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Research Article

Pharmaceutico-Analytical and Pharmacognostic study of *Ksharagada*-Bridging Tradition and Modern Pharmaceutics

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Abstract

Ksharagada (KA) is a potent formulation mentioned by Acharya Charaka, Acharya Sushruta and Acharya Vagbhata as a part of *Visha Chikitsa* (toxicology). It treats poison-induced illnesses including human poisoning from plants and animals. KA is a Herbo-mineral formulation which comprises of eighteen ingredients, among them seventeen herbal and one mineral ingredient having Anti-poisonous, Anti-bacterial, Anti-oxidant, Anti-inflammatory, Anti-helminthic, Anti-mutagenic, Diuretic and Hepatoprotective activities. Because of its wide therapeutic potential, KA serves as a unique bridge between traditional wisdom and modern pharmaceutics. The present study aimed to standardized preparation of KA and authenticate by Pharmacognostic, physico-chemical and chromatographic analyses. Pharmacognostic evaluation was carried out at pharmacognosy department, ITRA, Jamnagar; physico-chemical and TLC studied were conducted at the department of pharmaceutical chemistry, ITRA, Jamnagar. HPTLC analysis was performed at Vasu research centre, Vadodara. Pharmacognostic findings for KA to confirm the authenticity and genuine ingredients of formulation. The average values of physicochemical parameters of KA were found as follows: pH value: 6, loss on drying: 4.75%, Total Ash value: 15.96%, Water soluble extractive value: 29.9%, Alcohol soluble extractive value: 25.5%, Acid insoluble extractive value: 6.030%, Qualitatively TLC study showed eleven spots at 254 nm and eighteen spots at 366 nm. HPTLC study showed six peaks at 254 nm, eight at 366 nm and nine at 540 nm. These results confirm that KA is authentic and free from any adulteration, and the data generated may serve as a preliminary standardization profile for ensuring its quality control and supporting future research.

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Keywords: Agad Tantra, *Palasha Kshara*, *Ksharagada,* Pharmaceutical, Physico chemical analysis, HPTLC

Introduction

Ayurveda is one of the oldest traditional Indian systems of medicine. They believe not only in treating the diseases but also give various ways to prevent them and improve the quality of living. *Ayurveda* having eight main branches, among them one which is for emergency medicine is *Damstra Chikitsa* (toxicology) which includes *Sthavara* (plant poison), *Jangama* (animal poison), *Dooshi Visha* (cumulative poison) and *Gara Visha* (artificial poison). (1) In this branch it explained about cause, sign and symptoms, diagnosis, management and complication of various types of poisoning.

The formulation used to counteract the poison is known as *Agada* (antidote). In today's era there are a large number of diseases which are caused by exposure to cumulative, concocted poisons and incompatible dietary habits which signifies the need of detoxification at all levels. *Agada Yogas* (anti-toxic composition) are traditionally used as antidotes which have properties like anti-toxic, hepatoprotective, anti-oxidant, anti-mutagenic, anti-bacterial and anthelminthic, removes free radical from the body.

Many *Agada* are mentioned in classical texts. One of the potent among them is KA mentioned in *Charaka Samhita* in the context of *Visha Chikitsa*. (2) KA indicated in various conditions like *Sthavara Visha, Jangama Visha, Sopha* (inflammation), *Arsha* (hemorrhoids), *Grahani* (irritated bowl syndrome), *Ajirna*

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(indigestion), *Ashmari* (renal calculi), *Kasa* (coughing), *Shwasa* (dyspnea), *Twaka Vikara* (skin diseases). The same reference is also mentioned in Sushruta Samhita (3) and Ashtanga Sangraha (4), but with different ingredients

KA is a complex Herbo-mineral formulation, which has seventeen herbal drugs and one mineral drug. It includes drugs like *Palasha, Gairika, Haridra, Daru Haridra, Shweta Surasa Manjiri, Yastimadhu, Laksha, Saindhava, Jatamamsi, Renuka Beeja, Hingu, Shweta Sariva, Krishna Sariva, Kushtha, Sunthi, Maricha, Pippali, Bahlika. Palasha Kshara* was prepared after collecting whole plant of *Palasha*. After proper drying of *Palasha, Kshara* was prepared by *Kshara Vidhi*. After making *Palasha Kshara* all above mentioned ingredients were added which are in fine powder form. Then this formulation was dried in sunlight and stored in an air tight container.

In the current scenario of the market, there are so many adulterant compounds present, which causes health hazards to consumers. The quality of drug is reduced by various factors like physical, chemical and geographical so the need for quality maintenance of formulations is of utmost concern. So, it is important to reassure the herbal drugs before bringing them to market. Standardization is required for each and every formulation along with its phytochemical investigations. Different types of quality control tools are used to assure the quality of drugs. TLC study is used for qualitative and semi-quantitative analysis of natural products for separation and analysis of the mixture of compounds. HPTLC study is useful for the qualitative and quantitative analysis, and the detection of adulterants or any impurities. (5) The present study is aimed to authenticate and to develop analytical profile of KA.

Aim: The study is aimed to develop Standard Manufacturing Procedure of *Ksharagada* and authenticate by evaluating through Physico- chemical analysis & Pharmacognostic parameters.

Objectives

1. To identify and authenticate the raw materials used in the preparation of *Ksharagada* and standardize the preparation process of *Ksharagada.*

2. To carry out Pharmaceutico-analytical studies to evaluate the organoleptic, physicochemical, and qualitative parameters of the prepared formulation.

Materials and methods

The pharmaceutical study of *Ksharagada* was carried out through the following steps:

- Collection of raw drugs for *Ksharagada*
- Preparation of Taruna *Palasha* whole plant *Kshara (Palasha Kshara)*
- Preparation of *Ksharagada*

Collection of raw drugs for *Ksharagada*

Most of the raw drugs of *Ksharagada* were collected from the Pharmacy, ITRA, Jamnagar. *Palasha* and *Shweta Surasa Manjiri* were collected from the Pharmacy of Junagadh. *Shweta Sariva* was procured from the Local vendor Jamnagar, Gujarat. All ingredients are mentioned below in (Table no. 1).

Table 1: Ingredients of *Ksharagada*

SN	Ingredients	Latin/English Name	Part used (6,7)	Quantity
1	*Palasha Kshara*	*Butea Monosperma* Lam. Taub.	Whole plant	1 Part
2	*Gairika*	*Red ocre*	Powder	1 Part
3	*Haridra*	*Circuma longa* Linn.	Rhizome	1 Part
4	*Daru Haridra*	*Berberis aristata* DC	Root	1 Part
5	*Shweta Surasa*	*Ocimum sanctum* Linn.	Flower stalk	1 Part
6	*Yasti Madhu*	*Glycyrrhiza glabra* Linn.	Rhizome	1 Part
7	*Laksha*	*Laccifer locca*	Resin	1 Part
8	*Saindhava*	*Rock salt*	Powder	1 Part
9	*Jatamamsi*	*Nardostachys jatamamsi* DC	Root	1 Part
10	*Renuka Beeja*	*Vitex negundo* Linn.	Seed	1 Part
11	*Hingu*	*Ferula foetida* Regel.	Oleo, Gum, Resin	1 Part
12	*Shweta Sariva*	*Hemidesmus indicus* Linn. R. Br	Root	1 Part
13	*Krishna Sariva*	*Ichnocarpus frutescens* Linn. R. Br	Root	1 Part
14	*Kushtha*	*Sausurea lappa* C. B. Clarke	Root	1 Part
15	*Sunthi*	*Gingiber officinale* Rosc.	Dried Rhizome	1 Part
16	*Maricha*	*Piper Nigrum* Linn.	Fruit	1 Part
17	*Pippali*	*Piper longum* Linn.	Fruit	1 Part
18	*Bahlika (Hingu)*	*Ferula foetida* Regel.	Oleo, Gum, Resin	1 Part

Preparation of Taruna *Palasha* whole plant *Kshara* (alkaline preparation)

The *Taruna Palasha* whole plant (35 KG) was collected from the different locations of Junagadh and authenticated. *Taruna Palasha* were burned to ash in a clean furnace since lightish grey coloured ash (2.8 KG) obtained. The ash then mixed with six times of water (V/V%) and kept overnight (12 hr) to soak. The next morning, the siphoning was done from the soaked ash. This mixture was filtered 21 times to obtain *Ksharodaka* (alkaline water). *Ksharodaka* is then heated until all the water content evaporates and dry whitish grey powder of *Taruna Palasha* is obtained which is mentioned below (Figure no. 1). Similarly, Second and third wash were given and *Palasha Kshara* was obtained. (8) Three batches of *Palasha Kshara* were prepared in Rasa Shastra and Bhaishajya Kalpana department, ITRA, Jamnagar.

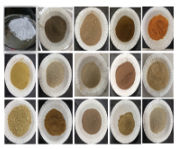
Preparation of *Ksharagada*

Kshara prepared from *Taruna Palasha* was taken and added *Churna* of *Lohitamrut*, *Haridra*, *Daruharidra*, Flower stalk of *Shweta Surasa, Madhuka*, *Laksha*, *Saindhava*, *Jatamamsi*, *Harenu*, *Hingu*, *Shweta Sariva*, *Krishna Sariva*, *Kushtha*, *Trikatu* (*Shunthi*, *Maricha*, *Pippali*) which were taken in equal quantity & mixed well. Dried in sunlight and Stored in an air tight Container which is given in (Figure no. 2). likewise, three batches of *Ksharagada* were prepared in the Pharmacy of ITRA, Jamnagar. (9)

Figure 1: Steps of *Palasha Kshara* Preparation

		
Fig - 1 (a): Dry *Palasha Panchanga* in furnace	**Fig -1 (b): Properly ignition given**	**Fig-1(c): Ash formation**
		
Fig - 1 (d): Addition of 6 times water in ash and soaked overnight	**Fig - 1 (e): Collection of *Ksharodaka* by siphoning method**	**Fig -1 (f): Sieving of *Ksharodaka* 21 times**
		
Fig - 1 (g): Ignition on iron vessel	**Fig - 1 (h): Complete burn till dryness achieved**	**Fig - 1 (i): Obtained white powder of *Palasha Kshara***

Figure 2: Steps of *Ksharagada* Preparation

			
Fig 2(a): White powder of *Palasha Kshara*	**Fig 2(b): All other ingredients added in equal quantity**	**Fig 2(c): All ingredients are mixed well**	**Fig 2(d): Dried and stored in an air tight container.**

Pharmacognostic evaluation

As per the API standards the drugs which were used in the formulation and prepared as *Ksharagada was* identified and authenticated by the Pharmacognosy Laboratory, ITRA, Jamnagar. (10)

Powder microscopy

Powdered drugs were studied microscopically and microscopic characters of individual drugs were noted. The powder of the drug was dissolved with water followed by microscopy of the sample without stain and after staining with Phloroglucinol + HCl. Microphotographs of the sample were also taken under Carl – Zeiss trinocular microscope. (11)

Pharmaceutical Analysis of *Ksharagada*

Pharmaceutico-analytical study was carried out at pharmaceutical laboratory, ITRA, Jamnagar.

Qualitative Analysis consideration

Physicochemical analysis was conducted to find out the following parameters,

pH value

pH value was determined using pH paper. A strip of pH paper was placed on a white tile surface. A drop of *Ksharagada* sample was poured on pH paper with the help of a dropper. The colour obtained on pH paper was compared with different shades of colour pH chart, and the pH value was noted down, which was 6 (mildly acidic in nature).

Loss on drying

Accurately weighing about 1 gm**.** of sample was transferred to a cleaned, dried and previously weighed Petridis, it was spread evenly and dried in an oven at 105^{o}C till constant weight**.** From the amount of weight loss, the loss on drying was calculated on the basis of an air-dried sample**.**

Total Ash value

Incinerate about 2 to 3 gm accurately weighed powdered sample in a tared porcelain crucible at a temperature not exceeding 450^{0}C until free from carbon**.** The sample was cooled and weighed and the percentage of ash is calculated with reference to the airdried drug**.**

Total Acid Insoluble Extract

The ash obtained from the ash value experiment was boiled for 5 minutes with 25 ml of dilute hydrochloric acid**.** The insoluble matter was collected on an ash-less filter paper no**.**41 and washed with hot water till chloride free **(**filtrate + AgNO3 No whit ppt**.)**. Then dried the paper with funnel in a hot air oven at 105^{0}C and then folded the paper and kept in the previously weighed empty crucible and ignited to constant weight**.** The percentage of acid insoluble ash was calculated with reference to the airdried drug**.**

Water Soluble Extract

5 gms of coarsely powdered sample was macerated with 100 ml of water in a closed flask for twenty-four hours**.** The flask was shaken intermittently during the first six hours and allowed to stand for eighteen hours**.** The extract was filtered rapidly taking precaution against loss of solvent**.** 25 ml of filtrate was evaporated to dryness in a dried, previously weighed, evaporating dish and dried at 110^{0}C in a hot air oven**.** From the weight of the residue, the percentage of water-soluble extract was calculated with reference to the air-dried drug**.**

Alcohol soluble Extract

5 gm of coarsely powdered sample was macerated with 100 ml of alcohol in a closed flask for twenty-four hours**.** The flask was shaken intermittently during the first six hours and allowed to stand for eighteen hours**.** The extract was filtered rapidly taking precaution against loss of solvent**.** 25 ml of filtrate was evaporated to dryness in a dried, previously weighed, evaporating dish and dried at 110^{0}C in a hot air oven**.** From the weight of the residue, the percentage of water-soluble extract was calculated with reference to the air-dried drug**.**

Thin Layer Chromatography (TLC):

Thin layer Chromatography (TLC) study was carried out at pharmaceutical laboratory, ITRA, Jamnagar.

Materials & Methods Section

The TLC method is at present an important analytical tool for qualitative and semi quantitative analysis of a number of natural products. The adsorbent, such as Silica Gel G, is coated to a thickness at 0.3 mm or clean TLC plates using commercial spreader, the plates are activated at 105^0 C for 30 minutes and used. The selection of the mobile phase depends upon the type of constituents to be analysed. After the development of chromatogram by ascending technique, the resolved spots are revealed by spraying with suitable detecting agents. (12)

TLC conditions

- Sample preparation: The Drug is powdered and is extracted with Methanol for 1 hour and then filter and filtrate is used for TLC.
- Stationary Phase: Merck pre-coated silica gel 60 F254 plate
- Solvent system: Toluene: Ethyl Acetate: Formic acid: Methanol (6: 3: 0.1: 1)
- Solvent front: 8.5 cm
- Spray reagent: Anisaldehyde Sulphuric Acid Spray

High performance thin layer chromatography (HPTLC):

High performance thin layer chromatography (HPTLC) study was carried out at Vasu Research Centre, Vadodara, Gujarat.

Sample Preparation for HPTLC

1 g of sample was weighed accurately in a conical flask. To it 10 mL methanol was added, reflux for 30 minutes on water bath. Then, allowed to cool and filtered with the help of Whatman filter paper No. 1. The filtrate thus obtained was used for HPTLC fingerprinting. (13)

Method for developing HPTLC

HPTLC analysis was performed on a CAMAG HPTLC system. HPTLC Silica gel 60 F254 aluminium plate 10 cm X 10 cm from Merck was used as a stationary phase. The plate was activated at 110^oC for one hour before use. Before HPTLC analysis, extracts were put at room temperature for 2 h. Using the CAMAG Lino mat 5 semi-automatic sampler, 7 µl samples were applied using a 100 µl syringe. Samples were applied with 8 mm bandwidth and 8 mm from the bottom of the plate. The CAMAG ADC2 automatic developing chamber was saturated with the mobile phase Toluene: Ethyl acetate: Acetone acid 80:10:10 (v/v/v) for 30 min and then developed until 8.5 cm height.

Results and observations

The results were observed after three batches of *Ksharagada* prepared are mentioned below in (Table no. 2).

Finished product microscopy

Microscopic evaluation of finished product (*Ksharagada)* was conducted, Characters were noted down and microphotographs were taken which were observed in photo microscopy in 10X lens (Figure no. 3).

Organoleptic Parameters of Prepared Drug

It refers to analytical methods like *Sparsha, Roopa, Rasa, Gandha* etc, (14) One pinch of *Churna* was randomly selected from the all three batches of *Ksharagada.* The identification was carried out based on the organoleptic features and microscopy of the prepared drug**.** Which is mentioned below in (Table no. 3).

Table 2: *Palasha Kshara* and *Ksharagada* Preparation (3 batches)

Steps	Batch 1	Batch 2	Batch 3
Weight of *Taruna Palasha* Whole plant	35 Kg	35 Kg	35 Kg
Weight of Dried *Taruna Palasha*	28.30 Kg	28.56 Kg	28.45 kg
Weight loss of *Palasha* after drying	6.70 Kg	6.44 Kg	6.55 Kg
Percentage of weight loss after drying	19.14%	18.40%	18.71%
Weight of ash obtained	2.80 kg	2.75 kg	2.82 kg
Percentage of ash obtained from dry *Taruna Palasha* whole plant	9.89%	9.62%	9.91%
6 times Water added in ash (V/V%) and kept overnight without disturbing	16.80 Liter	16.10 Liter	16.90 Liter
Palasha Kshara obtained after first wash	179 gm	167 gm	186 gm
Palasha Kshara after second wash	60 gm	58 gm	68 gm
Palasha Kshara after third wash	41 gm	40 gm	51 gm
Total *Palasha Kshara* obtained with three washes	280 gm	265 gm	305 gm
Percentage of obtained *Palasha Kshara*	0.933%	0.883%	1.01%
Above 17 ingredients were added with *Palasha Kshara* in equal proportion and mixed well	280*18	265*18	305*18
Obtained *Ksharagada*	5.04 kg	4.770 kg	5.490 kg

Physico-Chemical Analysis

After the preparation of *Ksharagada* in three batches, the Physico-chemical (15) analysis was carried out for all three batches on different parameters, and results are presented in (Table no. 4).

TLC value of *Ksharagada*

TLC fingerprinting was one of the fundamental objectives of present study. Below are the images of *Ksharagada* TLC showing the separation of components at different levels, at different wavelengths and after spray. TLC showed 11 spots under 254 nm, 18 spots under 366 nm and 10 spots after spraying with Anisaldehyde sulphuric acid spray. TLC study with photographs (Figure no. 4) and Rf values of all spots and their colours are mentioned in (Table no. 5).

HPTLC value of *Ksharagada*

The HPTLC fingerprinting of *Ksharagada* was performed using a silica gel 60 F254 plate and visualized at 254 nm, 366 nm, and 540 nm after derivatization. The sample (Track T1) showed distinct chromatographic profiles under each wavelength, indicating a rich phytochemical composition. At 254 nm, six prominent peaks were observed at Rf values 0.30, 0.55, 0.61, 0.72, 0.79, and 0.88, suggesting the presence of multiple UV-absorbing compounds (Figure no. 5(a)). Under 366 nm, eight peaks were noted, including major spots at Rf 0.24, 0.38, 0.44, 0.51, 0.55, 0.61, 0.72, and 0.84, indicating fluorescence characteristics of certain phytoconstituents (Figure no. 5(b)). After derivatization and visualization at 540 nm, nine peaks appeared at Rf 0.19, 0.28, 0.33, 0.34, 0.55, 0.61, 0.67, 0.72, and 0.88, which reflect colour- producing compounds such as terpenoids or phenolics (Figure no. 5(c)).

Figure 3: Microphotographs of Prepared Drug.

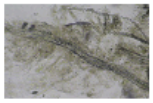
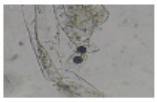
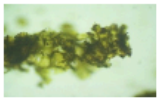
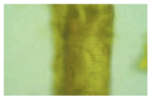
			

Fig 3(a): Crystal fibres of *Palasha*	Fig 3(b): Rosett crystal of *Palasha*	Fig 3(c): Cork in surface view of *Haridra*	Fig 3(d): Scalariform vessel of *Haridra*

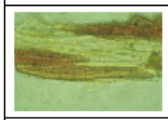
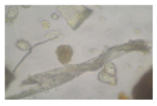
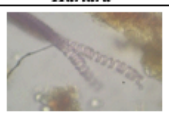
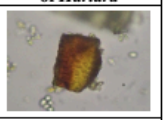

			

Fig 3(e): Scleroids of *Daruharidra*	Fig 3(f): Fibres of *Surasa*	Fig 3(g): Spiral vessels of *Surasa*	Fig 3(h): Brown content of *Yasti Madhu*

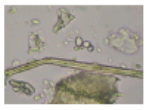
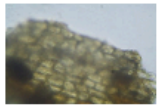
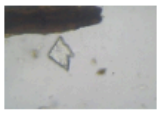
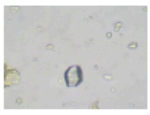

			

Fig 3(i): Fibre and starch grains of *Yasti Madhu*	Fig 3(j): Parenchyma cells of *Jatamansi*	Fig 3(k): Prismatic crystal of *Jatamansi*	Fig 3(l): Calcium oxalate crystal of *Nirgundi*

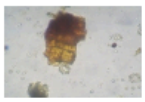
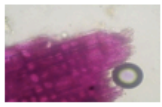
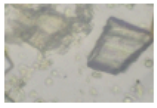

		

Fig 3(m): Tannin containing cells of *Nirgundi*	Fig 3(n): Lignified fibres medullary rays of *Sariva*	Fig 3(o): Prismatic crystal of *Sariva*	Fig 3(p): Annular vessels of *Kustha*

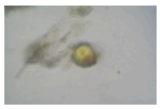
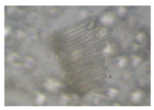
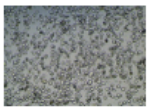

			

Fig 3(q): Oil globule of *Kustha*	Fig 3(r): Fibres of *Shunthi*	Fig 3(s): Scalariform vessels of *Shunthi*	Fig 3(t): Starch grains of *Shunthi*

Figure 5: Photographs of HPTLC study of *Ksharagada*. (a- HPTLC Chromatogram at UV 254nm, b- HPTLC Chromatogram at UV 366nm, c- HPTLC Chromatogram at UV 540nm)

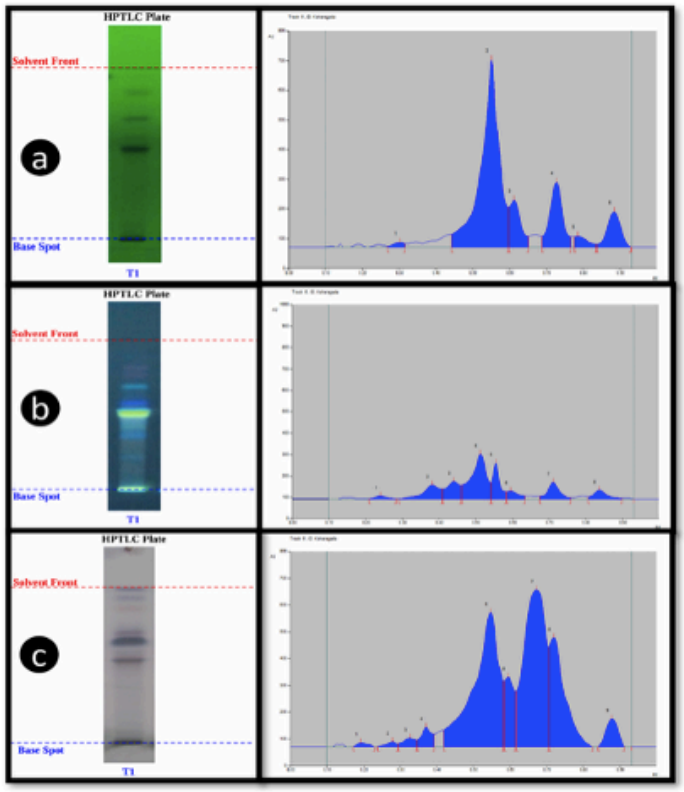


Figure 4: Photographs of TLC study of *Ksharagada*. (a- UV 254 nm, b- UV 366 nm, c- After derivatized with Anisaldehyde Sulphuric acid Spray)

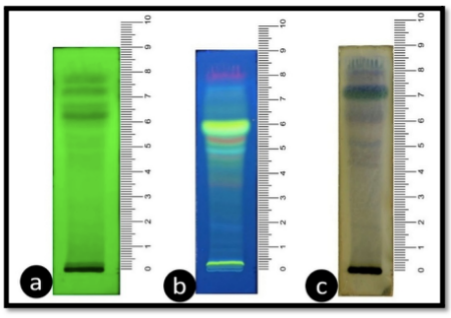


Figure 6: Developed HPTLC plate of three sample of three batches of *Ksharagada* extracts and reference standard-Palasitrin

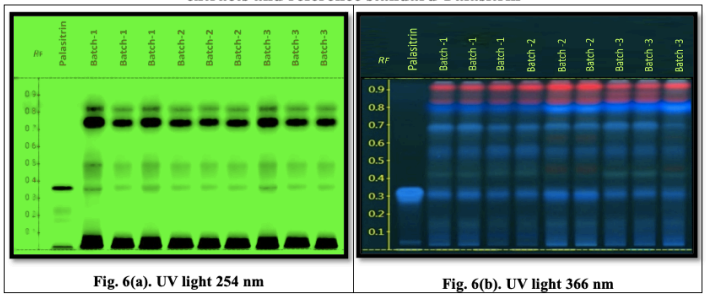


Fig. 6(a). UV light 254 nm

Fig. 6(b). UV light 366 nm

Table 3: Organoleptic characters of *Ksharagada* (3 Batches)

Characters	Batch 1	Batch 2	Batch 3
Sparsha (consistency)	Frictionless	Frictionless	Frictionless
Rupa (colour)	Light Brownish	Light Brownish	Light Brownish
Rasa (taste)	*Lavana* (salty)	*Lavana* (salty)	*Lavana* (salty)
Gandha (odour)	Odourless	Odourless	Odourless

Table 4: Physico-Chemical parameters of *Ksharagada* (3 batches)

No.	Parameters	Batch 1	Batch 2	Batch 3
1	pH Value	6	6	6
2	Loss on drying (%)	4.75%	5.10%	4.77%
3	Total Ash value (%)	15.96%	15.11%	14.99%
4	Water soluble extract (% w/w)	29.9%	28.7%	28.2%
5	Methanol soluble extract (%)	25.5%	26.8%	24.6%
6	Acid insoluble extract (%)	6.030%	5.93%	6.29%

Table 5: TLC Rf values of *Ksharagada*

UV 254 nm		UV 366 nm		After derivatized with Anisaldehyde	
0.10	Grey	0.03	Fluorescent	0.09	Grey
0.16	Grey	0.04	Blue	0.21	Grey
0.21	Grey	0.10	Grey	0.31	Grey
0.52	Grey	0.15	Grey	0.50	Purple
0.61	Grey	0.21	Pale Blue	0.55	Purple
0.64	Grey	0.34	Grey	0.61	Blue
0.70	Grey	0.42	Pink	0.72	Purple
0.74	Black	0.44	Faint Green	0.82	Green
0.78	Grey	0.49	Blue	0.85	Blue
0.85	Black	0.52	Green	0.94	Purple
0.91	Black	0.55	Pink		
		0.58	Sky Blue		
		0.62	Green		
		0.63	Red		
		0.70	Fluorescent		
		0.76	Pale Green		
		0.84	Grey		
		0.88	Blue		

Table 6: Analytical Profile of *Ksharagada*

Parameter	Observation	Inference
Organoleptic Evaluation	*Sparsha*(texture): Frictionless *Roopa*(colour): Light Brownish *Rasa* (taste): *Lavana* (salty) *Gandha*(smell): Odourless	Passed the test
Microscopic Characteristics	Prismatic crystal of *Daru Haridra*, Prismatic crystal of *Sariva*, Tannin containing cells of *Nirgundi*, annular vessels of *Kusta*, Scalariform vessels of *Shunthi* etc.	Passed the test
Physico-chemical Evaluation		
pH	6	Slightly acidic
Loss on drying	4.75%	-
Total Ash	15.96%	-
Water soluble extractive	29.9%	-
Alcohol soluble extractive	25.5%	-
Acid Insoluble extractive	6.030%	-
TLC value	TLC study shows 11 spots under 254 nm, 18 spots under 366 nm and 10 spots after spraying with Anisaldehyde sulphuric acid spray	-
HPTLC Value	HPTLC study shows Prominent peaks (Six at 254 nm, eight at 366 nm and nine at 540 nm)	-

Palasitrin, an active chemical constituent of *Palasha* plant was chosen as reference standard, and its Rf values were measured. Palasitrin was seen as a blue band under 366 nm UV light and grey band under 254 nm UV light with a Rf value of 0.33. A similar blue band and grey band with the same Rf value were seen on plates with extracts of all 3 batches of *Ksharagada,* mention below in (Figure no.6)

Complete analytical profile of *Ksharagada*

The complete analytical profile for one batch of *Ksharagada* is mentioned below in the (Table no. 6).

Discussion

Taruna Palasha plant was burned to ash, the ash was filtered 21 times after adding six times water and soaked overnight. *Ksharodaka* was heated till water content completely evaporated and thus obtained *Palasha Kshara*. (16) Additional ingredients were added to prepare *Ksharagada*. *Visha* and other ailments brought on by *Kledana, Chedana*, and *Bhedana* that must be cured can be treated with *Ksharagada*. Most of the drugs in *Ksharagada* have *Tikta, Katu Rasa, Katu Vipaka, Ushna Virya* and *Vishaghna, Kushthaghna Karmas*. Individually some of the drugs have anti-inflammatory, hepatoprotective and anti-toxic properties hence it is used as anti-poisonous formulation. For years, it has been the preferred medication for neoplastic conditions among many traditional healers. The final product underwent analysis for organoleptic properties, Pharmacognostic characteristic findings, and other quality parameter analysis.

Every medical system clarifies that preserving a drug's quality is crucial for society's good. WHO has also issued guidelines to ensure the quality of medicines along with its efficacy. For the present investigation, *Ksharagada* was prepared according to the procedure outlined in the *Gangadhara* tika of the *Charaka Samhita*. (17) The formulation contained seventeen herbal and one mineral medication that were properly collected and validated. Every drug was mixed together and triturated to make a firm mixture. Pharmacognosy, qualitative and quantitative checks of standardization were assessed for the *Ksharagada* which was in compliance with the Ayurvedic Pharmacopeia of India. According to pharmacognosy analysis, some components contained cork cells, oil globules, lignified fibres, prismatic crystals, crystal fibres, and starch grains-which shows the drug was authentic and genuine.

Several Physico-chemical indicators were employed to validate the pharmaceutical process. The final product's acidic character was demonstrated by the pH. Reduced drying loss suggested a lower likelihood of microbiological contamination. It also shows that the medicine is stable. The ash value, also referred to as the ash content, is the quantity of inorganic residue left over after organic matter has been oxidized or burned. Based on the calculated ash value of 15.96 %, the inorganic compounds in the sample were deemed to be within normal limits. The value of acid insoluble extract is 6.030%. A medicine's water-soluble extractive value measures the number of water-soluble components it contains. Water soluble extract value 29.90 % indicates that it contains a moderate number of water-soluble compounds like sugars, acids, and inorganic salts within its composition. Alcohol soluble extractive value is 25.5 %. Which measures the amount of alcohol present in formulation during pharmaceutical analysis. TLC study of the *Ksharagada* show the one common Rf values 0.21 on different wavelength, which confirms the there was no any other mixture was found or separation occurs of any materials from this formulation.

HPTLC study shows repeated appearance of common Rf values such as **0.55, 0.61, 0.72**, and **0.88** across all wavelengths confirms the presence of consistent bioactive markers in the formulation. These fingerprint data provide a reliable basis for the

identification, standardization, and quality control of *Ksharagada*. Palasitrin, an active chemical constituent of *Palasha* plant was chosen as reference standard, and its Rf value were measured. Dark blue band and grey band of Palasitrin was seen under 366 nm and 254 nm UV light with Rf value of 0.33 respectively. A similar dark blue band in 366 nm and grey band in 254 nm with the same Rf value was seen on plate with extract of *Ksharagada* suggesting Palasitrin presence in all analysed extracts. The separation showed common spot in reference and all samples (*Ksharagada* and standard Palasitrin) shows that both molecules are similar in adsorption behaviour.

This study will not only help in enhancing the quality control of Ayurvedic formulations but also increase their acceptance in modern medical practices by proving their effectiveness with scientific backing and data preservation.

Conclusion

Ksharagada is a Herbo-mineral compound useful in many conditions in the context of the *Visha*. *Ksharagada* ingredients were confirmed by Pharmacognostic study. Physico-chemical analysis helps to create a preliminary standard analytical profile for *Ksharagada* as no standard is available in the Ayurvedic Formulary of India. Hence, the purity and identity of *Ksharagada* formulation is determined by creating data generation in this study.

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