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PHARMACEUTICO-ANALYTICAL AND EXPERIMENTAL STUDY TO EVALUATE HEPATOPROTECTIVE ACTIVITY OF GUDUCHYADI CHURNA

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ABSTRACT

Yakrit is the mulastana of raktavahasrotas, and Ranjaka pitta[1] which transform rasa dhatu into rakta dhatu.Yakrit vikaras are described in Ayurvedic texts and are correlated with liver diseases.Hepatic disorders are a major health concern worldwide, with drug-induced hepatotoxicity being a common cause of hepatic injury. Guduchyadi Churna[2], a classical herbomineral formulation described in Bhaishajya Ratnavali& indicated in Yakrit Rogas.The present study was undertaken to prepare Guduchyadi Churna according to classical guidelines, evaluate its pharmaceutical and physicochemical characteristics, and assess its hepatoprotective activity in a paracetamol-induced hepatotoxicity model. The formulation was prepared using authenticated raw drugs following Standard Operating Procedures. Analytical evaluation included organoleptic assessment, physicochemical parameters, microbial limit tests, heavy metal analysis, XRD, SEM–EDS, particle size analysis, FTIR, and NPST. The prepared formulation exhibited acceptable quality with pH 7.1, total ash 26.5%, acid-insoluble ash 15.5%, water-soluble ash 81.5%, and loss on drying 9.89%. Microbial counts and heavy metal levels were within permissible limits. Experimental evaluation demonstrated improvement in body weight, significant reduction in serum SGPT, total bilirubin, and direct bilirubin levels, maintenance of total protein and albumin, and improvement in liver histopathology with minimal cellular alterations and absence of inflammation or fibrosis. The analytical findings confirmed the quality and safety of the formulation, while biochemical and histopathological observations established its hepatoprotective potential. The study concludes that Guduchyadi Churna is a standardized, safe, and effective Ayurvedic formulation with promising hepatoprotective activity.

KEYWORDS: *Guduchyadi Churna, Hepatoprotective, Hepatotoxicity, Yakrit Rogas, Kasisa bhasma, Yavakshara.*

I. INTRODUCTION

Rasashastra is a specialized branch of Ayurveda deals with the processing, purification, standardization, and therapeutic application of metals, minerals, and herbo-mineral formulations. Through pharmaceutical procedures such as Shodhana,Marana , Bhavana and Mardana, of raw materials are transformed into safe, stable, and therapeutically potent medicines with enhanced bioavailability and reduced toxicity.Among the classical dosage forms Churna Kalpana[3] is a simple yet effective formulation that facilitates better absorption and uniform distribution of active constituents.Guduchyadi Churna is a classical herbomineral formulation described in Bhaishajya Ratnavali. It contains Guduchi, Ativisha, Shunti, Bhunimba, Yavatikta, Musta, Pippali, Yavakshara, Kasisa Bhasma, and Champaka . And this formulation is indicated in Yakrit Rogas.

II. AIMS AND OBJECTIVES

A. **Aim** : Pharmaceutico-Analytical and experimental study to evaluate Hepatoprotective activity of Guduchyadi churna .

B. **Objective**

- To prepare Guduchyadi Churna as per the classical reference .
- To carry out the physicochemical analysis of Guduchyadi Churna.
- To carry out experimental study to evaluate Hepatoprotective activity of Guduchyadi churna

C. Formulation review

Guduchyadi Churna is an unique formulation mentioned in Bhaishajya Ratnavali under the context of Pleeha Yakrit Roga Chikitsa Prakarana with indication in Yakrit vikaras.

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Guduchyadi churna

गुडूच्यतिविषा शुण्ठी भूनिम्बयवतिक्तकम् । मुस्ता कणा यवक्षारः कासीसं भ्रमरातिथिः । ।12।।

एतेषां समभागेन चूर्णमेव विनिक्षिपेत् । यकृत्प्लीहपाण्डुरोगमग्निमान्धमरोचकम् ।।13 ||

ज्वरमष्टविधं हन्ति साध्यासाध्यमथापि वा। नानादोषोद्भवञ्चैव वारिदोषभवं तथा।।

विरुद्धभेषजभवं ज्वरमाशु व्यापोहति ।।14।।

(Bhaishajya Ratnavali, Yakrit Pleeha roga chikitsa prakarana, 12-14)

Sl.no	Ingredients	Botanical name/ Chemical name	Part used	Quantity
1.	Guduchi	*Tinospora cordifolia*	Stem	1 part
2.	Ativisha	*Aconitum heterophyllum*	Root	1 part
3.	Shunti	*Zingiber officinale*	Rhizome	1 part
4.	Bhunimba	*Swertia chirata*	Panchanga	1 part
5	Yavatiktaka	*Andrographis paniculata*	Panchanga	1 part
6	Musta	*Cyperus rotundus*	Tuber	1 part
7	Pippali	*Piper longum*	Fruit	1 part
8	Yavakshara	Potassium Carbonate [K_2CO_3]	Panchanga	1 part
9	Kasisa bhasma	Green vitriol [FeSO4]	Bhasma	1 part
10	Champaka	*Michelia champaca*	Root	1 part

III. METHODOLOGY

- Raw drugs which were having similar Grahya lakshanas as mentioned in the Rasa classical texts, were collected from the market.
- Yavakshara was prepared.[4]
- Kasisa shodhana[5] and marana[6] procedure was carried till it attains bhasma siddhi lakshana.
- Prepare the fine powders of all the ingredients separately.
- All the finely powdered ingredients are mixed together thoroughly by triturating in khalva yantra till it attains homogeneous mixture
- **Dose** – 1 karsha[7]
- **Anupana** – Ushna jala, Madhu
- **Indications** – Yakṛidroga, Pleeha roga, Pandu roga, Agnimadndya, Arocaka, Eight types of Jwara, Sadhya Jwara, Asadhya Jwara, Nanadoshodbhava Jwara, Varidoshaja Jwara and Viruddha bhesaja bhava Jwara .

Experimental study design

Group	Group name	Treatment	Dose	Frequency	Duration
	Normal control	Vehicle	3ml/kg BW	Daily	10 days
	Positive control	Paracetamol (PCM)	3g/kg BW	6^{th}&8^{th} Day	10 days
	Induced hepatotoxicityTest drug: *GC* with *ushna jala* as *anupana*	PCM	3g/kg BW	6^{th} &8^{th} Day	10 days
		Guduchyadi Churna with *ushna jala* as *anupana*	2.6g/kg BW	Daily	10 days
	Induced hepatotoxicityParacetamol + Standard drug: Silymarin	PCM	3g/kg BW	6^{th} &8^{th} Day	10 days
		Silymarin	50mg/kg BW	Daily once	10 days

Group 1: Normal control: animals received tap water.
Group 2: Positive control: animals received Paracetamol (3g/kgbw.p.o.), and distilled water.
Group 3: Test drug treated: animals received *Guduchyadi churna*(1240 mg/Kgbw,p.o.) in addition to Paracetamol.
Group 4: Standard drug treated: animals received Silymarin (50mg/kgbw,p.o.), in addition to Paracetamol.

The Test drug *Guduchyadi churna* and Standard drug Silymarine were administered orally for 10 consecutive days and two dose of the toxicant (Paracetamol) were administered orally to each group, except the normal control group, on 6th and 8th day 1hour after test drug administration. After 48 hours of toxicant Paracetamol, the blood was collected in the tubes and sent for biochemistry laboratory for biochemical investigations. All the animals were sacrificed by cervical dislocation. Important organs like liver is dissected out, cleaned to remove extraneous

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tissues, blotted to remove blood stain and weighed. A piece of liver tissue was preserved in 10% formalin for histopathological processing.

Serum was separated and serum level of biochemical parameters namely SGOT, SGPT. TB, DB etc. were estimated as per standard procedures.

IV. RESULTS

1. Pharmaceutical results

Showing results of Yavakshara

Materials	Results
Dried yava panchanga	21 kg
Ash of Yava panchanga	3.2 kg(8ser)
Ksharodaka before filtration	48 ltrs
Ksharodaka after filtration	45 ltrs
pH of Ksharodaka	10
Yavakshara	115gms

Showing results of Kasisa *Shodhana*

No. of Bhavana	Quantity of Kasisa taken in gms	Quantity of Kasisa obtained in gms	Gain in gms	Yield %
1	650	654	4	100.6%
2	654	660	6	100.9%
3	660	664	4	100.6%

Showing results of *Ativisha Shodhana*

Quantity of Ashodhita Ativisha taken	Quantity of Shodhita Ativisha obtained	Loss	Yield %
100gms	80gms	20gms	80%

Showing results of Kasisa *Marana*

No. of Puta	Quantity of Kasisa Bhasma before marana in gms	Quantity of Kasisa Bhasma obtained after marana in gms	Loss in gms	Yield %
1	664	206	458	31.02%
2	206	152	54	73.79%
3	152	117	35	76.97%

Showing results of *churnikarana* of herbal drugs used in the preparation of *Guduchyadi churna*

SL. NO	Drugs	Quantity of drugs before churneekarana In gms	Quantity of drugs after churneekarana In gms	Loss in gms	Yield %
1	*Guduchi*	100	80	20	80%
2	*Shodhita Ativisha*	80	65	15	81.25%
3	*Shunti*	100	60	40	60%
4	*Bhunimba*	100	70	30	70%
5	*Yavatikta*	100	80	20	80%
6	*Musta*	100	76	24	76%
7	*Pippali*	100	90	10	90%
8	*Champaka*	100	60	40	60%

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Showing results of preparation of Guduchyadi churna

Quantity of churnas before mardana in gms	Quantity of Guduchyadi Churna after mardana in gms	Loss in gms	Yield %
500	490	10	98%

2. Analytical results

Showing organoleptic characters of Kasisa Bhasma and Guduchyadi Churna

Physical test	Kasisa Bhasma	Guduchyadi Churna
Colour	Brown	Brown
Odour	Characteristic odour	Characteristic aromatic odour
Taste	Astringent	Astringent
Touch	Fine	Fine

DETERMINATION OF pH, ASH VALUE, ACID INSOLUBLE ASH, WATER SOLUBLE ASH, LOSS ON DRYING AT 105^{0}C, SPECIFIC GRAVITY.

	Kasisa Bhasma	Guduchyadi Churna
pH Value	6.8	7.1
Ash Value	98.5%	26.5%
Acid Insoluble Ash	92.5%	15.5%
Water Soluble Ash	6%	81.5%
Loss on drying at 105^{0}C	0.48%	9.89%

Showing results of Total fungal count

Sl.no	Samples	Dilutions	Colony forming Units/ml
01	Guduchyadi Churna	Direct	10 CFU

Fungal count is within permissible limit.

Showing results of Total bacterial count

Sl.no	Samples	Dilutions	Colony Forming Units/ml
01	Guduchyadi Churna	Direct	4CFU

Bacterial count is within permissible limit.

Showing results of heavy metal test of Guduchyadi churna

Si. No	Test	Results
1	Limit test for Mercury	Nil
2	Limit test for Lead	Nil
3	Limit test for Cadmium	Nil
4	Limit test for Arsenic	Nil

Showing XRD report of Kasisa Bhasma

2-Theta(deg)	D(ang)	Intensity
25.7	3.4636	17180
28.6	3.1186	17350
31.1	2.8734	17140
33	2.7122	17520
39.7	2.2685	17240
48.8	1.8647	17160
52	1.7572	17290
56.7	1.6222	17330
66.6	1.403	17150
77.6	1.2293	17080

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Showing results of XRD report of Guduchyadi churna

2-theta(deg)	d(ang.)	Height(cps)
5.00	5.57	8501
5.18	3.34	743
6.15	2.82	828
6.67	2.09	588
6.85	1.82	342
6.93	1.68	263
7.27	1.48	250
7.93	1.38	205
8.50	1.26	188
9.33	1.17	165

Showing SEM EDS result of Kasisa Bhasma and Guduchyadi churna

Sample	KASISA BHASMA		GUDUCHYADI CHURNA	
Percentage	At %	Wt %	At %	Wt %
Carbon	14.29	2.97	41.21	17.87
Oxygen	52.08	14.43	49.00	28.30
Potassium	0.61	0.41	1.55	2.18
Calcium	0.40	0.28	0.25	0.37
Manganese	0.70	0.67	--	--
Iron	31.91	30.85	7.58	15.27
Chlorine	--	--	0.41	0.53

Showing results of Parcticle size analysis of Kasisa Bhasma and Guduchyadi Churna

Sample	Mean diameter(nm)
Kasisa Bhasma	3563.4
Guduchyadi Churna	1077.3

Showing results of FTIR of Kasisa Bhasma

Sample peaks Cm^{-1}	Bond	Functional groups
3888.46 cm^{-}	O–H stretching (free OH)	Alcohol / Phenol
3853.77 cm^{-1}	O–H stretching	Alcohol / Phenol
3743.69 cm^{-1}	O–H stretching	Hydroxyl group
3713.08 cm^{-1}	O–H stretching	Alcohol
3696.06 cm^{-1}	O–H stretching	Free hydroxyl group
3633.78 cm^{-1}	O–H stretching (H-bonded)	Alcohol / Water molecules
3480.87 cm^{-1}	O–H / N–H stretching	Alcohol / Amine
2343.05 cm^{-1}	O=C=O asymmetric stretching Carbon dioxide (CO_2 adsorption)	Carbon dioxide (CO_2 adsorption)
2050.40 cm^{-1}	C≡C / C≡N stretching	Alkyne / Nitrile
1141.30 cm^{-1}	C–O stretching	Alcohol / Ether / Ester
691.75 cm^{-1}	C–H bending (out-of-plane)	Aromatic compound

Showing results of FTIR of Guduchyadi churna

Sample peaks Cm^{-1}	Bond	Functional groups
3277.00 cm^{-1}	O–H stretching	Alcohol / Phenol
2921.16 cm^{-1}	C–H stretching	Alkane
1628.01 cm^{-1}	C=C stretching	Alkene / Aromatic ring
1319.54 cm^{-1}	C–N stretching	Amine
1075.66 cm^{-1}	C–O stretching	Alcohol / Ether
1015.17 cm^{-1}	C–O stretching	Ether / Alcohol
691.96 cm^{-1}	C–H bending	Aromatic compound

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Showing N.P.S.T. Results of Kasisa Bhasma

Sample	I phase(0-5min)	II Phase(5-20min)	III Phase (24hrs)
Kasisa Bhasma	Wet periphery with dark blue circle in center of spot	Widespread with central dark blue spot. With light blue peripheral ring.	A dark blue central core surrounded by a prominent white ring and an outer light blue halo was observed.

3. Experimental results

Effect of test drug on serum biochemical parameters.

Parameters	CG	SG	TG
SGOT	NSI	NSD	NSD
SGPT	VSI	VSD	VSD
ALP	NSD	NSI	NSD
TP	NSD	NSI	NSI
ALB	NSI	NSD	NSD
TB	VSI	VSD	SD
DB	NSI	SD	NSD
SERUM CHOLESTEROL	VSI	NSD	NSI
SRUM CREATININE	NSI	NSD	NSI
LIVER WEIGHT	SI	NSD	NSD
% CHANGE IN BODY WEIGHT	VSD	NSD	NSD

NSD- Non significant decrease
NSI-Non significant increase
SD- Significant decrease
SI-Significant increase
VSD-Very significant decrease
VSI- Very significant increase

Histopathological Changes

REPORT : Liver

Showing results of Histopathology

Slide No	Necrosis	Inflammatory infiltrate	vacuolation	Foci of cellular alteration	Fibrosis
N1	-	-	-	-	-
N2	-	-	-	-	-
C1	-	+	-	++	-
C2	-	-	-	+	-
S1	-	+	-	+	-
S2	-	++	-	++	++
T1	-	-	-	+	-
T2	-	-	-	+	-

-Nil, + Mild, ++ Moderate, +++ severe

Report

All slides show liver tissue with lobular arrangement. Each lobule consists of a central vein and portal triads along the periphery of lobules. Numerous sinusoids pass radially from central veins and the spaces between the sinusoids contain liver cells.

NC-. Mild dilation of sinusoids seen in 1 slide. Necrosis and degeneration are not seen. No change in tissue architecture.

C- The tissue section of C1 shows focal areas of mononuclear (lymphocytes) inflammatory infiltration. Both the slides show multifocal areas of cellular alterations. No changes in tissue architecture.

S- S2 shows fibrosed areas with increased deposition of fibrous connective tissue and multifocal areas of mononuclear inflammatory infiltration . Foci of cellular alteration and focal areas of mononuclear inflammatory infiltration is seen in both the slides. No changes in tissue architecture.

T- Small areas of foci of cellular alteration were seen in both slides. No inflammation and fibrosis in both slides. Compared with C group, there were reduced histological changes.

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DISCUSSION

Discussion on Pharmaceutical Study

Yavakshara

Yavakshara was prepared successfully from dried Yava Panchanga. Proper drying, complete incineration, repeated filtration, and controlled heating yielded a creamy-white, alkaline Kshara of good quality. The alkaline pH confirmed successful extraction of water-soluble alkaline constituents.

Kasisa Shodhana

Shodhana was performed by Bhavana with Bhringaraja Swarasa, which effectively removed impurities, reduced particle size, and enhanced the therapeutic properties of Kasisa. The observed colour and physical changes confirmed successful purification.

Marana of Kasisa

Marana with Nimbuka Swarasa and repeated Puta converted Shodhita Kasisa into a fine, bioavailable Bhasma. Classical Bhasma Pareeksha tests confirmed proper incineration, while repeated heating and trituration improved particle fineness and therapeutic efficacy.

Ativisha Shodhana

Shodhana by Gomutra Sthapana effectively detoxified Ativisha, as indicated by physical changes and disappearance of the tingling sensation. Gomutra enhanced the safety and therapeutic utility of the drug.

Churnikarana

Churnikarana reduced the particle size of all herbal ingredients, which may improve dissolution, absorption, and therapeutic effectiveness.

Preparation of Guduchyadi Churna

Guduchyadi Churna was prepared by uniformly mixing all ingredients through proper Mardana. The formulation showed characteristic brown colour, Tikta-Katu Rasa, and characteristic odour, indicating a homogeneous and good-quality preparation suitable for therapeutic use.

Discussion on Analytical Study

Organoleptic characters: Kasisa Bhasma was brown, odourless, tasteless, and fine in texture, whereas Guduchyadi Churna was brown with a characteristic aromatic odour, astringent taste, and fine consistency, indicating acceptable sensory characteristics.

pH: Kasisa Bhasma (6.8) and Guduchyadi Churna (7.1) exhibited near-neutral pH, suggesting good stability and suitability for oral administration.

Total ash: Kasisa Bhasma showed a high total ash value (98.5%), confirming its mineral nature, while Guduchyadi Churna (26.5%) reflected the predominance of herbal constituents.

Acid insoluble ash: The higher value in Kasisa Bhasma (92.5%) indicated abundant inorganic mineral matter, whereas Guduchyadi Churna (15.5%) suggested lower insoluble mineral content.

Water soluble ash: Kasisa Bhasma showed low water-soluble ash (6%), while Guduchyadi Churna (81.5%) indicated a higher proportion of water-soluble phytoconstituents and salts.

Loss on drying 105^{0}C: Kasisa Bhasma (0.48%) exhibited very low moisture content, whereas Guduchyadi Churna (9.89%) reflected the hygroscopic nature of herbal ingredients.

Microbial limit test: Total bacterial (4 CFU/ml) and fungal counts (10 CFU/ml) were within permissible limits, confirming good microbiological quality.

Heavy metal analysis: Mercury, Lead, Cadmium, and Arsenic were absent, demonstrating compliance with safety standards.

XRD: Kasisa Bhasma exhibited sharp crystalline peaks, confirming a well-crystallized mineral phase, whereas Guduchyadi Churna showed broad amorphous peaks due to organic phytoconstituents.

SEM–EDS: Kasisa Bhasma was rich in iron and oxygen, while Guduchyadi Churna predominantly contained carbon and oxygen along with trace minerals, confirming its herbomineral composition.

Particle size: Guduchyadi Churna (1077.3 nm) had a smaller mean particle size than Kasisa Bhasma (3563.4 nm), which may enhance surface area and bioavailability.

FTIR: FTIR confirmed the presence of characteristic functional groups such as O–H, C–H, C–O, C–N, and aromatic bonds, indicating the presence of bioactive phytoconstituents and mineral-associated compounds.

NPST: Kasisa Bhasma exhibited a characteristic persistent central blue spot after 24 hours, indicating proper pharmaceutical processing and confirming the quality of the prepared Bhasma.

DISCUSSION ON EXPERIMENTAL STUDY

Paracetamol administration produced hepatotoxicity, evidenced by reduction in body weight, elevation of SGOT, SGPT, total bilirubin, direct bilirubin, serum cholesterol, liver weight, and histopathological changes. These findings indicate hepatocellular injury and impaired liver function.

Treatment with Guduchyadi Churna improved body weight and reduced SGOT, SGPT, total bilirubin, direct bilirubin, and liver weight, while maintaining total protein and albumin levels. Although changes in ALP, serum cholesterol, and serum creatinine were statistically non-significant, the overall biochemical profile suggested protection against paracetamol-induced liver damage.

Histopathological examination further supported these findings, showing minimal cellular alterations without inflammation or fibrosis in the Guduchyadi Churna-treated group,

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indicating better preservation of liver architecture than the paracetamol control group.

Overall, the biochemical and histopathological results demonstrate that Guduchyadi Churna possesses significant hepatoprotective activity, likely due to its antioxidant, hepatocellular membrane-stabilizing, and restorative effects on liver function.

Probable mode of action

Guduchyadi Churna exerts hepatoprotective activity through the synergistic action of its herbal and mineral ingredients. The predominance of Tikta and Katu Rasa, Laghu-Ruksha Guna, and Ushna Virya promotes Deepana, Pachana, Ama Pachana, and Kapha-Pitta Shamana, thereby improving Agni and metabolic functions. Hepatostimulant herbs such as Guduchi, Bhunimba, and Pippali support liver function, while Rakta Shodhaka drugs purify blood and correct Raktadushti. Phytoconstituents including tinosporine, andrographolide, gingerol, piperine, wedelolactone, and eriocitrin provide antioxidant and anti-inflammatory effects, protecting hepatocytes from oxidative damage. Yavakshara relieves Srotorodha, Kasisa Bhasma enhances haemopoiesis, and Gomutra contributes detoxifying (Vishahara) action. Collectively, these actions improve digestion, detoxification, blood purification, and hepatic metabolism, making Guduchyadi Churna a promising Ayurvedic formulation for the management of Yakritroga and related liver disorders.

CONCLUSION

The present study successfully established the pharmaceutical preparation, analytical standardization, and experimental hepatoprotective efficacy of Guduchyadi Churna prepared according to classical Ayurvedic principles. The formulation complied with classical quality parameters and modern analytical standards, demonstrating acceptable physicochemical properties, absence of toxic heavy metals, permissible microbial load, and characteristic herbomineral features confirmed by advanced analytical techniques. In the experimental study, Guduchyadi Churna exhibited significant hepatoprotective activity against paracetamol-induced liver injury by improving biochemical parameters, maintaining liver architecture, and reducing histopathological damage. These findings scientifically validate the traditional therapeutic use of Guduchyadi Churna in the management of Yakrit Roga and related disorders. The study concludes that Guduchyadi Churna is a safe, standardized, and effective Ayurvedic formulation with promising hepatoprotective potential, warranting further clinical studies to establish its therapeutic efficacy in human subjects.

Annexure I

Fig. No. 1

Reports of Physical Analysis



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Annexure II

XRD Graphs of Guduchyadi churna and Kasisa Bhasma

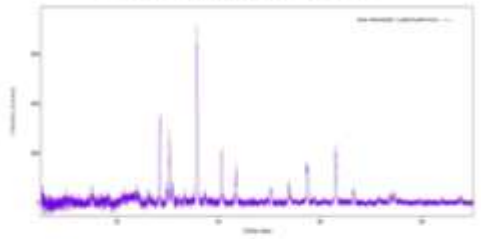


Fig. No. 2 XRD graph of Guduchyadi Churna

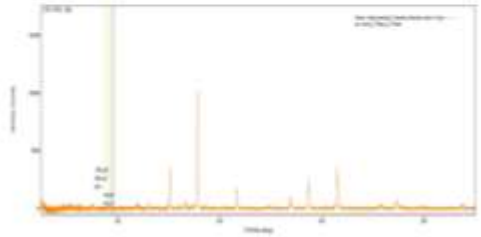


Fig. No. 3 XRD of Kasisa Bhasma

Annexure III

FTIR Graphs of Guduchyadi churna and Kasisa Bhasma

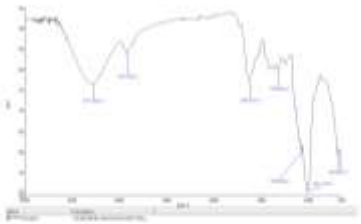


Fig no. 4 FTIR Graph of Guduchyadi Churna

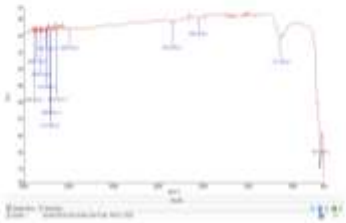


Fig No. 5 FTIR graph of Kasisa Bhasma

Annexure IV

SEM-EDS REPORTS OF GUDUCHYADI CHURNA AND Kasisa BHASMA

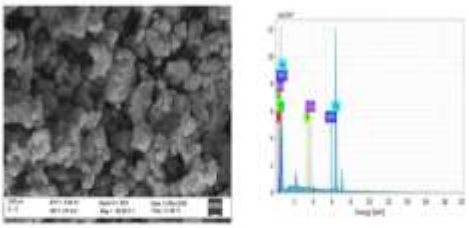


Fig no. 6 SEM – EDS report of Kasisa bhasma

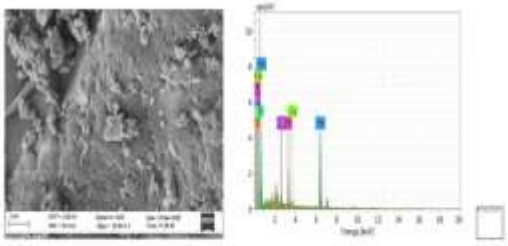


Fig no. 7 SEM – EDS report of Guduchyadi churna

Annexure V

ZETA PALS reports of Kasisa bhasma and Guduchyadi churna



Fig. No.8 ZETA PALS report of Kasisa Bhasma



Fig. No.9 ZETA PALS report of Guduchyadi churna

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PHARMACEUTICAL STUDY

YAVAKSHARA PREPARAION



Fig. No. 10
Dried Yava Panchanga



Fig. No. 11
Preparation of Yava panchanga bhasma



Fig. No. 12
Adding of Yava panchang bhasma to water



Fig. No. 13
Soaking of yava Panchanga bhasma



Fig. No. 14
1st Filtration



Fig. No. 15
Gomutra varna ksharajala after 21st filtration



Fig. No. 16
Yavakshara

ATIVISHA SHODHANA



Fig. No. 17
Ashodhita Ativisha



Fig. No. 18
Gomutra



Fig. No. 19
Gomutra sthapana



Fig. No. 20
Shodhita Ativisha



Fig. No. 21
Ativisha churna

KASISA SHODHANA



Fig. No. 22
Ashodhita Kasisa



Fig. No. 23
Bhringaraja



Fig. No. 24
Bhringaraja Swarasa



Fig. No. 25
Kasisa bhavana with Bhringaraja Swarasa



Fig. No. 26
Subhavitha lakshana



Fig. No. 27
Shuddha Kasisa



Fig. No. 34
Bhavana of Kasisa bhasma with nimbu swarasa



Fig. No. 35
Kasisa bhasma chakrikas after 3rd puta



Fig. No. 36
Kasisa bhasma

KASISA MARANA



Fig. No. 28
Nimbu Swarasa



Fig. No. 29
Kasisa Chakrikas



Fig. No. 30
Placing of Chakrikas in sharava



Fig. No. 31
Placing of sharava in vanapalas



Fig. No. 32
Subjected to puta



Fig. No. 33
Chakrikas after subjecting puta

BHASMA PAREEKSHAA



Fig. No. 37
Rekhapurnatva



Fig. No. 38
Vaaritaratva



Fig. No. 39
Unnama

Guduchyadi Churna preparation



Fig. No. 40
Ingredients of Guduchyadi



Fig. No. 41
Adding ingredients of Guduchyadi churna



Fig. No. 42
Homogeneous mixing of Guduchyadi churna



Fig. No. 43
Guduchyadi churna

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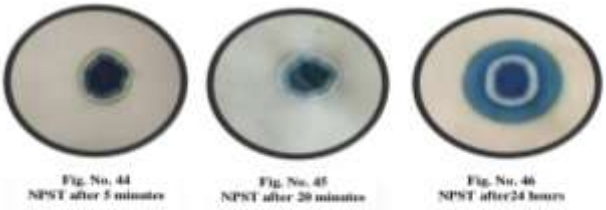


Fig. No. 44
NPST after 5 minutes

Fig. No. 45
NPST after 20 minutes

Fig. No. 46
NPST after24 hours

EXPERIMENTAL STUDY



Fig. No. 47
Weighing of rats

Fig. No. 48
Labelling of rats

Fig. No. 49
Dosing of rats



Fig. No. 50
Collection of Blood sample

Fig. No. 51
Blood samples

Fig. No. 52
Dissection of rats

Fig. No. 53
Liver sample

HISTOPATHOLOGICAL SLIDES

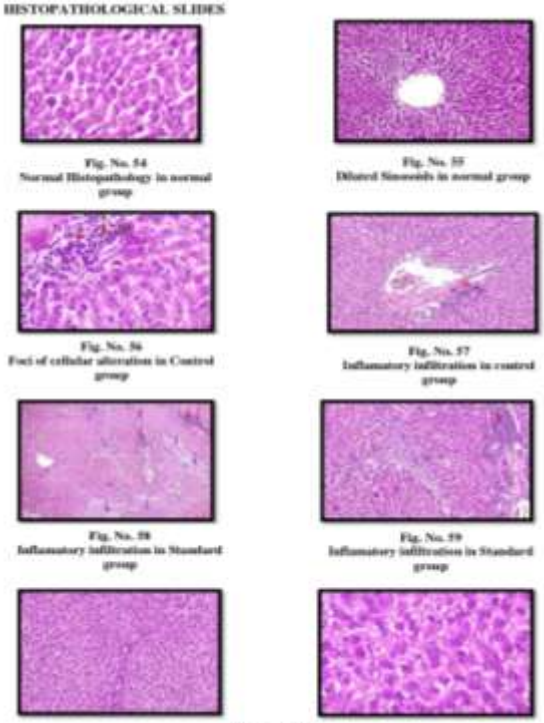


Fig. No. 54
Normal Histopathology in normal group

Fig. No. 55
Dilated Sinusoids in normal group

Fig. No. 56
Foci of cellular alteration in Control group

Fig. No. 57
Inflamatory infiltration in control group

Fig. No. 58
Inflamatory infiltration in Standard group

Fig. No. 59
Inflamatory infiltration in Standard group

Fig. No. 60, 61
Reduced Histological changes in test drug group

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