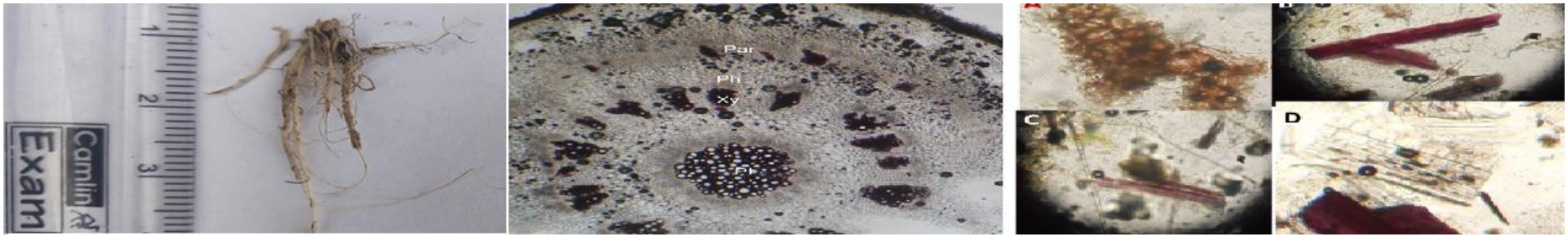

Figure 2: Macroscopic microscopic and powder microscopic characteristics of *Limnophila repens root*

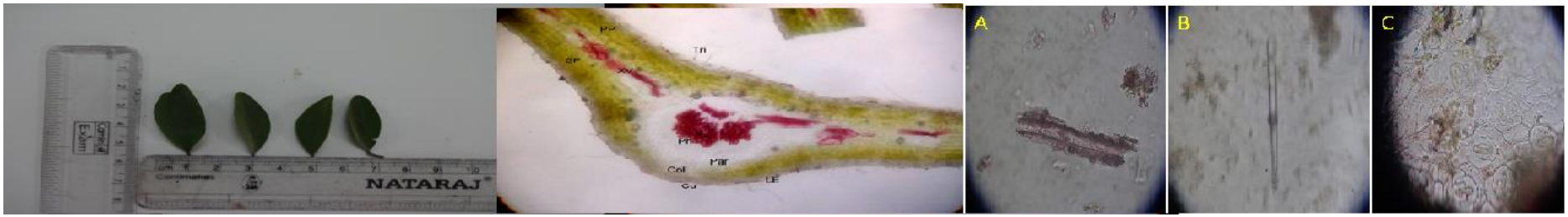

Figure 4 Macroscopic microscopic and powder microscopic characteristics of *Capparaisn brevespina* leaf

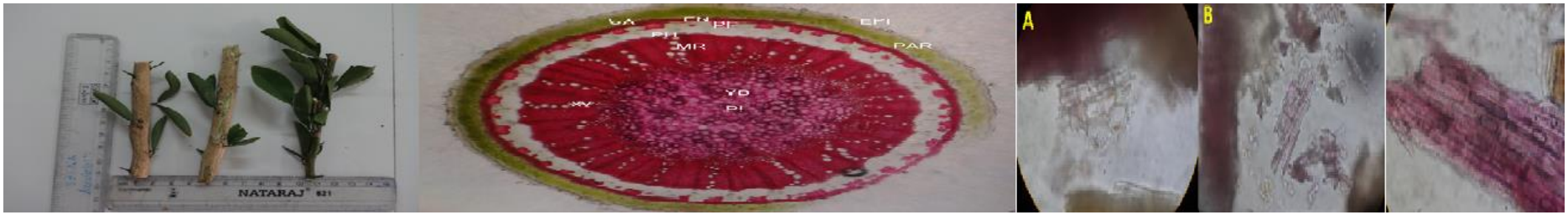

Figure 5 Macroscopic microscopic and powder microscopic characteristics of *Capparaisn brevespina* stem

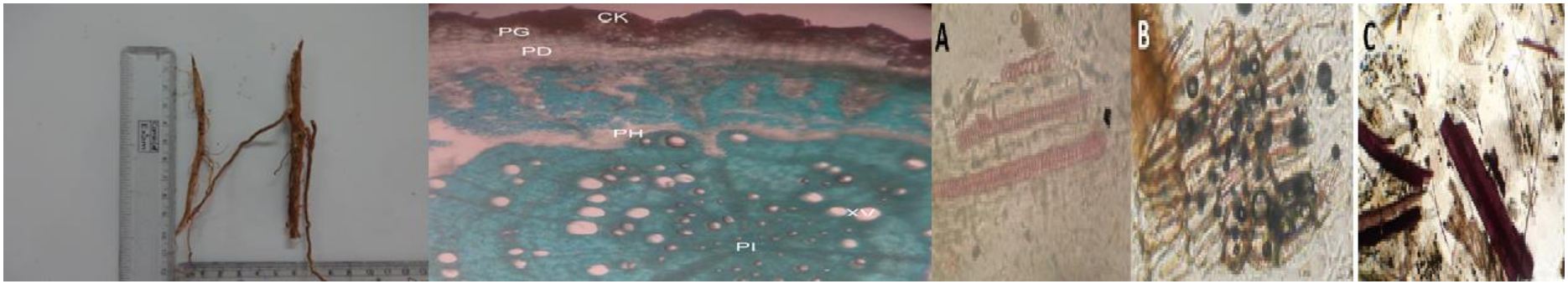

Figure 6 Macroscopic microscopic and powder microscopic characteristics of *Capparais brevespina* root

Table 2 physicochemical parameters of selected plants

Parameters	limino phila repens			capparis brevespina		
	leaf	stem	root	leaf	stem	root
	Values (%w/w)	Values %w/w	Values %w/w	Values %w/w	**Values %w/w**	**Values %w/w**
Moisture content (Loss on drying)	6.56±0.56	6.24 ± 0.21	3.28±0.21	6.37±0.44	4.48±0.44	4.48±0.21
Total ash	5.2 ± 0.23	8.35 ± 0.22	4.56±0.78	4.28±0.85	5.16±0.85	6.26±0.78
Acid insoluble ash	1.25 ± 0.06	2.25 ± 0.06	1.45±0.12	1.54±0.66	1.26±0.66	1.96±0.12
Water soluble ash	2.25 ± 0.34	1.66 ± 0.51	1.24±0.04	1.32±0.12	0.48±0.12	0.98±0.04
Petroleum ether soluble extractive value	0.68 ± 0.06	1.21 ± 0.05	0.48±0.05	0.32±0.08	0.32±0.08	0.98±0.05
Chloroform soluble extractive value	1.54 ± 0.26	2.27 ± 0.21	0.85±0.1	0.89±0.12	0.89±0.12	0.96±0.1
Ethyl acetate soluble extractive value	4.86 ± 0.33	3.86 ± 0.52	2.23±0.12	2.54±0.34	2.54±0.34	2.16±0.12
Methanol soluble extractive value	10.23 ± 0.34	9.25 ± 0.21	5.25±0.08	6.32±0.1	5.86±0.1	6.42±0.08
Water soluble extractive value	12.25 ± 1.25	10.22 ± 2.58	8.52±0.15	7.88±0.55	9.68±0.55	8.42±0.15

Table 3 **Fluorescence analysis of root powder of Liminophila repens**

	leaf			stem			root		
Solvent used	Visible light	UV light		Visible light	UV light		Visible light	UV light	
		Atshort(254nm)	**AtLong(365nm)**		**254 nm**	**366 nm**		**At short (254nm)**	**At Long (366nm)**
Distilled water	Green	Green	Black	Pale Buff	Brown	Dark Brown	Light Buff	Light Brown	Dark brown
Methanol	Pale green	Brownish black	Yellowish green	Light brown	Green	Brownish green	Brownish red	Brownish green	Brownish Black
1N HCl	Blackish green	Dark grey	Dark green	Brown	Greenish brown	Pale green	Pale Brown	Reddish brown	Dark Brown
$FeCl_3$	Blackish green	Brownish green	Dark green	Brown	Green	Pale yellow	Crimson yellowish	Brownish black	Green
$CHCl_3$	Pale green	Brownish black	Dark grey	Buff	Bluish yellow	Bluish green	Brownish blue	Black	No fluorescence
Picric acid	Yellowish white	Dark blue	Black	Buff	Black	Light green	Light Buff	Dark brown	Black
Ethyl acetate	Green	Buff	Greenish black	Yellowish brown	Green	Bark brown	Brownish yellow	Yellowish green	No fluorescence
methanol	Light brown	Green	Brownish green	Light brown	Green	Brownish green	Brownish red	Brownish green	Brownish Black

Fluorescence analysis of root powder of *Capparis brevespina*

	leaf			stem			root		
Solvent	Visible light	UV light		**Visible light**	**UV light**		**Visible light**	**UV light**	
		254 nm	**366 nm**		**254 nm**	**366 nm**		**At short (254nm)**	**At Long (366nm)**
Distilled water	Pale Buff	Brown	Dark Brown	Pale Buff	Brown	Dark Brown	Light brown	Brown	Dark Black
1 N NaOH	Light brown	Green	Brownish green	Light brown	Green	Brownish green	Brownish blak	Brownish green	Black
1N HCl	Brown	Greenish brown	Pale green	Brown	Greenish brown	Pale green	Pale Brown	Dark brown	Brown
50% HNO3	Brown	Green	Pale yellow	Brown	Green	Pale yellow	Crimson	Brown green	Green
FeCl3	Buff	Bluish yellow	Bluish green	Buff	Bluish yellow	Bluish green	Brownish blue	Dark brown	No fluorescence
Ethyl acetate	Buff	Black	Light green	Buff	Black	Light green	Light brown	Dark brown	Black
Picric acid	Yellowish brown	Green	Bark brown	Yellowish brown	Green	Bark brown	Brownish yellow	Yellowish green	No fluorescence
Methanol	Light brown	Green	Brownish green	Light brown	Green	Brownish green	Brownish blak	Brownish green	Black

`Table 2 Quantitate microscopic characters of selected plants

Parameters	Values (per mm^2 area)	Values (per mm^2 area)
Stomatal number upper surface	7.52±2.56	76.12±12.85
Stomatal number lower surface	10.55±1.52	204.52± 28.46
Stomatal Index upper epidermis	12.56±3.55	12.52±2.32
Stomatal Index lower epidermis	15.58±1.25	36.94±6.52
Vein Islet number	5.88±2.25	77.42±6.25

Discussion

Pharmacognostic Studyof selected plants

Evaluation of Morphological with respect to organoleptic, anatomical sections, Powder microscopic and physic chemical characters of *Limnophila repens* and *Capparis brevispina* plants were carried out to determine the macroscopic and microscopic, powder microscopic and physicochemical characteristics in order to provide some standard quantitative and qualitative parameters in this regard. These characters of above mentioned plants were as fallowed.

Organoleptic Evaluation

Characteristics such as color, odor, taste, structure, shape are evaluated in the organoleptic evaluation and this is useful for ensuring pureness, accuracy and identification. In this segment, which is useful for the identification of adulterants, consistency confirmation was provided the observation of the organoleptic study *Limnophila repens* and *Capparis brevispina whole* plants.

Limnophila repens, leaves opposite or whorled, either homophyllous, lanceolate/ ovate and serrate, or heterophyllous with the submersed leaves, laciniate to compound pinnate and grading transitionally upward to fleshy, entire to deeply pinnatifid emersed leaves

Capparis brevispina, Shrubs, 2 - 4 m, coarse branchlets. Leaves 5-7x 2 - 4 cm, elliptical or oblong, toxic, corial, very small stipular spines and smooth cataphylls. Axilla, alone, 4 - 5 cm around flowers; pedicel 4 cm long; sepals 4 in 2 whorls; petals 4, oblong, obovate, white with dark patches; multiple stammers, exerts, gynandrophorus, dorsifixed anthers as long as or longer than the threaded; 6 mm ovaries; ellipsoid, little to many ovules

Microscopic Evaluation

Liminophila repens ' leaf surface represents the cell-covered stomatoes accompanied by the epidermis layer .Rectangular, thin and flat wall cells are epidermal cells. Stomata, 4 - 5 parental cells are anomocytic or sporadic stomata. The surface examination of the leaf also shows that the veins, vein islet and vein end are visible.

The *Liminophila repens* cross section reveals the epidermis membrane, which is accompanied by the cuticle layer and the vascular cords. The higher epidermis is composed of rectangular cells and an external wall comprising trichomes. The trichomes are multicellular and united. The mesophyll is characterized by palisade and spongy parenchyma. Spongy parenchyma is compactly packed, typically two to three layers. Collenchyma stripes are located below the upper and lower epidermis membranes. Collenchyma is walled with thick cells of cellulose. The tissue of Collenchyma consists of thick-walled rounded cells. Xylem is lignified, while phloem is unligned. Similar to upper epidermis is the lower epidermis. The *Liminophila repens* leaf powder plant material is greenish, shows pieces of parenchyma, lignified vessels, fragments of epidermal cells along with anomocytic stomata.

The *Liminophila repens* stem plant displayed a dicot plant's general characteristics. A broad pith and vascular bundles were arranged in a ring in the microscopic study of the plant. The upper epidermal cork comprises of tangentially elongated cells with a thick wall. Below is the development of thin walled parenchyma with limited intracellular cortex areas. Phloem forms of isodiametric, intercellular parenchym with small areas. The pith consists of lignificant cells. The powdered stem of *Limnophila repens*was pale buff, which revealed the presence of cork cells, parenchyma cells, phloem fibers, pigment cells, and starch grains. The cross - section of the *L. repens* revealed that Cortex's presence composed of thin walled parenchymatic cells with very limited intercellular spaces. Cork showed peridermic involvement, i.e. 2 - 3 small, tangentially expanded cells of dark brown granular material. Phelloderm is 1 - 2 coated rows of thin walled cells, thus elongated. Phloem and xylem is found in the endodermis. The phloem is between the medullary rays. The medullary rays are parenchymatic and unified, often severe. There were dramatically structured vascular bundles in which Phloem is well formed and exhibits non-lignified phloem fibers. The presence of Phloem parenchyma was also shown. The xylem area was within the phloem area and was therefore surrounded by single medullary rays. Xylem tissue comprises of circular xylem tubes, xylem fibers, and xylem parenchyma.

The powdered root of *Limnophila repens,* which revealed the presence of cork cells, phloem fibers, xylem fibers and xylem vessels. The transver section of leaf *Capparis brevispina* showed that surface of midrib is wavy and the epidermal layer in thin and less conspicuous. The ground tissue is parenchymatous and homogeneous; the cells are small and compact. The vascular strand is single, prominent and deeply urn shaped. It consists of dense and compact thick walled fibres and vessels arranged into thick radial segments. Phloem is wide and ensheaths the xylem strand. The vascular strand is 400 μm wide. The lateral vein is also prominent and planoconvox in sectional view. It has thick walled narrow epidermal layer, compact, thick walled ground parenchyma and wide arc of vascular strand comprising of long and thick radial segments of collateral bundles. The leaf powder plant material of *Capparis brevispina* is greenish, shows pieces of lignified xylem vessels, stomata, and covering trichomes .

A cross section of the *C .brevispina* shows a number of trichomes, ramified and stillate, attached to a thick cuticle layer. Older stem sections have scarring (stumps of weakened trichomes). There were one layer of epidermal cells, isodiametric parenchyma and a pith containing prismtic oxalate crystals of calcium and several grains of starch. The vascular bundle has lignified vessels with outer phloem .The powdered stem plant material of *Capparis brevispina* is pale buff, shows pieces of parenchyma, phloem fibres and lignified xylem fibres.

One to two layers of epidermal cells are covered in a cross section of the *Capparis brevispina* root by a cork without a trichomium and 4 to 7 layers of cortical collenchyma cells. Large starch grains and stone cells are highly dispersed through the isodiametric parenchyma cells. There is a collateral vascular distribution of 15 - 25 levels of parachymal cell lignified medullary rays. A pith lies in the middle. Both cells (from the epidermis to the pith) in the section are oil reservoirs. The powdered root of *Capparis brevispina* was Light brown, which revealed the presence of cork cells, phloem fibers, xylem fibers and xylem vessels.

Physicochemical Constant Values

To asses the purity and quality of plant drug it is needed to check the physicochemical parameters. An ash value is an earthy matter of the drug, or it may consist of other impurities. Calcium oxalates are naturally occurring inorganic salts which were get stored in parts of the plant in different shapes of crystals. Incineration at controlled operations the crude drug resulted in ash residue of inorganic substances such as silica and salts of metals.

The evaluation of drug at its purity level is necessary as the parts of the plant may adhere with extraneous matter or soil. The determination of both physiological and non-physiological combined called as total ash. The deviations in these values represent in adulteration of the drug.

Extractive values report about the chemical constituent's presence and their nature of solubility in the drug, and it also used for the determination of adulteration of the drug. The results suggest that the selected plant drugs were shown high water-soluble extractive values and methanol soluble extractive values. it indicates the presence of various constituents such as sugars, acids, and inorganic substances and in the methanol extractive values suggests that the drugs contain polar components more.

The loss on drying for leaves, stem, and root of *Limnophila repens* and *Capparis brevispsina* and these values represents that both the drug contains the moderate amount of moisture content. If the drug contains more amount of moisture, it leads to deterioration due to microbial growth or decomposition. This is particularly essential for materials that easily accumulate humidity or rapidly deteriorate with time. Evaluation of physicochemical constants for plant drug was used to establish the standards to determine the quality of the plant drug.

Fluorescence Analysis

The study of fluorescence is an important qualitative parameter for pharmacognostic plant content assessment and is a phenomena posed by plant phytoconstituents. Some constituents fluoresce in daylight while some require UV light. A non-fluorescent compound may exhibit fluorescence if mixed with impurities or other reagents. In the current study, the fluorescence property of the leaf powder and various solvent extracts were observed in daylight and UV light.it idicates that the powder extract of selceted plant extract may having the secondary metabolites like flavnoid,alkalois, tannins and phyto sterols etc.

Aknowedgement:

I would like to thank tha magangent ,principals and staff of both college ,A M reddy meorial college of pharmacy and Gitam institue of pharmacy.also I would like to thank my wife G Ankalakshmi helping in the preparation of manuscript.

Conflict of intrest: We have no conflict of intrest

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