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Pharmacognostical, phytochemical and HPTLC evaluation of *Erandamuladi Kwatha Churna* - A polyherbal formulation for pharmaceutical standardization

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ABSTRACT

Introduction: *Erandamuladi Kwatha* is mentioned in Ayurveda classics as a therapeutic formulation of *Basti* mainly to treat *Trika-prishta Shoola* (low back ache). The most common disorder which affects the movement of leg particularly in the productive period of life is low backache. *Erandamuladi Kwatha* used in *Basti* contains 15 drugs in which most of the drugs are having *Ushna Veerya* and are *Vatakaphahara* in nature. **Materials and Methods:** *Yavakuta Choorna* of *Erandamuladi Kwatha* was evaluated for their pharmacognostic and pharmaceutical analysis. **Results and Discussion:** Pharmacognostic study showed the presence of contents such as starch grains of *Kantakari*, rosette crystal of *Rasna*, pollen grain of *Atibala* etc. Physico-chemical analysis showed that the loss on drying 7.74%, Ash value 6.78%, Water soluble extract 20.12%, Alcohol soluble extract 4.3%, pH 7.2. **Conclusion:** From the study, data developed can be espoused for laying down the standards of *Erandamuladi Kwatha*.

Key words: *Erandamuladi Kwatha, Pharmacognostic, Pharmaceutical analysis, HPTLC.*

INTRODUCTION

Back pain is the most common ailment in today's busy life. Over 80% of the population will suffer from low backache during their lives. The burden of musculoskeletal disorder is global and after looking at the gravity of the situation, WHO declared 2000-2010 as the Bone and Joint decade. This disease has a significant impact upon working population.

Erandamuladi Kwatha comprising of *Eranda*, *Palasha*, *Shalaparni*, *Prishniparni, Brihati, Kantakari, Gokshura, Rasna, Ashwagandha, Atibala, Guduchi, Punarnava, Aragwadha, Devadaru* and *Madanaphala* is mentioned in *Charaka Samhitha* which is mainly indicated in *Trika-prishta Shoola*[1] (low back ache). Anti-inflammatory, anti-oxidant, central analgesic, antinociceptive and bone regeneration activity are found in *Ricinus communis* (*Eranda*)[2] which is the main content of *Erandamooladi Niruha Basti*.

The multifaceted action of *Basti* can be ascribed to the permutation and combination of the drugs used for preparing *Bastidravya.*[3] It not only serves the purpose as curative but also plays role in preventive and promotive aspects.

Pharmacognosy is an important link between pharmacology and medicinal chemistry. Any plant, which is used medicinally, requires detailed study prior to its use because the therapeutic efficacy absolutely depends on the quality of the plant used. If the plant drugs are adulterated, then the quality of preparation can't give the desirable results.[4]

Pharmaceutics is the discipline of pharmacy that deals with the process of turning a new chemical entity

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(NCE) into a medication to be used safely and effectively by patients. It is also called the science of dosage form design.It deals with the formulation of a pure drug substance into a dosage form.

Objectives of the Study

To analyze the pharmacognostic, pharmaceutical and HPTLC of *Erandamuladi Kwatha Churna.*

Materials and Methods

Collection and preparation of the drug

Whole plant of *Shalaparni, Prishniparni, Brihati, Kantakari, Atibala* and *Punarnava,* Root of *Eranda, Gokshura, Rasna* and *Ashwagandha,* Seed of *Palasha,* Stem of *Guduchi*, Fruit pulp of *Aragwadha*, Heartwood of *Devadaru* and Fruit of *Madanaphala* were collected from the Pharmacy of IPGT & RA, Jamnagar. The obtained drugs were shade dried. Drugs were made into coarse powder with the help of mechanical grinder. Ingredients of *Erandamooladi Kwatha* are summarized in Table 1.

Table 1: Ingredients of *Erandamuladi Kwatha Churna.*

SN	Drug	Botanical source	Part used	Dosage
1.	*Eranda*	*Ricinus communis* Linn.	Root	3 parts
2.	*Palasha*	*Butea monosperma* Linn.	Seed	1 part
3.	*Shalparni*	*Desmodium gangeticum* D.C.	Whole plant	1 part
4.	*Prishniparni*	*Uraria picta* Disce.	Whole plant	1 part
5.	*Brihathi*	*Solanum indicum* Linn.	Whole plant	1 part
6.	*Kantakari*	*Solanum surratens Burn.*	Whole plant	1 part
7.	*Gokshura*	*Tribulus terrestris* Linn.	Root	1 part
8.	*Rasna*	*Pluchea lanceolata C.B* Clarke	Root	1 part
9.	*Ashwaganda*	*Withania somnifera* D.C.	Root	1 part
10.	*Atibala*	*Abutilon indicum* Linn.	Whole plant	1 part
11.	*Guduchi*	*Tinospora cordifolia* Willd.	Stem	1 part
12.	*Punanarnava*	*Boerhavia diffusa* Linn.	Whole plant	1 part
13.	*Aragwadha*	*Cassia fistula* Linn.	Fruit pulp	1 part
14.	*Devdaru*	*Cedrus deodara* Roxb.	Heartwood	1 part
15.	*Madanphala*	*Randia spinosa* Pair	Fruit	1 part

Observations and Results

Organoleptic evaluation

Organoleptic characters of *Erandamuladi Kwatha Churna* in dry form were scientifically studied as shown in Table 2.

Table 2: Organoleptic Characters of *Erandamuladi Kwatha Churna.*

1.	Color	Yellowish brown
2.	Touch	Coarse
3.	Odour	Characteristic
4.	Taste	Tasteless

Microscopic characters

The microscopic characters of the mixture of powdered drugs are analyzed under microscope showed various characteristics. The photo plates of the same are given in photo plates 1 and 2.

Analytical Study

1. Loss on Drying

For determination of the loss on drying, 2 gm sample was taken in a previously dried and weighed dish and

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Plate 1: Microphotographs of *Erandamuladi Kwatha Churna*.

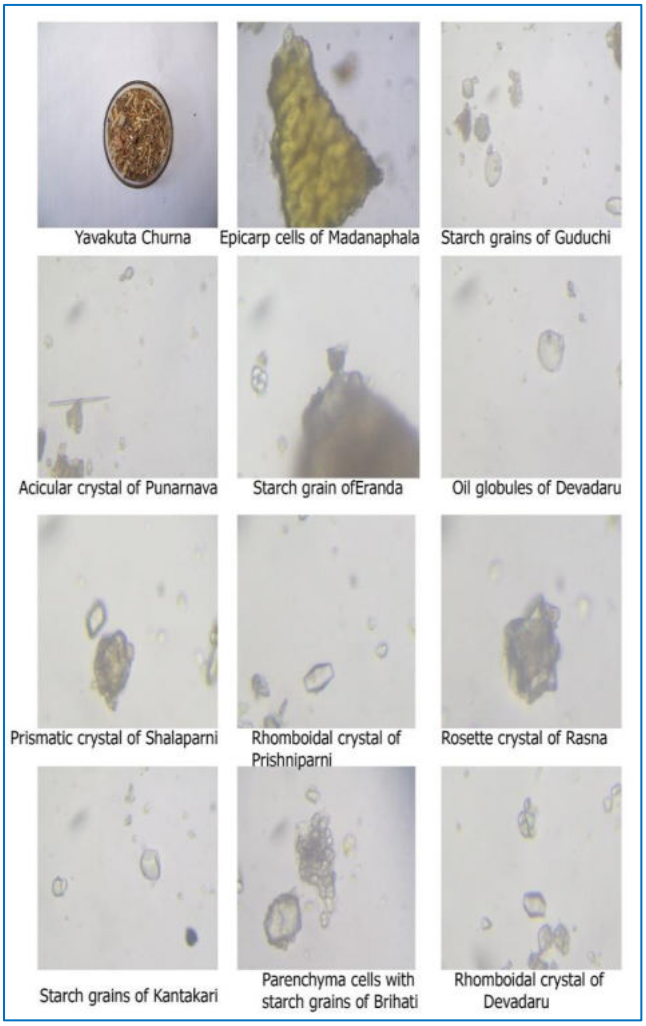
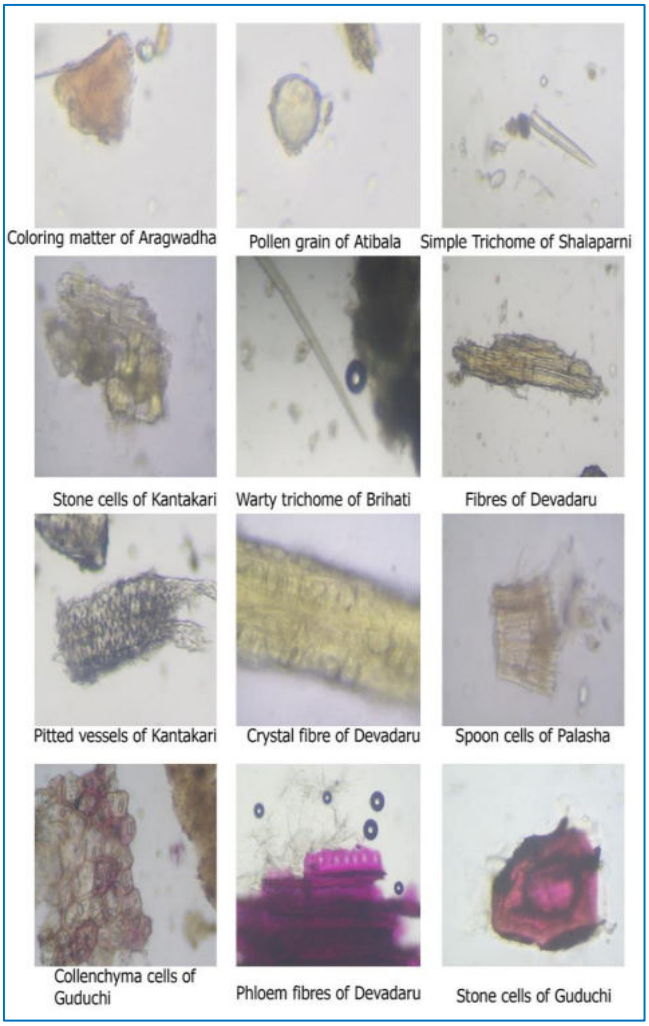


Plate 2: Microphotographs of *Erandamuladi Kwatha Churna*.



dried initially on a water bath and finally in an oven at 110°C temperature until constant weight was obtained. From the weights noted, loss on drying of the sample was calculated and expressed as % w/w.[5]

2. Ash value

This test was carried out to evaluate the ash content of the sample. 2 gm accurately weighed sample was taken in a previously weighed and dried crucible. It was then subjected to incineration in a muffle furnace at 550°C without placing the lid on the crucible, allowed to cool and again weighed. From the residue obtained, the percentage of total ash content in the sample was calculated and expressed as % w/w.[6]

3. Water Soluble Extract

Powder of sample weighing 5gm was taken in 250 ml conical flask and 100 ml distil water was added. It was stirred for 15-20 minutes and allowed to stand for soaking at overnight and filtered by simple filter paper. The 20 ml filtrate was taken in a pre-weighed flat-bottomed shallow dish, evaporated on water bath and dried in hot air oven for 1 hour, then cooled and weighed.[7]

4. Methanol Soluble Extract

Powder of sample weighing 2.5g was taken in 250ml conical flask and 50 ml methanol was added. Stirred for 15-20 minutes and then allowed to stand for soaking at overnight and filtered it by simple filter paper. 20 ml filtrate was taken in pre weighed flat-bottomed shallow dish, evaporated on water bath and dried in hot air oven for 1 hour. Cooled and weighed.[8]

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5. Determination of pH

The pH conventionally represents the acidity or alkalinity of an aqueous solution. pH value of sample was determined by potentiometer or pH meter. Powder of sample weighing 5g was taken in 250 ml conical flask and added 100 ml distilled water. Stirred for 15-20 minutes and filtered by simple filter paper. The filtrate was collected in 100 ml beaker and pH was measured at the same temperature as for the standard solutions using pH strips.[9]

Table 3: Physico-chemical analysis of *Erandamuladi Kwatha Churna.*

SN	Parameters/ Sample	Result
1.	Loss on drying	7.74 % w/w
2.	Ash value	6.78 % w/w
3.	Water soluble extract	20.12 % w/w
4.	Methanol soluble extract	4.3 % w/w
5.	pH value	7.1

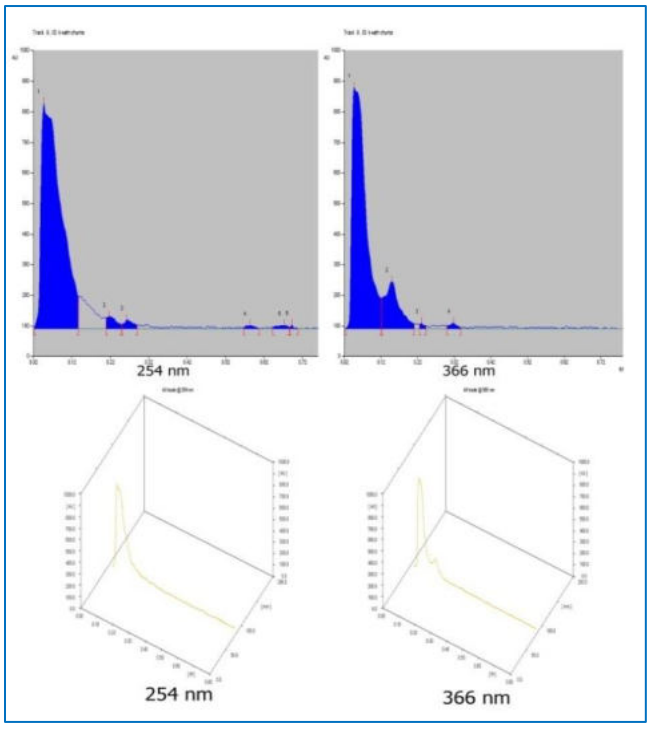

Plate 3: Densitogram and 3D Graph of *Erandamuladi Kwatha Churna.*

6. High Performance Thin Layer Chromatography (HPTLC)[10]

HPTLC is an invaluable quality assessment tool for the evaluation of botanical materials. It allows for the analysis of a broad number of compounds both efficiently and cost effectively. Additionally, numerous samples can be run in a single analysis thereby dramatically reducing analytical time. With HPTLC, the analysis can be viewed using different wavelengths of light thereby providing a more complete picture of the plant than that is typically observed with more specific types of analysis.

HPTLC Method for present study: A drop of sample was taken and diluted with hexene. Application of the sample at the one end of the pre-coated plate through Lino mat V (150 µl/sec) was done. On the sample zone again 7% alcoholic KOH was applied and left for 10-15 minutes at 60-80°c in oven. The plate was then developed by the suitable mobile phase in a chromatographic chamber, which was previously saturated with the mobile phase. Then, development was visualized in day light, short UV (254nm) and/or by derivatization of the plate with suitable reagent. The Rf value and the colors of resolved bands and fingerprinting profiles were recorded.

Rf Value: The distance of each spot from the point of its application was measured and recorded and the Rf. Value was calculated by dividing the distance travelled by the spots by the distance travelled by the front of the mobile phase.[11]

Table 4: Chromatographic results of *Erandamuladi Kwatha Churna.*

SN	Conditions	No. of Spots	Rf Values
1.	Short ultra violet (254nm.)	6 spots	0.05, 0.22, 0.27, 0.58, 0.68, 0.69
2.	Long ultra violet (366nm.)	4 spots	0.05, 0.15, 0.23, 0.32

DISCUSSION

Pharmacognosy can be defined as a branch of biosciences that deals with the knowledge and

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authentication of medicinal and related products of crude or primary type originated from both plants and animals in detail. The detailed Pharmacognostical study of plant helps us to differentiate between closely related species of the same genus or related genera of the same family. It is also the first step to standardize a drug, which is the need of the day.

Pharmaceutics is the study and design of drug formulation for optimum delivery, stability, pharmacokinetics, and patient acceptance. It helps to relate the formulation of drugs to their delivery and disposition in the body.

The mixture of dry drug under pharmacognostical evaluation showed their particular microscopic characters, which prove the purity and quality of the drugs. Epicarp cells, starch grains, oil globules rosette crystal, brown coloring matter are observed in the ingredients. First step in standardizing a new drug is, to strictly follow the parameters of pharmacognosy and phytochemistry. The microscopic and macroscopic characteristics identified in dry powder form, assisted in the authentication of the drugs. HPTLC results showed the presence of 6 spots at 254nm. and 4 spots at 366nm. Further studies may be carried out on it on the basis of observation made and results of experimental studies. This study may be beneficial for future researchers and can be used as a reference standard in the further quality control researches.

Conclusion

In today's era, it is important to standardize drugs for assurance of quality. This was the aim of present study. All the microscopic and macroscopic characters identified in the dry powder mixture form were equivalent to standard profile of these drugs. Physico-chemical and HPTLC studies inferred that the formulation meets the minimum quality standards as reported in the API at a preliminary level. Additional important analysis will be required for the identification of active chemical constituents of the test drug. The inference from this study may be used as reference standard in the further quality control researches.

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