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Study of Physicochemical and Standardization parameters of Launaea intybacea (Jacq) Beauv.

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Abstract: The medicinal plants are widely used by the traditional medical practioners for curing various diseases. However many of them have been not investigated for their described effect. *Launaea intybacea* is one such medicinal plant, in traditional system of medicine, whole plant is used in the against jaundice, hepatomegaly, dyspepsia, skin disease, dry cough and galactoriya. Till today there is no detailed standardization work reported for the plant *launaea intybacea*. The present study deals with physicochemical parameters , preliminary characterstics, phytochemical and elemental analysis, HPTLC fingerprinting of plant *launaea intybacea*. The study revealed different parameters of the crude drug which will be useful in identification and control of adulterations.
Key words: *Launaea intybacea*, physicochemical parameters and HPTLC fingerprinting..

INTRODUCTION

Herbal medicines , as the major remedy in traditional medical systems, have been used in medical practice for thousands of years and have made a great contribution to maintaining human health. A majority of world's population in developing countries still relies on herbal medicines to meet its health needs. The use of herbs to treat disease is almost universal among non-industrialized socities[1] . The world Health Organization (WHO) estimates that 80 percent of the world's population presently uses herbal medicine for some aspect of primary health care[2]. Herbal medicine is a major component in all traditional medicine systems and a common element in Siddha, Ayurvedic, Homeopathic, Naturopathic, traditional Chinese medicine, and Native American medicine. The use of, and search for, drugs and dietary supplements derived from plants has accelerated in recent years. Pharmacologists, microbiologists, botanists and natural-products chemists are combing the earth for phytochemicals and leads that could be developed for treatment of various diseases. In the present study we attempted to evaluate the physicochemical parameters, preliminary phytochemical parameters, phytochemical and elemental analysis, HPTLC fingerprinting of plant *launaea intybacea*.

MATERIALS AND METHODS

Plant material

The plant material used in this study was collected during month of Oct-Nov in Akole Dist-Ahmednagar (MH), India and authenticated from Department of Botanical Survey of India, Pune (India). The plants were washed thoroughly with tap water and air dried in shade at room temperature. They were mechanically powdered and sieved. The whole plant powder was used for the study .

Preparation of the Extracts

Powdered material was extracted by soxhlet apparatus and extraction was carried out successively with pet

ether(60-80^0.) , chloroform, ethyl acetate solvents and water extraction was carried out by maceration for 7 days in room temp. All extracts were individually filtered, evaporated to dryness(40^o). The percentage yield of extractions were calculated. (Table No- 1) .

Physicochemical Parameters

Physicochemical parameters of the powdered drug such as foreign organic matter, ethanol soluble extractives, water soluble extractives, total ash content, acid insoluble ash, water soluble ash, loss on drying and percentage moisture content were determined according to the standard methods[3,4,5]. (Table No- 2).

Preliminary Phytochemical Investigation

All the extracts of the plant material were subjected to preliminary phytochemicals screening for the detection of various plant constituents[6,7,8,]. (Table No-3).

Phytochemical Analysis

The precise mode of extraction depends on the texture and type of the substances to be isolated. The classical chemical procedure for obtaining constituents extract powdered material in a Soxhhlet apparatus with a range of solvent . Standared procedure [8] which was employed for determination of phytochemical profile of plant *launaea intybacea*. The percentages of neutral, moderately polar, basic, polar extracts and fibers were determined. (Table No-4)

Elemental Analysis

The crude drug was analyzed for the presence of seventeen elements by using atomic absorption spectroscopy [9] (Table No-5 and 6)

Table 1. Solvent extraction method and respective percentage yield

Sr. No.	Solvents	Polarity index	Extraction	Percentage Yield
1	Petroleum ether	0.0	Soxhelation	2.3
2	Chloroform	4.1	Soxhelation	3.1
3	Ethyl acetate	5.2	Soxhelation	14.6
4	Water	9.0	Maceration	30.12

Table 2: Physicochemical parameters

Sr. No	Parameters	% w/w (±) S.D.
1	Foreign organic matter	0.040 % ± 0.202
2	Ethanol soluble extractive	14.81 % ± 0.519
3	Water soluble extractive	30.91 % ± 2.220
4	Total ash	5.57 % ± 0.430
5	Acid-insoluble ash	2.56 % ± 0.121
6	Water soluble ash	5.7 % ± 0.231
7	Loss on drying	7.725 % ± 0.315
8	Moisture content	5.97 % ± 0.212

Table 3 : Preliminary phytochemical tests for different extracts .

Sr.No.	Plant constituents	Test performed	Result
1.	Alkaloids	Hanger's test Mayer's test Wager's test	+ ve + ve + ve
2.	Tannins and Phenolic	Lead acetate test Pot. Dichromate test	+ ve + ve
3.	Flavonoids	Shinoda test Lead acetate test	+ ve +ve
4.	Fats and oils	Filter paper test	+ ve
5.	Proteins	Mellon's test Biuret test	+ ve +ve
6.	Amino acid	Ninhydrin test	+ ve

Table 4 : Percent Phytochemicals.

Sr. No.	Phytochemical extracts	% Extract
1	Neutral extract (Fats and waxes)	1.092
2	Moderately polar extract (Terpenoids and phenolics)	2.7
3	Basic extract (Most alkaloids)	17.44
4	Polar extract	0.33
5	Fibers	77.71

Table 5- Atomic Absorption Spectroscopy

Element	Percentage
Ca	2.85
Mg	0.51
Na	1.2
Fe	0.023

Table 6 - Atomic Absorption Spectroscopy

Element	mg/Kg
Al	4.66
Cr	0.44
Cu	14
Ni	2.68
Pb	0.58
Zn	4.28
Mg	0.51
Ag	0.45
Mn	43
Sb	4.79
Ba	3.96
Sn	110.22
Co	0.4

Figure 1 : Typical HPTLC Chromatogram for methanol extract

Fluorescence

UV

HPTLC Fingerprinting

Chromatography is essentially a group of techniques used for separation of the constituents of mixture by continuous distribution or adsorption of analyte between two phases. Among various chromatographic analytical techniques HPTLC has a firm place as a reliable method for quantitation at micro and nanogram level for the drug present single or in multicomponent formulation. HPTLC has evolved through conventional TLC by improvements in quality of the sorbent layers, methods of sample applications, new development techniques and availability of scanning densitometer for quantitative analysis.

HPTLC gives better choice of analysis as it can handle several samples of divergent nature and composition by several analysts at the same time. In TLC the stationary phase is either solid (as silica Gel) or liquid coated on solid support and mobile phase is liquid. Substances are separated on the basis of their differential migration in a system of two phases.[10,11.]

In HPTLC, a sample is spotted on thin layer of stationary phase over which mobile phase flows. Solutes of sample undergo repeated interaction between the mobile phase and stationary phase. Sample components are gradually separated in bands on the stationary phase. Distribution of solute between two phases results from the balance of two forces between solute molecule and the molecule of each phase. In the present study HPTLC of methanol extract was performed by using mobile phase toluene : ethyl acetate. Toluene and ethyl acetate with volume proportion 8.5 : 1.5 shows good separation of the phytoconstituents from the point of application. The chromatogram was observed in UV chamber at 245 nm in absorbance and at 336 nm in fluorescence modes. (Fig-1)

Result and Discussion

The preliminary phytochemical screening of the various extracts showed the presence of Alkaloids in pet ether, chloroform, ethyl acetate and aqueous extracts. Fats and oil, Tannins and Phenolic, Flavonoids, Protein and Amino acids are present in chloroform, ethyl acetate and aqueous extracts. Physicochemical parameters study revealed the total ash content as 5.57%, negligible amount of acid-insoluble ash 2.55% and water soluble ash 5.7% were present in the plant. Water soluble extractive value has indicated the presence of sugar , acids and inorganic compounds. Phytochemical analysis revealed that the basic extract (most alkaloids) content as 17.44% was present in the plant. Atomic absorption spectroscopy study showed the more percentage of calcium 2.85% in the plant and plant may be used as a source of calcium in calcium deficiency disease . HPTLC chromatogram showed that maximum number of components were observed under UV and florescence absorbance mode. Eleven peaks are observed and Rf values are 0.05, 0.09,0.14,0.18,0.21,0.27,0.34, 0.48,0.61,0.69 and 0.18. The characteristics pattern of methanol extract shows good well separated pattern of peaks.

In 21st century Ayurveda can not continue in the age-old conventional manner. It has to accept the new challenges and be prepared to answer the queries of the modern man about the quality and efficacy of the herbal drugs administered to him and also how they are cultivated and collected, processed , preserved and used.

The above study provide information in respect of their identification, chemical constituents and physico chemical characters which may be useful for standardization of herbal drugs so that folk medicinal practice becomes compatible with present era and result in enrichment of Ayurvedic pharmacopoeia.

Conclusion

The present study on physicochemical parameters and preliminary phytochemical screening , phytochemical and elemental analysis provide useful information which may help in authenticating the plant along with nature of phytoconstituents present in it. HPTLC shows clear separation of components present in the methanol extract of the plant powder of *launaea intybacea*. The method may be applied to identify the plant of *launaea intybaecea* from other species. HPTLC fingerprint enables a particular plant to be identified and distinguished from closely related species.[12]

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