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Original Research Paper

PHYSICOCHEMICAL STANDARDIZATION OF *USTUKHUDOOS* (*LAVENDULA STOECHAS LINN.*) - A UNANI DRUG

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ABSTRACT

Proper identification & standardization is mandatory to ensure the therapeutic efficacy of herbal drugs used for health ailments. All single drugs and compound formulations should be standardized according to the guidelines of Pharmacopoeia to ascertain their quality standards. Physicochemical and phytochemical standardization is considered a prerequisite for the assessment of biological activity or determination of biological standards of the plant material. Ustukhudoos is an important drug of Unani Medicine. It increases the tone of brain, stomach, liver and spleen and prevents sepsis. It is useful in neuralgia, costalgia and sinusitis, it is proved more efficient in cases of cold, cough and other chest affection. In present study, an effort has been made to carry out the physicochemical and phytochemical studies of Ustukhudoos. Physicochemical parameters as Extractive Values in different solvents: petroleum ether (2.90%), di-ethyl ether (3.18%), chloroform (0.33%), acetone (0.51%), ethanolic (2.82%), aqueous (9.12%); Solubility: Water (20.7 %) & Alcohol (6.10 %); Moisture content (15 %), Total Ash values (8.71%), pH of 1% (6.94) & 10% solution (5.49) and loss on drying (9.09%). Phytochemical Analysis revealed the presence of almost all the phytoconstituents in the test drug sample i.e. alkaloid, flavonoids, glycoside, carbohydrate and tannin.

Keywords: Ustukhudoos, Physicochemical, Phytochemical, Standardization, Herbal drugs, Ustukhudoos (*Lavendula stoechas Linn.*), Unani drug.

INTRODUCTION

The name *Levendula* is derived from the Latin *Lavaree* (to wash), which alludes to the ancient custom of scenting water for the toilette with oil of Lavender or a few Lavender flowers.¹ There are about 25 species of *Levendula* diffused throughout the Mediterranean region; its grey-green or olive-green foliage has fragrance which blends well with other Mediterranean plants such as rosemary, sage, myrtle and lemons.² The best variety has pleasant odor and is much bitter in test. All the species are fragrant, in both flower and foliage but the perfume has not always the same intensity and is not always as agreeable as that of the common lavender. It is cultivated in

Arab, Afghanistan, France, Iran and Spain.² The plant cultivated in Peshawar, Afghanistan and Rome is qualitatively the best.³ The drug has been termed as hot 1° and dry 2° by the consensus of a large number of Unani physicians^{4,5}, Hot 2° Dry 2°.^{6,7,12} Ustukhudoos is used as a *Mohallil*, *jali*, *Molattif* and *Mofatteh-e-Sodud*. It increases the tone of brain, stomach, liver, and spleen. It is purgative of phlegm and is used in melancholia, mania, emolition, convulsion and palpitation. It is useful in neuralgia and costalgia and is antidote against wasp bite. It is proved more efficient in cases of cold, cough and other chest affection than that of *Zoofa*. It is used in combination with

Bekh-e-Kibr (2:1) in hemorrhoids, hepatitis, spleenitis and ascites.^{8,9,12} It is cardio tonic drug and also increases the tone of urinary bladder. It is good purgative of melenckole and is highly efficient of cleaning out melanchole from brain and heart to the respect of other drugs (Aqsarai, 1326H). It excretes the undue amount of *Sauda* and *Balgham* and does the brain free from these crudities so that it is called as the broom of the brain.¹⁰ It proves very useful in dementia and catalepsy when applied locally and acts as pain killer.¹¹ It is *mofarreh* and heart tonic⁴. It invigorates the vital organs and is very effective in arthritis. It is drug of choice in case of migraine. It is astringent and jail dueto its taste and temperament.¹⁵ It is used with wine in poisoning and with *ma'a-ul-usool* in catharsis.^{3,6} In combination with *ma'a-ul-usool* it effective in head injury, shock and is applied locally in epilepsy.⁶

MATERIALS AND METHODS

The raw material was collected from Dawakhana of Tibbiya College and the sample was authenticated in pharmacognosy section of Department of IlmuAdvia, Faculty of Unani Medicine, AMU, Aligarh.

Chemical Parameters

First the organoleptic characters were studied. The dried powder of the plant was used for chemical analysis. Various physico-chemicals studied like total ash, acid insoluble ash, water soluble ash, alcohol and water soluble matter, moisture content, successive extractive values using soxhlet extraction method, bulk density and pH studies were carried out as per guidelines of W.H.O. Qualitative analysis of the drug was conducted to identify the organic chemical constituents present in the drug. The thin layer chromatographic analysis was conducted following and on pre-coated silica gel 60F₂₅₄ TLC plates.^{16,17} The plates were visualized in day light and UV Long and they were also derivatised using iodine vapour.

Observations

- *Organoleptic Characters*

- The powder of the *Ustukhudoos* was light gray with characteristic odor with astringent taste (Summarized in Table-1).
- *Physico-Chemical Constants*
- The analytical values of different physico-chemical constants were determined (Table-2).
- *Qualitative Analysis Of Phyto-Chemical Constituents Of Drug*
- The phytochemicals present in the drug were identified on the basis of different chemical tests given for various plant constituents, results have been summarized in Table-3.
- *FTAR Analysis*
- Fluorescence analysis of the successive extract was studied under day light as well as Ultra Violet (short and long wave length), (table-4). FTAR Analysis was also done of the powdered drug after reacting them with various chemical reagents.
- *Thin Layer Chromatographic (Tlc) Profile*
- TLC analysis of successive extracts was carried out using different solvent systems and visualizing agents and Rf values were calculated to standardize the drug for its identity and purity.

DISCUSSION

The efficacy of a drug mainly depends upon its physical and chemical properties therefore, the determination of physicochemical characters for the authenticity of a drug is necessary before studying it for pharmacological activity. Following parameters were used for the physicochemical study of *Ustukhudoos*. For establishing the standards of any drug the extractive values play an important role, as the adulterated or exhausted drug material will give different values rather than the extractive percentage of the genuine one.¹³ Percentage of Solubility is also considered as an index of purity, as alcohol can dissolve almost all substances including glycosides, resins, alkaloids etc. The ash value determination furnishes the basis of judging the identity and cleanliness of a drug and

give information related to its adulteration with inorganic matter.¹³ The moisture content of the drug is variable because mostly herbal drugs are hygroscopic and excessive moisture content becomes an ideal medium for the growth of different type of micro-organisms like bacteria and fungi they subsequently spoil the purity of drug. The pH provides a useful practical means for the quantitative indication of the acidity and alkalinity of a solution.¹⁴ Qualitative phytochemical analysis of the drug (*Ustukhudoos*) was also carried out for the determination of the presence of alkaloids, flavonoids, glycosides, tannins, phenols, resins, sterols/terpenes, sugars, starch, amino acid, proteins and saponins. The therapeutic properties of the crude drugs are mainly due to physiologically active chemical constituents present in the drugs, and the lower percentage of chemical constituents may cause lesser therapeutic values. Thin layer chromatography is one of the important parameters used for detecting the adulteration for judging the quality of the drugs. The resolution of different kinds of chemical components are separated by using TLC and calculating the R_f values after detecting the spots in order to standardize the drug for its identity, purity and strength. The exhausted or

deteriorated drugs may lose the components and the number of spots appeared might be less. Keeping this in mind TLC studies of different extracts obtained in different organic solvents of the test drug have been conducted, and R_f values of various spots appeared in different solvents system have been noted.

CONCLUSION

Physicochemical study helps in characterization of constituents or groups of constituents that frequently lead to establish the structure-activity relationship and the likely mechanism of action of the drug. Physicochemical constituents present in the drug vary, not only from plant to plant but also among different samples of same species, depending upon various atmospheric factors, storage and drying conditions. A little deviation from the normal in terms of quality and quantity of the constituents may alter the effect of the drug. Apart from the degradation in the quality of the drugs that occurs due to above conditions, adulteration also contributes to variability. The physicochemical studies therefore, on the drug under study, were carried out to standardize the drug sample and to characterize for the future reference.



Plant of *Ustukhudoos* (*Lavendula stoechas* Linn.)

Table 1: Organoleptic Characters of powder of *Ustukhudoos (L. stoechas)*

Colour	Light gray
Appearance	Powder
Texture	Coarse
Taste	Astringent
Smell	Pleasant

Table 2: Physicochemical study of powder of *Ustukhudoos (L. stoechas)*

S. No.	Parameters	Percentage (w/w)
1.	Ash value	
	Total ash	8.71
	Acid insoluble ash	0.14
	Water soluble ash	1.95
2.	Soluble Part	
	Ethanol soluble	6.10
	Aqueous soluble	20.7
3.	Successive Extractive Values	
	Pet. Ether	2.90
	Di-ethyl ether	3.18
	Chloroform	0.33
	Acetone	0.51
	Alcohol	2.82
	Aqueous	9.12
4.	Moisture Content	15
5.	Loss on Drying	9.09
6.	pH Value	
	1% water solution	6.97
	10% water solution	5.49
7.	Bulk density	0.45

Table 3: Preliminary screening of major phytochemicals of *Ustukhudoos (L. stoechas)*

S. No.	Chemical Constituent	Tests/Reagent	Inference
1	Alkaloids	Dragendorff's reagent	+
		Wagner's reagent	+
		Mayer's reagent	+
2	Carbohydrate	Molisch's Test	+
		Fehling's Test	+
		Benedict Test	+
3	Glycosides	NaOH Test	+
4	Flavonoids	Mg ribbon Dil. Hcl	+
5	Tannins/Phenols	Ferric Chloride Test	+
		Liebermann's Test	+
		Lead Acetate Test	+

6	Proteins	Xanthoprotein Test Biurate Test	- -
7	Starch	Iodine Test	-
8	Saponins	Frothing With NaHCO ₃	+
9	Steroid/Terpenes	Salkowski Reaction	+
10	Amino Acid	Ninhydrin Solution	-
11	Resin	Acetic Anhydride Test	-

Indications: '-' Absence and '+' presence of constituent.

Table 4: FTAR analysis of Ustukhudoos (*L. stoechas*)

S. No.	Extract	Day Light	UV Long	UV Short
1.	Pet. Ether	Transparent	Dark Blue	Transparent
2.	Di- Ether	Light Green	Bluish	Transparent
3.	Chloroform	Transparent	Light Blue	Light Green
4.	Acetone	Greenish	Violet	Grey
5.	Alcohol	Muddy Green	Black	Yellowish Brown
6.	Aqueous	Greenish Brown	Light Green	Dark Brown

Table 5: Fluorescence analysis of Ustukhudoos (*L. stoechas*) with different chemical reagent

S. No.	Powder drug + Chemical Reagent	Day light	UV Short	UV Long
1.	Powdered drug + Conc. HNO ₃	Grey	Green	Black
2.	Powdered drug + Conc. Hcl	Brown	Dark Green	Black
3.	Powdered drug + Conc. H ₂ SO ₄	Brown	Light Green	Reddish Black
4.	Powdered drug + 2 % Iodine solution	Yellow	Reddish	Black
5.	Powdered drug + Galcial Acetic Acid	Green	Light green	Green
6.	Powdered drug +Galcial Acetic Acid	Grey	whitish	Black
7.	Powdered drug +NaOH (10%)	Light Brown	Greenish Blue	Light Green
8.	Powdered drug + Dil. HNO ₃	Reddish	Green	Green
9.	Powdered drug + Dil. H ₂ SO ₄	Greenish	Light Green	Black
10.	Powdered drug +Dil. Hcl	Light Brown	Green	Cherry Red
11.	Powdered drug +Dragendorff's	Greenish. B	Dark Green	Black
12.	Powdered drug + Wagner's Reagent	Light Red	Brown	Black
13.	Powdered drug + Benedict' Reagent	Pale	Whitish green	Grey

Table 6: Thin layer chromatographic Ustukhudoos (*L. stoechas*)

Treatment	Mobile Phase	No of Spots	R _f Value and colour Spots
Alcoholic Extract			
Day Light	vButanol: Acetic acid: Water (5: 1: 4)	1	0.33 (Brown)
Iodine Chamber		1	0.33 (Light yellow)
UV Long		1	0.33 (Dark Blue)



Daylight



Iodine Vapour

Butanol: Acetic acid: Water; (5:1:4)



UV Long

TLC Profile of Alcoholic extract of *Ustukhudoos* (*L. stoechas*)

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