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Development and Phytochemical Evaluation of *Panchavalkaladi Kashaya:* A Polyherbomineral Formulation

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Abstract

Background: Wound healing is a major task in the field of surgery. Proper initial care will prevent infection and enhance healing. So it requires use of drug which is having *Shodhana* and *Ropana* property. Hence an attempt was made to prepare *Panchavalkaladi Kashaya* a novel polyherbomineral formulation which contains *Vata, Udumber, Ashawatha, Parish, Plaksha, Kasisa, Tutta, and Spatika*. Already it is proved fact that Panchavalkal is having the *shodhana* and *ropana* properties and being frequently used in every speciality of *Ayurveda.* To enhance its properties, to increase stability of this compound and make readily available for the usage, we have added *Kasisa, Tutta, and Spatika* which possess *shodhan, ropana* and *krimighna* property. *Aims and Objective:* Development and phytochemical evaluation of *Panchavalkaladi Kashaya. Methods and Material:* It was subjected to phytochemical, physicochemical and TLC analysis in AYUSH approved Central Research Facility. *Results: Kashaya* showed presence of phytochemical constituents ie reducing sugar, hexose sugar, saponines, alkaloids, and tannins. TLC showed four R_f values in short wave and three R_f values in long wave. *Conclusions:* It showed presence of total solids 11% and pH 4.25, tannins, alkaloids and saponins which may be act as vranaropana and shodhana clinically.

Keywords: *Panchavalkala Kashaya*; *Panchavalkaladi Kashaya*; Phytochemical Evaluation.

Introduction

Surgery is not without wounds and trauma. Healing is a complex phenomenon which includes resurfacing, reconstitution, and restoration of tensile strength of injured skin and it is major challenge to a surgeon which requires proper wound care. In A*yurveda Acharya Sushruta* has emphasis more on *Vrana* and its *chikitsa*. He defines *vrana* as the one which causes *gatravichurnana* and produces the *vivarnata* of *shareer [1]. Shashti upakrama [2]* are explained for the management of *vrana.* It is said that for proper wound healing one should prevent the wound from the infection. There are several formulations mentioned in the classics which are having antibacterial and anti-inflammatory activity. Among which *Panchavalkal Kahsaya* is more frequently used for the *Vrana prkshalan*, and *yoni prakshalan* etc. It contains *Vata* (*Ficus bengalensis* Linn), *Udumber* (*Ficus racemosa* Linn), *Ashawatha (Ficus religiosa* Linn), *Parish* (*Thesposia populnea* Soland), *Plaksha* (*Ficus infectoria* Roxb.) having the properties like *Vrana shodhan, ropana, shothahara, upadamshahara, visarpahara [3]*. As *Kashaya* is having less self-life, to increase its stability,to enhance its properties and to make it readily usable, an attempt is made to prepare *Panchavalkaldi Kashaya* a new polyherbomineral formulation which has the combination of the drugs *Panchavalkal, Kasisa*(Ferrous sulphate $FeSO_4 7H_2O$), *Tutta*(Copper sulphate $CuSO_4 7H_2O$), and *Spatika*(Potash Alum $K_2SO_4Al_2(SO_4)_3 24H_2O$). *Kasisa* has properties like *vatakapha, nashaka, Vrnaropaka, Shwitragna, Kesharanjana, Vishanashaka, Krimigna [4], Tutta* has *lekhana, bhedana, kriminashaka [5]*, and *Spatika* has *vranaropana, Visarpanashaka, Kandughna, Vishaghan , Rakthastambana [6]* properties. As it is a new formulation the study is carried out to evaluate the physicochemical and phyochemical properties of *Panchavalkaladi Kashaya.*

Aims and Objectives

Development and phytochemical evaluation of *Panchavalkaladi Kashaya.*

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Materials and Methods

Collection of raw drugs from GMP certified KLEU's Ayurveda Pharmacy, Khasabag, Belgaum, India and were authenticated in AYUSH approved Central Research Facility, KLEU's Shri B.M.K Ayurveda Mahavidyalaya, Belgaum, India.

Preparation of *Panchavalkaladi Kashaya* was done in the department of Rasashastra and Bhaishajya Kalpana KLEU's Shri B.M.K Ayurveda Mahavidyalaya, Belgaum, India.

Preliminary physicochemical and phytochemical study of *Panchavalkaladi Kashaya* was carried out in AYUSH approved Central Research Facility, KLEU's Shri B.M.K Ayurveda Mahavidyalaya, Belgaum, India

Preparation of Panchavalkaladi Kashaya

Ingredients

Panchavalkaladi Kashaya contains eight drugs and they are *Vata* (*Ficus bengalensis* Linn), *Udumber* (*Ficus racemosa* Linn), *Ashwatha (Ficus religiosa* Linn), *Plaksha* (*Ficus infectoria* Roxb), *Parisha* (*Thesposia populnea* Soland), *Tutta* (Copper sulphate $CuSO_4\ 7H_2O$), *Kasisa* (Ferrous sulphate $FeSO_4 7H_2O$), *Spatika* (Potash Alum $K_2SO_4Al_2(SO_4)_3 24H_2O$).Preservatives Sodium benzoate and Methyl paraben.

Pharmaceutical Procedure

It includes two steps-

Step 1: Preparation of *Panchavalkal Kashaya*

Step 2 : Preparation of *Panchavalkaladi Kashaya*

Step 1. Preparation of Panchavalkal Kashaya [7]:

Coarse powder of *Panchavalkal (Vata, Udumber, Ashwatha, Parish, and Plaksha)* was taken in equal quantity and soaked in 16 parts of water for overnight. Next day it was subjected to heat with intermittent stirring. Boiling was continued till it reduced to 1/8th part. Then *Kashaya* was filtered through four folded cotton cloth and was collected in clean vessel.

Organoleptic Characters:

Colour: Reddish brown

Odour: Characteristics (Aushadhi gandha)

Taste: Kashaya rasa

Consistency: Liquid

Duration of process: 4 ½ hrs

Step 2. Preparation of Panchavalkaladi Kashaya

Ingredients:

1.	Panchavalkala Kashaya:	100ml
2.	Shodhita Kasisa:	1gm
3.	Shodhita Tutta:	25mg
4.	Shodhita Spatika:	2.75gm
5.	Sodium benzoate:	10mg
6.	Methyl paraben:	100mg

Panchavalkal Kashaya was dissolved with *Shodhita Kasisa*, *Shodhita Tutta, and Shodhita Spatika* completely. Then Sodium benzoate & Methyl paraben were added and stirred well till completely dissolve and stored in air tight bottles. (The ratio was finalised after conducting pilot studies).

Results

Analytical study was conducted at AYUSH approved drug testing laboratory, KLEU's Shri B.M.K Ayurveda Mahavidyalaya, Belgaum, India.

Organoleptic Characters

- *Panchavalkala Kashaya* was brick red colour with characteristic odour and astringent in taste.
- *Panchavalkaladi Kashaya* was blackish in colour with characteristic odour.

Discussion

The herbal drugs selected in the preparation are documented as *vranaropana, shodhana* action in

Table 1: Organoleptic features of panchavalkala raw drugs

Organoleptic Features of Panchavalkala Raw Drugs						
Sl no	**Test**	**Vata**	**Udumbara**	**Ashwatta**	**Plaksha**	**Parisha**
1	Part	Stem bark	Stem bark	Stem bark	Stem bark	Stem bark
2	Colour	Reddish brown	Reddish brown	brownish	Grayish brown	Brownish
3	Taste	Astringent	Astringent	Astringent	Astringent	Astringent
4	Odour	Characteristic	Characteristic	Characteristic	Characteristic	Characteristic

Table 2: Physico Chemical Analysis of Panchavalakala

Physico Chemical Analysis of Panchavalakala						
Sl.No	**Test**	**Vata**	**Udumbara**	**Ashwatha**	**Plaksha**	**Parisha**
1	Foreign matter	Nil	Nil	Nil	Nil	Nil
2	Loss on Drying	12%	9.6%	10%	12%	14%
3	Total Ash value	6.94%	10.31%	6.0%	16.32%	14.0%
4	Acid insoluble ash	2.5%	0.95%	0.159%	7.20%	1.52%
5	Water soluble extractive	9.12%	9.65%	11.23%	6.40%	10.40%

Table 3: Test for inorganic components of panchavalkala

Test for Inorganic Components of Panchavalkala						
Sl.No	**Test**	**Vata**	**Udumbara**	**Ahwatha**	**Plaksha**	**Parish**
1	Test for Iron	Present	Present	Present	Present	Present
2	Test for Magnesium	Absent	Absent	Absent	Absent	Absent
3	Test for Calcium	Absent	Absent	Absent	Absent	Absent
4	Test for Phosphates	Present	Present	Present	Absent	Present
5	Test for Sulphate	Present	Present	Present	Present	Present
6	Test for Chlorides	Present	Present	Present	Present	Present
7	Test for carbonates	Present	Absent	Absent	Absent	Absent
8	Test for nitrates	Absent	Present	Present	Absent	Absent
9	Test for potassium	Absent	Absent	Absent	Absent	Absent
10	Test for sodium	Absent	Absent	Absent	Absent	Absent

Table 4: Physico-chemical analysis of Panchavalkala Kashaya & Panchavalkaladi Kashaya

Physico-chemical analysis of Panchavalkala Kashaya & Panchavalkaladi Kashaya			
SL No	**Test**	***Panchavalkala Kashaya***	***Panchavalkaladi Kashaya***
1	Specific gravity	1.01cm/ s2	1.042
2	Total solids	6.4%	11%
3	pH	6	4.25

Table 5: Rf values of TLC

Rf values of TLC							
RF Values	**Vata**	**Udumbara**	**Ashwatta**	**Plaksha**	**Parisha**	**Panchavalkal Kashaya**	**Panchavalkala diKashaya**
Long wave 366nm	0.17 0.61 0.72 0.86 0.92	**0.86** 0.95	0.22, **0.61** **0.86** **0.95**	0.34, 0.57 0.61, 0.73 **0.86, 0.95**	0.59 0.77 0.92	**0.11**, **0.22**, 0.34 , 0.77 **0.61**	0.05, 0.15, 0.48
Short wave 254nm	**0.51, 0.61** 0.94	**0.51** **0.59**	**0.51, 0.59,** 0.96	0.54 0.61 0.96	**0.51, 0.57** **0.59,** 0.79 0.92	0.43	0.1, 0.11, 0.20, 0.43

Table 6: Preliminary phyto-chemical parameters of panchavalkaladi*Kashaya*

Preliminary Phyto-chemical Parameters of *PanchavalkaladiKashaya*		
Sl. No.	**Parameter**	**Results**
1	Carbohydrates	Negative
2	Reducingsugar	Positive
3	Pentose sugar	Negative
4	Hexose sugar	Positive
4	Monosaccharide's	Negative
5	Nonreducingsugar	Negative
6	Proteins	Negative
7	Aminoacids	Negative
8	Steroids	Negative
10	Saponinglycosides	Positive
11	Flavonoides	Negative
12	Alkaloids	Positive
13	Tanins	Positive

Ayurvedic classics. Apart from herbs the mineral *Kasiasa*, *Tutta* and *Spatika* also exhibited these properties individually. *Panchavalkala Kashaya* is already proved to be *Vrana shodhana* and *Ropana Vrana Prakshalana, Yonidhavan*, etc. action clinically. Here to enhance the potency, increase the stability and easy to handle as well as transport, this basic decoction was developed as herbomineral preparation by

adding *Kasiasa, Tutta, Spatika* and preservatives. As decoction form it is convenient pharmaceutically and clinically in various post-operative surgical procedures. Physicochemical and phytochemical results of raw materials showed that, they are as per AFI standards.

Panchavalkaladi Kashaya is a new formulation so organoleptic, physicochemical, TLC, and preliminary phytochemical constituents were evaluated as a primitive step. Brick red coloured *Panchavalkal Kashaya* was changed to blackish colour after preparation of *Panchavalkaladi Kashaya*, reason may be due to addition of Shodhita Kasisa. It has characteristic odour may be due to added ingredients. Physicochemical analysis of *Panchavalkala Kashaya* showed presence of total solids 6.4%, which is increased to11% after preparing *Panchavalkaladi Kashaya*. This may be due to added effect of mineral drugs which increases the solid contents. The pH of *Panchavalkala Kashaya* is 6, when *shudha Kasisa, Tutta* and *Spatika* are combined to *Kashaya* soon its pH was also changed 4.25.

Panchavalkaladi Kashaya showed remarkable a variation in TLC studies with two wavelengths indicates presence of other water soluble ingredients.

Panchavalkaladi Kashaya showed presence of reducing sugar, hexose sugar, saponins, alkaloids and tannins. Presence of alkaloids, saponins and tannins could be benefited to prepare new herbal decoction to treat various wound clinically. Addition of preservative helpful in maintain the stability of the product. Tannins helpful in wound healing, Saponin glycosides are thought to promote the wound healing process due to their antioxidant, astringent and antimicrobial properties

Conclusion

Panchavalkaladi Kashaya can be manufactured by combining *Panchavalkala Kashaya* along with *shuddha*

Ingredients of Panchavalkaladi Kashaya

Kasisa, Tutta, Spatika along with preservatives. It showed presence of total solids 11% and pH 4.25, tannins, alkaloids and saponins which may promote wound healing.

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