Research Article

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A COMPARATIVE PHARMACEUTICO-ANALYTICAL STUDY OF NAVKARSHIK KASHAY AND ITS GHANVATI

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ABSTRACT

In the last few years there has been an exponential growth in the field of Ayurvedic medicine and the drugs are gaining popularity both in developing and developed countries. Because of their natural origin and less side effects, many traditional medicines in use are derived from medicinal plants, minerals and organic matter. Navkarshik kashay is such a formulation firstly quoted by learned Acharya Chakrapani in his text Chakradutta under Vatarakta (Gout) chikitsaprakaran. Panchvidha Kashay Kalpanas are considered to be fundamental preparation in Ayurvedic pharmaceutics which is having good therapeutic action and prepared for instant use. Kashay Kalpana is utmost important, very effective and widely used dosage form but has some disadvantages such as bitter in taste, palatability, feasibility, short shelf life; an effort is made to convert it into Vati form i.e Navkarshik Ghanvati. Aims & objectives: Aim was to prepare samples of Navkarshik Kashay Churna & Navkarshik Ghanvati and to evaluate the formulations through Pharmaceutical and analytical measures. Materials & methods: Navkarshik Kashay Churna was formulated as per the reference of Chakradutta and Navkarshik Ghanvati was prepared by adopting appropriate the heating procedure to Navkarshik Kashay. Results: It was observed that average yield of Navkarshik Ghana was 18.66% and the water soluble extractives were found high in Navkarshik Ghanvati than Navkarshik Kashay Churna. Discussion: Ghanavati is the most concentrated form of active constituents and easy to consume than Kwatha preparation.

Keywords: Kashay Kalpana, Navkarshik kashay, Physico-chemical parameters.

INTRODUCTION

Bhaishajya Kalpana consists of two words Bhaishajya and Kalpana which means eliciting desire shape for dravya (substance) and converts the raw drugs into effective dosage form, as per need of drugs administration by adopting different sanskaras or kriyavishesha (modifactory procedures) and make them suitable to cure ailments.

Pharmaceutical study includes mainly preparation of crude drugs and pharmaceutical processing in which drug ratio, liquid quantity, intensity of fire and its duration etc.

In the present study, on taking into consideration all above things, Here an attempt was made to prepare Navkarshik Kashay (coarse powder) and Navkarshik Ghanvati repeatedly for three times to ensure the process validation and to evaluate, compare the formulation with the available physico-chemical parameters.

Navkarshik Kashay formulation, quoted by Acharya Chakrapani in his vibrant classical text Chakradutta for treating Vataraktadau (especially in Vatarakta and Kushtha, Pama & Raktamandal). Acharya has mentioned this peculiar formulation under Vatarakta chikitsa rogadhikar.[1]

MATERIALS AND METHODS

Plant Material

All the raw drug materials were collected from the Pannalal Brijlal General Merchant and authenticated by P.G department of DravyaGun, Rishikul campus Hardwar. The ingredients are mentioned in table 1.

Pharmaceutical Study

For preparing samples of Navkarshik Kashay and Navkarshik Ghanvati following experiments were carried out in the Maa Rajeshwari Research Lab, Shri Hans Ayurved Bhawan, Hardwar (Uttarakhand). The room temperature during pharmaceutical procedure was ranged between 28^0C-31^0C and whole procedure was conducted into following experiments:

Experiment No.1: Preparation of Navkarshik Kashay Churna & details are shown in table 2.

Experiment No.2: Preparation of Navkarshik Kwatha[2] & details are shown in table 3.
Reference: Sha. Sam. Ma. Kha. 2/1

Experiment No.3: Preparation of Navkarshik Ghana[3] & details are shown in table 4.
Reference: Sha. Sam. Ma. Kha. 8/1
Principle: Boiling

Experiment No.4: Preparation of Navkarshik Ghanvati & details are shown in table 5.
Reference: Indian Pharmacopoeia, Vol.- I
Principle: Compression
Ingredients: total yield of three ghana samples (500+460+440g= 1400g)

Navkarshik Kwatha was prepared after mixing of raw drugs mentioned in table 1. Then Ghana was obtained after boiling procedure. After that granules were prepared through sieve no.20.

With the help of tableting machine the granules form of drugs were compressed and punched into tablets. Due to the elimination of heat and moisture from the granules, stability of the formulation may be increase.

Physico-Chemical Parameters

Navkarshik Kashay & Navkarshik Ghanvati were analyzed by using qualitative and quantitative parameters at Bilwal Medchem & Research lab Pvt. Ltd Jaipur. The analytical parameters mentioned for Kashay Churna and compressed tablets are, Loss on drying at 105^0C, total ash, pH value and water soluble extractives, alcohol soluble extractives, Determination of acid insoluble Ash, water soluble ash, Friability, Disintegration time, and Hardness[4]

Thin Layer Chromatography (TLC)

Ethanol Extract of test samples (Navkarshik kashay & Navkarshik Ghanvati) was used. T.L.C. plate coated with 0.25 mm layer of silica gel GF 254 with fluorescent indicator (Each plate dimension is 10 cm long and 2 cm width). Preparation of mobile solution done with Toluene: Ethyl Acetate: Formic acid (6:3:1), p-AnisaldehydeSulphuric Acid was used in visualization. Measure and record the distance of each spot from the point of its application and calculate the Rf. value by dividing the distance travelled by the spots by the distance travelled by the front of the mobile phase[5].

Table 1: Ingredients of Navkarshik Kashaya

Name of Drug	Family	Quantity	Parts used
Haritaki (*Terminalia chebula)*	Combrataceae	1part	Drd Fruit
Bibhitaki (*Terminalia bellirica)*	Combrataceae	1part	Drd Fruit
Amalaki(*Emblica officinalis)*	Euphorbiaceae	1part	Drd. Fruit
Nimba *(Azadirachta indica)*	Meliaceae	1part	Leaf
Manjistha(*Rubia cordifolia)*	Rubiaceae	1part	Stem
Vacha *(Acorus calamus)*	Araceae	1part	Rhizome
Kutaka *(Picrorhiza kurroa)*	Scrophulariaceae	1part	Rhizome
Guruchi *(Tinospora cordifolia)*	Menispermaceae	1part	Stem
Daruhaldi *(Berberis aristata)*	Berberidaceae	1part	Stem

Table 2: the amount of ingredients and the successive quantity of coarse powder along with average yield and average % loss obtained in the experiment.

S. No.	Name of Drugs	Original amount (gm)	Powder obtained (gm)			Average Yield (gm)	Average % loss
			Sample 1	Sample 2	Sample 3		
1.	Haritaki(*Terminalia chebula*)	150	145	146	148.5	146.5	2.3
2.	Bibhitaki(*Terminalia bellirica*)	150	145	147	147.5	146.5	2.3
3.	Amalaki(*Emblica officinalis*)	150	146	146.5	147	146.5	2.3
4.	Nimba (*Azadirachta indica*)	150	146	146.5	146	146.16	2.5
5.	Manjistha (*Rubia cordifolia*)	150	146	147	145.5	146.16	2.5
6.	Vacha (*Acorus calamus*)	150	146	146.5	148	146.83	2.1
7.	Katuka (*Picrorhiza kurroa*)	150	145	148	148	147	2
8.	Guduchi(*Tinospora cordifolia*)	150	144.5	147.5	148.5	146.8	2.1
9.	Daruhaldi (*Berberis aristata*)	150	145	148	147.5	146.8	2.1

Table 3: Details during preparation of Navkarshik Kwatha

Parameters	Sample 1	Sample 2	Sample 3	Mean
Initial qty. of Kwatha Churna (g)	2500	2500	2500	2500
Total qty of water (L)	40	40	40	40
Total time for soaking (h)	12	12	12	12
Temp.during preparation of Kwatha	90-100 ^{0}C	90-100 ^{0}C	90-100 ^{0}C	90-100 ^{0}C
Total time taken for Kwatha (h)	5:30	5:30	5:30	5:30
Total qty. of Kwatha obtained (L)	5	5	5	5
Wt. of residue after filtration (g)	7000	7280	7880	7386.7

Table 4: Details during preparation of Navkarshik Ghana

Parameters	Samples			
	1	2	3	Mean
Total time taken for preparation of Ghana (h)	4:30	4:45	4:30	4:35h
Final qty. of Ghana obtained before drying (g)	590	580	560	576.7g
Total time for drying (h)	27	26	28	27h
Final Qty. of dried Ghana obtained (g)	500	460	440	466.7g
Percentage of dried Ghana obtained (%)	20	18.4	17.6	18.7%

Table 5: Details during preparation of Navkarshik Ghanvati

Parameters	Values
Total time taken for preparation of Tablet (h)	25h
Final qty. of Tablet obtained (g)	1344g
Final qty. of Tablet obtained (%)	96%

Table 6: Organoleptic features of Navkarshik Kashay & Navkarshik Ghanvati

S. No.	Characters	Navkarshik Kashay	Navkarshik Ghanvati
1	Colour	Yellow, brown	Brown, Black
2	Odour	Characteristics	Characteristics
3	Taste	Bitter	Bitter

Table 7: Physico-chemical parameters of Navkarshik Kashay & its Ghanvati

Parameters	Navkarshik Kashay	Navkarshik Ghanvati
Loss on drying %	1.6	3.2
Ph	4.2	4.2
Aqueous Extractive Value%	7.032	72.04
Alcoholic Extractive Value %	20.62	32.94
Total Ash %	4.2	2.48
Acid Insoluble Ash%	1.34	0.85
Water Soluble Ash%	3.21	1.32
Particle size	Moderately coarse powder	-
Weight variation (mg)	-	503.6 ±2.035
Disintegration time (minute)	-	23-24
Friability (%w/w)	-	0.0858
Hardness (kg/cm^2)	-	9

Table 8: Assay for heavy metals of Navkarshik Kashay & Navkarshik Ghanvati

Heavy Metals	Navkarshik Kashay	Navkarshik Ghanvati	Possible limit
Lead (ppm)	0.694PPM	0.458PPM	10ppm
Cadmium	0.073PPM	0.063PPM	0.3ppm
Arsenic	0.197PPM	0.154PPM	3ppm
Mercury	0.147PPM	0.124PPM	1ppm

Table 9: Aflatoxins of Navkarshik Kashay &Navkarshik Ghanvati

Aflatoxin	Navkarshik Kashay	Navkarshik Ghanvati	Possible limit
B_1	Not Detected	Not Detected	0.5PPB
B_2	Not Detected	Not Detected	0.1PPB
G_1	Not Detected	Not Detected	0.5PPB
G_2	Not Detected	Not Detected	0.1PPB

Table 10: Microbial contamination of Navkarshik Kashay & Navkarshik Ghanvati

Test (cfu/gm)	Navkarshik Kashay	Navkarshik Ghanvati	Possible limit
Total Bacterial Count	10^3/g	10^4/g	10^5cfu\gm
Total Fungal Count	10^2/g	10^2/g	10^3 cfu\gm

RESULTS AND DISCUSSION

Pharmaceutical Study

During preparation of Navkarshik Kashay Churna, the average maximum percentage loss was seen in nimb, manjishtha i.e. 2.5% due to manual errors such as scattering during crushing. Drugs having more fibrous part showed more % loss. For preparation of Navkarshik Ghanvati. Navkarshik Kashay was prepared as per the text Sharagadhar Samhita, sixteen times of water has been added to the coarsely powdered (sieve no.8) material, soaked overnight, the volume of which was reduced to 1/8th on the next day. Average temperature observed during the preparation of Kwatha i.e. 95^0C. The solubility of compound in a solvent increases by increasing temperature and up to some extent higher temperature facilitates penetration of the solvent into the cellular structure of the organism to be extracted.

The main purpose of preparing Ghana is to obtain the therapeutically active principle from the source drug without damaging any useful active constituent. Ghana is the most concentrated form of active constituents. That is why the formulation is more acceptable than Kwatha form. Average yield of Navkarshik Ghana was 18.66%. Loss was encountered may be due to adherence to hand gloves during collection and also sticking to the equipment. For preparation of Navkarshik Ghanvati, granules (sieve no 20) were compressed and punched into 500mg (approx.) tablets and 96% final yield was obtained.

Organoleptic Characters

Organoleptic features like colour, odour, and taste of Navkarshik Kashay and Navkarshik Ghanvati were recorded and are placed at table 6.

Physico-Chemical Parameters

Physico-chemical parameters of Navkarshik Kashay & its Ghanvati like Loss on drying, uniformity of vati, Disintegration time, friability, test for heavy metals, aflatoxins, microbial estimation all were found to be within the normal range. Navkarshik Ghanvati has more value of water soluble extractive than alcohol soluble extractive. On the other hand Navkarshik Kashay has more alcohol soluble extractive value than aqueous soluble extractive value. Details are placed at table 7-9.

TLC (Thin Layer Chromatography)

The major five spots are observed at Rf value 0.56, 0.67 and 0.78, 0.87, 0.91. The Rf value for both dosage forms are same and there are no change seen in Rf values, after the role of ignition and chemical reactions, which are performed during Ghanvati (or extract) formulation.

CONCLUSION

Navkarshik Kashay is used for Vatarakta (Gout) in Ayurveda. Kashay Kalpana is utmost important, very effective and widely used dosage form but has some disadvantages such as difficulties in ensuring quality control of herbal ingredients, time and inconvenience required in preparation, transportation, storage and is difficult to prescribe in accurate dose. These obstacles reduce compliance and may interfere with treatment. Due to globalization, there is a need of advancement in its dosage forms. Considering the mentioned problems, so scholar had an attempt to prepare a new dosage form of the formulation and compare it on analytical parameters. The ingredients were identified, authenticated and used for the preparation. The formulation was subjected to physico-chemical, and TLC studies. It is inferred that the formulation meets the minimum qualitative standards as reported in the API at a preliminary level. The inference from this study may be used as reference standard in the further quality control researches.

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