

PHARMACEUTICO-ANALYTICAL AND EXPERIMENTAL STUDY OF USHIRADI CHURNA IN TAMAKA SHWASA W.S.R TO BRONCHIAL ASTHMA

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ABSTRACT

Background: Tamaka Shwasa is a Vata-Kapha predominant disorder characterised by Shwasa Kashtata, Kasa, Ghurghuraka and Pratiloma Vayu. Its clinical manifestations show close resemblance to bronchial asthma, particularly with respect to recurrent breathlessness, cough and airway obstruction. Ushiradi Churna is a classical formulation described in Charaka Samhita, Yogaratnakara, Vangasena and Brihat Nighantu Ratnakara etc. for the management of Tamaka Shwasa. Despite its classical therapeutic indication, systematic Pharmaceutico-analytical and experimental evaluation of the formulation is limited. Therefore, the present study was undertaken to evaluate the Pharmaceutico-analytical characteristics of Ushiradi Churna and its experimental effect in bronchial asthma.

Aims and objective: To prepare Ushiradi Churna according to the classical method and evaluate its analytical characteristics. To assess its experimental evaluation in an ovalbumin-induced model of bronchial asthma.

Materials and Methods: Ushiradi Churna was prepared using fine powders of Ushira, Kaliyaka, Lodhra, Padmaka, Priyangu, Katphala, Shankha Bhasma, Shuddha Gairika and Chandana. The prepared formulation was evaluated for physicochemical and instrumental parameters. Experimental evaluation was conducted in Wistar albino rats using an ovalbumin-induced bronchial asthma model. Animals were divided into 4 groups. Total and differential cell counts; body weight, lung weight, CRP and lung histopathology were assessed.

Results & Conclusion: Ushiradi Churna was obtained as a light-brown powder. It demonstrated characteristic elemental and crystalline features. In the experimental study, Ushiradi Churna reduced the increased total cell count induced by ovalbumin and showed favourable changes in differential cell count and lung histopathology. The findings provide preliminary experimental support for its classical use in Tamaka Shwasa.

KEYWORDS: Ushiradi churna, Tamaka Shwasa, Bronchial Asthma, Wistar albino rats.

INTRODUCTION

Rasashastra and Bhaishajya Kalpana is a specialized branch of Ayurveda encompassing diverse pharmaceutical processes involving herbal, mineral, metallic and animal-derived substances to develop therapeutically potent formulations.

Tamaka Shwasa is a dreadful and persistent disease which hinders the day today activities of the patient. *Vata dosha* is the main culprit in this disease which gets aggravated as a result of obstruction in *Pranavaha srotas* consequently provoking *Kapha dosha* which is seated in *greeva* and *shira pradesha* resulting in *Shwasa*

kruchratha, *Gurguratha* in *kanta pradesha* and *Kasa* as the main symptoms.^[1]

Bronchial asthma is a condition in which a person's airways become inflamed, narrow, swollen and produce extra mucus which makes it difficult to breath.^[2] Globally, asthma affected approximately 260.5 million people and accounted for 37.9 million new cases in 2021, with age-standardized prevalence and incidence rates of 3,340 and 516.7 per 100,000 population, respectively.^[3] Steroid resistance and dependence, along with inhaler abuse, are the challenges in clinical practice. Hence the need for new potent formulation *Ushiradi churna* has raised.

Ushiradi churna is unique formulation mentioned in *Charaka Samhita*^[4], *Yogaratanakara*^[5], *Vangasena*^[6], *Brihat Nighantu ratnakara*^[7] etc. containing *Ushira*, *Kaliyaka*, *Lodhra*, *Padmaka*, *Priyangu*, *Katphala*, *Shankha bhasma*, *Gairika*, *Chandana* which is indicated in *Raktapitta*, *Tamaka shwasa*, *Daha*, *Pipasa*. Most of its ingredients being *tikta*, *katu*, *kashaya rasa pradhana*, *laghu*, *ruksha guna*, *sheeta veerya*, *Raktaprasadana*, *Jwarahara*, *Lekhaniya*, *Kaphapittashamaka* which may be effective in *Tamaka shwasa*. Therefore, the present study aims to explore the rationality behind evaluating the effect of *Ushiradi churna* in *Tamaka shwasa*.

AIMS AND OBJECTIVES

Aim

To evaluate the Pharmaceutico-analytical characteristics and experimental effect of *Ushiradi Churna* in *Tamaka Shwasa* w.s.r to bronchial asthma.

Objectives

- To prepare *Ushiradi Churna* according to the classical method.
- To evaluate the physico-chemical and analytical characteristics of *Shankha Bhasma* and *Ushiradi Churna*.
- To assess the effect of *Ushiradi Churna* in experimental model of ovalbumin-induced bronchial asthma.

METHADODOLOGY

Test drug

Ushiradi churna preparation

Ushiradi churna was prepared as per the classical text reference in the department of Rasashastra and Bhaishajya Kalpana, Taranath Government Ayurvedic Medical College and Hospital, Ballari.

Ingredients are purchased from Bharat traders Mumbai, Anamaya herbals Udupi, Khalvachaya ayurvedic retail shop, Ballari.

Method of preparation

Fine powders of *Ushira*, *Kaliyaka*, *Lodhra*, *Padmaka*, *Priyangu*, *Katphala*, *Shankha Bhasma*, *Shuddha Gairika*, *Chandana* are taken in clean *khalwa yantra* and triturated to obtain homogeneous mixture.

Dose: 1 karsha^[8]

Methodology for Analytical study: Analytical evaluation of the *Ushiradi churna*, was carried out by adopting both classical Ayurvedic and modern analytical parameters to ensure standardization and quality assessment. Classical analysis included organoleptic evaluation and classical tests such as *Rasa*, *Varna*, *Sparsa*, *Gandha*, *Rekhapūrnatwa* and *Varitaratwa*.

Physico-chemical parameters including pH, total ash, acid-insoluble ash, water-soluble ash, and loss on drying,

microbial count test were assessed to determine purity, stability, and inorganic content. Modern instrumental analyses such as X-ray diffraction (XRD), scanning electron microscopy with energy dispersive spectroscopy (SEM-EDS), and Fourier transform infrared spectroscopy (FTIR), were performed to evaluate crystallographic nature, elemental composition, and chemical bonding. Particle size and distribution were analysed using Zeta PALS to assess the impact of pharmaceutical processing on drug fineness and potential bioavailability.

Methodology for experimental study: The study was conducted at the SDM Centre for Research in Ayurveda and Allied Sciences, Udupi. Animals were acclimatized and maintained under standard laboratory conditions (24 ± 2 °C, 70% RH, 12 h light/dark cycle) in the animal house, Department of Pharmacology. The experiment was carried out in accordance with CPCSEA guidelines after approval from the Institutional Animal Ethics Committee (IAEC Approval No: SDMCRA/IAEC/TGA-B-04).

24 healthy Wistar albino rats were selected and grouped into 4 groups. Selected animal was grouped by randomisation method. 6 animals in each group. The individual rat was weighed and rats with weight around 250-300 only taken for study and marked with picric acid for identification.

Experimental induction of Bronchial asthma

Bronchial asthma was induced to rats with ovalbumin through nebuliser chamber from 7th day to 10th day daily for 4 days. Dose was calculated according to individual rat weight. Test and standard drug were given orally by diluting it with water.

Dose Calculation

Rat dose will be calculated on the basis of human dose by using standard Conversion method on the basis of body surface area ratio. The human dose of *Ushiradi churna*– 12gm/ day Rat dose (mg/kg bw) = Human dose (mg/kg bw) x Km ratio = 1240 mg.

Statistical analysis

The data obtained was analysed by using analysis of variance (ANOVA) followed by Dunnett's 't' test for determining the level of significance of the observed effects. A 'P' value of less than 0.05 was considered statistically significant.

Treatment protocol

Group	Group name	Treatment	Dose	Frequency	Duration
i.	Normal control	Vehicle	-	Daily	10 days
ii.	Positive control	Ovalbumin	100µg/kg BW	7 th -10 th day	10 days
iii.	Induced Bronchial asthma	Ovalbumin	100µg/kg BW	7 th -10 th day	
	– Standard drug: Salbutamol	Salbutamol	100µg/kg BW	Daily	10 days
iv.	Induced Bronchial asthma	Ovalbumin	100µg/kg BW	7 th -10 th day	
	– Test drug: <i>Ushiradi churna</i>	<i>Ushiradi churna</i>	1240mg/kgbw	Daily	10 days

Group 1 Vehicle treated: animals received tap water.

Group 2 Positive control: animals received Ovalbumin (100µg/kgbw), for 4 days.

Group 3 Standard drug: Animals received Salbutamol (100µg/kgbw), in addition to Ovalbumin.

Group 4 Test drug: Animals received *Ushiradi churna* (1240mg/kgbw), in addition to Ovalbumin.

In this model, positive control was administered ovalbumin at a dose of 100 µg/kgbw through a nebulizer chamber from the 7th to 10th day to induce bronchial asthma. Standard drug, Salbutamol was administered at a dose 100 µg/kgbw orally for 10 days, while ovalbumin was administered from the 7th to 10th day. Test drug, *Ushiradi Churna* was administered at a dose 1240mg/kgbw orally for 10 days, while Ovalbumin was administered from the 7th to 10th day after 1 hour of test drug administration.

All the animals were sacrificed by cervical dislocation after ether anaesthesia. Blood was withdrawn to check

biochemical parameters. The lungs were dissected out and cleaned to remove extraneous tissues, and blotted to remove blood stains. The lungs were preserved in 10% formalin for histopathological processing.

Serum was separated and serum level of biochemical parameters namely CRP, Total cel count, Differential cell count was estimated as per standard procedure prescribed by manufacturer.

RESULTS**Pharmaceutical Study Results**

Shankha Shodhana yielded 594 g (99%) from 600 g, while Gairika Shodhana yielded 52 g from 50 g, showing a gain of 2 g. Shankha Marana after three Gajaputas yielded 544 g (91.75%) of Shankha Bhasma from 594 g of Shuddha Shankha. Churnikarana of the herbal ingredients showed yields ranging from 59–84%. For the final preparation, 30 g each of the nine ingredients (total 270 g) were taken and subjected to Mardana, yielding 262 g of *Ushiradi Churna* with a loss of 8 g (97% yield).

Analytical Study Results**Physical tests****1. Organoleptic characters**

Table No. 1: Showing organoleptic characters of Shankha Bhasma and *Ushiradi churna*.

Physical test	<i>Ushiradi churna</i>
Colour	Light brown
Odour	Characteristic
Taste	Astringent
Touch	Fine

Table No. 2: Showing results of pH, Ash value, Acid insoluble ash, Water soluble ash and loss on drying at 110°C.

	<i>Ushiradi churna</i>
pH Value	7.8
Ash Value	82%
Acid Insoluble Ash	28%
Water Soluble Ash	79.5%
Loss on drying at 110°C	8.94%

2. Microbial limit test**A) Total fungal count**

Table No. 3: Showing results of Total fungal count.

Sl.no	Samples	Dilutions	Colony forming Units/ml
01	<i>Ushiradi churna</i>	Direct	6CFU

Fungal count is within permissible limit.

B) Total bacterial count

Table No. 4: Showing results of Total bacterial count.

Sl.no	Samples	Dilutions	Colony Forming Units/ml
01	Ushiradi churana	Direct	5CFU

Bacterial count is within permissible limit.

CHEMICAL TESTS

1. X-RAY Diffraction study

Table No. 5: Showing XRD report of *Ushiradi churana*.

2-theta(deg)	d(ang.)	Height(cps)
12.1	7.31	110
18.7	4.74	160
20.9	4.25	290
22.4	3.96	180
24.8	3.58	390
26.3	3.38	150
27.4	3.25	1600
28.6	3.12	620
30.2	2.96	1320
36.7	2.45	170
39.5	2.28	420
43.1	2.10	250
48.4	1.88	310
50.1	1.82	360
52.0	1.76	150
57.3	1.61	210
60.0	1.54	180
68.4	1.37	95
81.7	1.18	70

2. SCANNING ELECTRON MICROSCOPY (EDS) STUDY

Table No. 6: Showing SEM EDS Result of *Ushiradi churana*.

Sample	<i>Ushiradi churana</i>	
Percentage	At %	Wt %
Carbon	60.98	52.82
Oxygen	37.60	43.38
Silicon	0.31	0.63
Potassium	0.20	0.57
Calcium	0.90	2.60

3. PARTICLE SIZE ANALYSIS

Table No. 7: Showing results of Particle size analysis of *Ushiradi churana*.

Sample	Mean diameter(nm)
<i>Ushiradi churana</i>	9989.7

4. FTIR ANALYSIS

Table No. 8: Showing FTIR results of *Ushiradi churana*.

Sample peaks Cm^{-1}	Bond	Functional groups
3329.65	O-H stretching (broad)	Alcohol
2921.48	C-H stretching	Alkanes
2050.23	$\text{C}\equiv\text{C}$	Alkyne
1607.0	$\text{C}=\text{C}$ stretching	Aromatic ring
1420.03	C-H bending	Alkanes
1319.83	C-N stretching	Aromatic amines
1236.23	C-O stretching	Phenols, ethers and secondary alcohols
1027.72	C-O-C stretching	Polysaccharides
873.09	=C-H Bending	Aromatic compounds

Experimental study results

NCG: Normal control group

PCG: positive control group

SDG: standard drug group

TDG: Test drug group

Table No. 9: Showing results of Test group on CRP.

Group	CRP	% change
NCG	0.3617 ± 0.05275	-
PCG	0.4233 ± 0.02171	17.0306 ↑@
SDG	0.5800 ± 0.08134	37.0186 ↑#
TDG	0.5940 ± 0.07047	40.3260 ↑#

Table No. 10: Showing results of Test group on Total cell count.

Group	Total cell count	% change
NCG	18517 ± 1916	-
PCG	20922 ± 1723	12.9880 ↑@
SDG	24353 ± 2062	16.3990 ↑#
TDG	15575 ± 3029	25.5568 ↓#

Table No. 11: Showing results of Test group on Neutrophil.

Group	Neutrophil count	% change
NCG	20.50 ± 3.003	-
PCG	19.67 ± 1.874	4.0487 ↓@
SDG	20.75 ± 4.029	5.4905 ↑#
TDG	16.67 ± 1.978	15.2516 ↓#

Table No. 12: Showing results of Test group on Lymphocytes.

Group	Lymphocytes count	% change
NCG	75.27 ± 3.358	-
PCG	68.17 ± 2.762	9.4327 ↓@
SDG	71.25 ± 3.400	4.5181 ↑#
TDG	75.17 ± 2.358	10.2684 ↑#

Table No. 13: Showing results of Test group on Monocytes.

Group	Monocyte count	% change
NCG	3.783 ± 0.6134	-
PCG	6.833 ± 0.6009**	80.6238 ↑@
SDG	4.250 ± 0.8539 *	37.80 ↓#
TDG	5.500 ± 0.5627	19.5082 ↓#

Table No. 14: Showing results of Test group on Eosinophil.

Group	Eosinophil count	% change
NCG	0.2000 ± 0.05774	-
PCG	5.167 ± 1.014**	2483.5 ↑@
SDG	3.500 ± 0.2887	32.2624 ↓#
TDG	2.667 ± 0.7601*	48.3839 ↓#

Table No. 15: Showing results of Test group on Basophil.

Group	Basophil count	% change
NCG	0.2500 ± 0.03416	-
PCG	0.1667 ± 0.1667	33.32 ↓@
SDG	0.2500 ± 0.2500	49.9700 ↑#
TDG	0.000 ± 0.000	100.0 ↓#

Table no. 16: Showing results of Test group on Lungs Weight.

Group	Lungs weight	% change
NCG	2.405 ± 0.1299	-
PCG	2.275 ± 0.1184	5.4054↓@
SDG	2.000 ± 0.1790	12.0879↓#
TDG	2.530 ± 0.05774	11.2087↑#

Histopathological Changes

Table No. 17: Showing results of Histopathology.

Slide No.	Necrosis	Inflammatory infiltrate	Congestion	Degeneration
NCG - 1	-	-	-	-
NCG - 2	-	-	-	-
PCG - 1	-	+	-	-
PCG - 2	-	+++	+++	-
SDG - 1	-	++	-	-
SDG - 2	-	++	++	-
TDG - 1	-	+	-	-
TDG - 2	-	+	-	-

-Nil, +Mild, ++Moderate, +++Severe

NCG showed normal alveolar architecture without inflammatory or degenerative changes. PCG demonstrated interstitial septal expansion with predominantly mononuclear inflammatory infiltration, along with congestion and alveolar haemorrhage. SDG showed septal expansion and inflammatory infiltration, with congestion and haemorrhage in one section. In contrast, TDG showed only mild mononuclear inflammatory infiltration and increased alveolar macrophages, without oedema, necrosis, alveolar damage or fibrosis. Compared with PCG, TDG demonstrated reduced septal expansion and inflammatory infiltration, with absence of congestion and alveolar haemorrhage, indicating comparatively less pulmonary inflammatory change.

DISCUSSION

Pharmaceutical Study

Ushiradi Churna is a herbo-mineral *Khalvi Rasayana*. There are eight references of *Ushiradi Churna* available, and in the present study, the reference from *Charaka Samhita* was followed. The formulation was prepared by triturating equal quantities of fine powders of *Ushira*, *Kaliyaka*, *Lodhra*, *Padmaka*, *Priyangu*, *Katphala*, *Shankha Bhasma*, *Gairika*, and *Chandana*.

Shankha Shodhana was performed by Swedana in Dolayantra with Nimbu Swarasa for 1½ hours, resulting in improved colour and lustre, indicating removal of impurities. Shankha Marana required three Gajaputas to attain Bhasma Siddhi Lakshanas, with Kumari Swarasa Bhavana between successive Putas facilitating particle disintegration and fineness. Gairika Shodhana by Bharjana with Ghrita for 2 hours 20 minutes produced characteristic colour and texture changes, indicating proper processing. Herbal ingredients were subjected to Churnikarana to reduce particle size. *Ushiradi Churna* was prepared by triturating equal proportions of nine ingredients in *Khalva Yantra*, ensuring uniform mixing,

homogeneity and proper incorporation of mineral components.

Analytical study

Ushiradi Churna was light brown in colour, possessed a characteristic odour, astringent taste and fine texture. These characteristics correspond to the combined sensory properties of its herbal ingredients and indicate the identity and acceptable quality of the formulation. The pH of *Ushiradi Churna* was 7.9, indicating a mildly alkaline nature. This may be attributed to the mineral constituents and phytochemicals present in the formulation and contributes to its physicochemical stability. The total ash value was 82%, which can be attributed mainly to the presence of *Shankha Bhasma* along with the naturally occurring mineral constituents of the herbal drugs. The high ash value therefore reflects the combined inorganic content of the herbo-mineral formulation. The acid-insoluble ash was 28%, indicating the presence of siliceous and earthy matter contributed mainly by the herbal ingredients. This value may reflect the inherent mineral content and phytoliths of the crude drugs. The water-soluble ash was 79.5%, indicating that a major proportion of the ash consisted of water-soluble inorganic constituents, reflecting the physicochemical characteristics of the formulation. Loss on drying at 110°C was 8.94%, indicating the moisture content of the formulation was within acceptable limits, thereby supporting its stability and reducing the possibility of microbial proliferation during storage. The formulation showed 5 CFU/g bacterial count and 6 CFU/g fungal count, indicating microbial load within permissible limits and satisfactory microbiological quality of the prepared formulation.

XRD analysis showed distinct diffraction peaks, particularly in the 26°–30° (2θ) region, indicating crystalline mineral phases contributed by the mineral components. Broad features may be attributed to

amorphous organic constituents of the herbal ingredients. The pattern supports the presence of both crystalline and amorphous phases in the herbo-mineral formulation. SEM-EDS showed carbon (52.82 wt.%) and oxygen (43.38 wt.%) as the predominant elements, reflecting the organic nature of the herbal constituents. Calcium indicates the presence of the mineral component, while trace elements such as silicon and potassium may arise from naturally occurring plant minerals. The elemental profile supports the herbo-mineral nature of Ushiradi Churna. The particle size of Ushiradi Churna was 9989.74 nm. The relatively larger particle size may be attributed to the lignocellulosic nature of Ushira roots, which can resist fine pulverization and form aggregates. Nevertheless, the particle size provides adequate surface area for dispersion and drug release. FTIR analysis demonstrated functional groups corresponding to hydroxyl, aromatic, alkane, ether and glycosidic groups. The broad peak at 3329 cm^{-1} indicated hydroxyl-containing compounds such as polyphenols and tannins, while peaks at 1236 and 1027 cm^{-1} suggested carbohydrate and glycosidic constituents. These findings support the presence of diverse phytoconstituents in Ushiradi Churna.

Experimental study

- The experimental results showed that both the Standard drug (Salbutamol) and *Ushiradi Churna* attenuated ovalbumin-induced asthmatic changes compared to the positive control group. The standard drug produced a significant reduction in monocyte count, whereas *Ushiradi Churna* demonstrated a significant decrease in eosinophil count and favourable modulation of total cell count and

differential leukocyte parameters. Although most changes were statistically non-significant, the overall haematological findings suggest that *Ushiradi Churna* exhibited comparatively better anti-asthmatic activity than the standard drug in this experimental model.

- Histopathological examination of lung tissues supported the anti-asthmatic activity of Ushiradi Churna. The test group showed minimal inflammatory changes with reduced inflammatory cell infiltration and absence of congestion and alveolar haemorrhage. These findings indicate protection against bronchial and pulmonary tissue damage and suggest effective attenuation of airway inflammation in bronchial asthma.

CONCLUSION

Ushiradi Churna, a herbo-mineral Khalvi Rasayana described in Charaka Samhita, was successfully prepared using classical pharmaceutical procedures, yielding 262 g of the formulation. The analytical findings demonstrated satisfactory organoleptic characteristics, physicochemical properties, microbial quality and the presence of both organic and mineral constituents. FTIR, XRD and SEM-EDS findings further supported its herbo-mineral nature. In the experimental study, Ushiradi Churna attenuated ovalbumin-induced asthmatic changes, with significant reduction in eosinophil count and favourable modulation of haematological parameters. Histopathology demonstrated reduced inflammatory infiltration and pulmonary tissue damage, supporting its potential anti-asthmatic activity.

Ayurvedic Medical College, Hospital, PG Research Centre
RON - 582 209,
 (AYUSH approved ASU) drug testing laboratory Lic. No. TL-13/2023)

Dist: Gadag

State: Karnataka.

DRUG TESTING LAB

Outward number: RGESDTL/18/25/02/13

Ref No.

DTLRC/25/181

Registration date:

10/11/2025

Report date:

29/11/25

Submitted by:

Dr. Vanshraj

Registration no:

NA

Sample Qty:

50GM

Sample name:

Ushweradi churna

Batch no:

NA

Date of expiry:

NA

Reference:

Compound drug

Mfg Date:

NA

Pack/Room:

Powder

TEST REPORT

Form - 50 (see rule-360-D (F))

(As per Drug and Cosmetic act 1940 and the rules there under)

Sl. No	TEST	RESULTS
A. Organoleptic study		
1.	Description	Form: Fine powder Colour : Light brown Taste: Astringent Odour : Characteristic
B. Physico-chemical study		
2.	Ash value	8.2%
3.	Acid insoluble ash	28%
4.	Water soluble ash	79.5%
5.	pH	7.8
6.	Loss on drying	8.94%
7.	Particle size	250-838µm
8.	Specific gravity	0.858
C. Microbiology		
9.	Total bacterial count	10CFU/ML (Limit <10 CFU/ML)
10.	Total fungal count	8CFU/ML (Limit <10 CFU/ML)

End of Report

(Standards referred above are as per API and PSFA)

In my opinion the sample is standard quality.

ANALYST

Lab in-charge (Authorized signature)
IN-CHARGE
DR. RAMESH K. SHIN

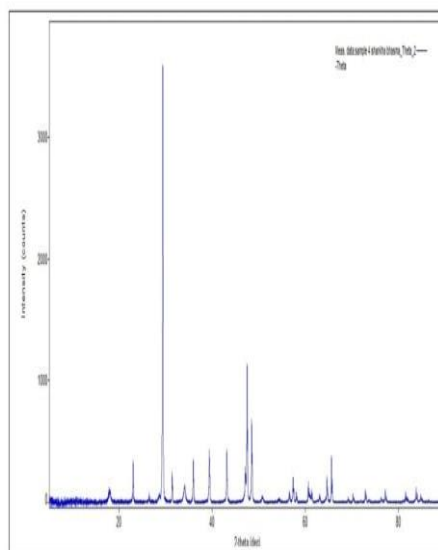


Fig.no.3: XRD graph of Ushiradi Churna

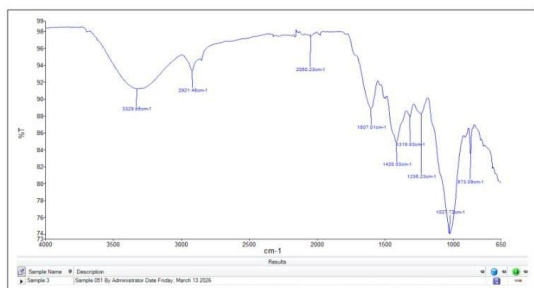


Fig No.5: FTIR Graph of Ushiradi Churna

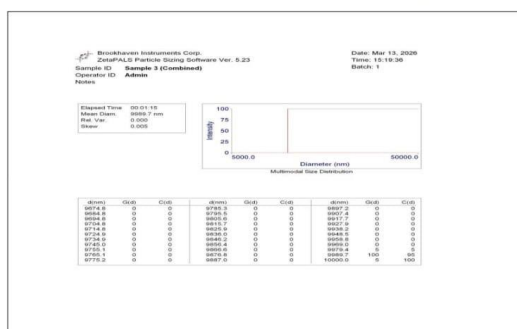


Fig. No.8: ZETA PALS Report Of Ushiradi Churna

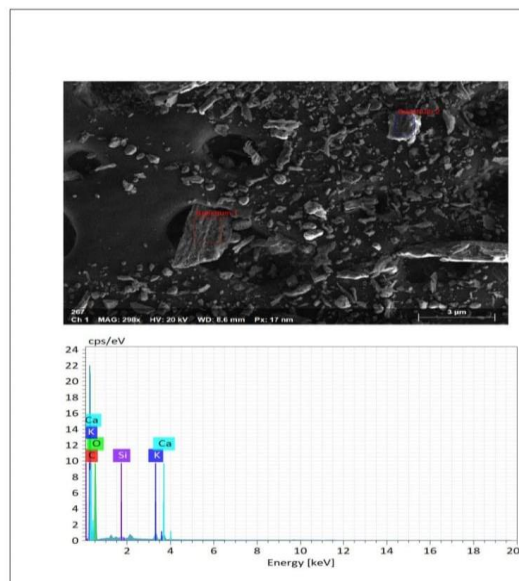


Fig.6: SEM EDS reports of Ushiradi churna

PHARMACEUTICAL STUDY

SHANKHA SHODHANA

Fig: 10



Ashodhita Shankha

Fig: 11



Nimbu Swarasa

Fig: 12



Shodhana of Shankha

SHANKHA MARANA

Fig: 13



Shankha After Shodhana

Fig: 14

1st Gajaputa

Fig: 15

After 1st Gajaputa

Fig: 16



After Pounding

Fig: 17



Kumari Swarasa

Fig: 18



Bhavana with swarasa

Fig:19



Shankha Chakrikas

Fig:20

After 2nd Gajaputa

Fig:21

After 3rd Gajaputa

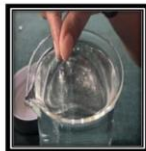
BHASKA PAREEKSHA

Fig:22



Shankha Bhaskra

Fig:23



Varitaratva

Fig:24



Rekhapurnatva

GAIRIKA SHODHANA

Fig:25

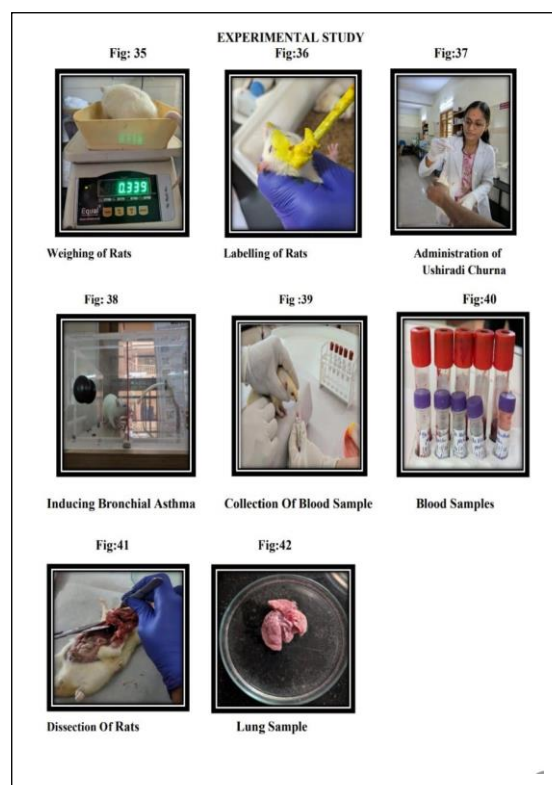
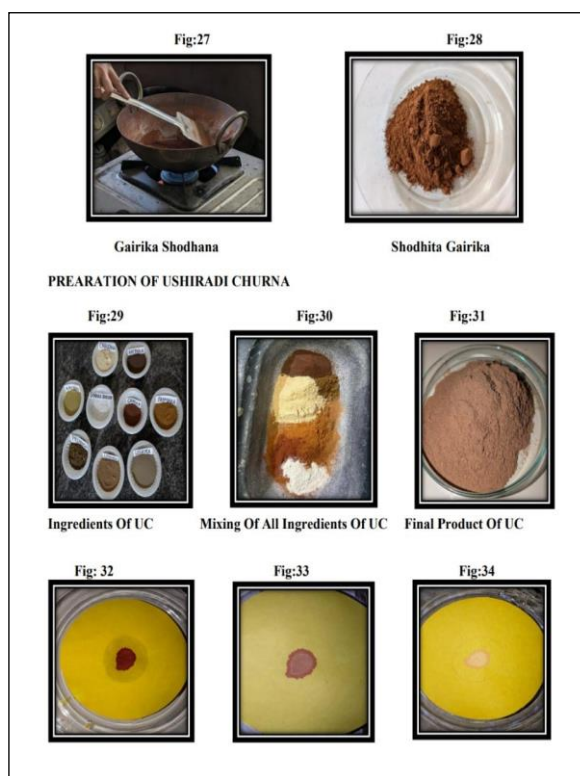


Ashodhita gairika

Fig:26

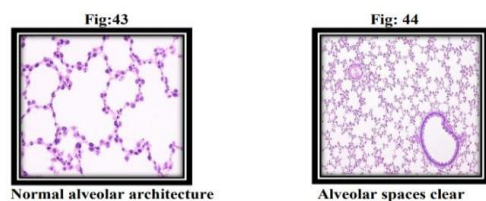


Goghrita

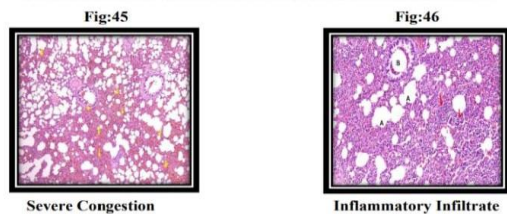


HISTOPATHOLOGY RESULTS OF LUNGS

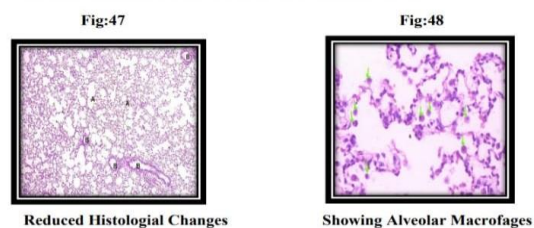
HISTOPATHOLOGICAL CHANGES IN NORMAL CONTROL GROUP



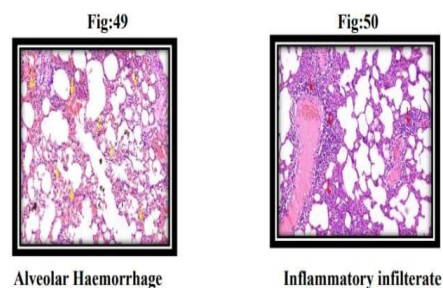
HISTOLOGICAL CHANGES IN POSITIVE CONTROL GROUP



HISTOLOGICAL CHANGES IN TEST DRUG GROUP



HISTOLOGICAL CHANGES IN STANDARD DRUG GROUP



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