

# International Research Journal of Ayurveda & Yoga

An International Peer Reviewed Journal for Ayurveda & Yoga



## Phytochemical Analysis And Standardization of *Pathyadi Ghana Vati* - An Ayurvedic Polyherbal Formulation For Migraine

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ICV-70.44- ISRA-1.318  
VOLUME 4 ISSUE 4

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Article received on 23<sup>rd</sup> March 2021

Article Accepted 27<sup>th</sup> April 2021

Article published 30 April 2021

### ABSTRACT: -

**Background:** Migraine is a common neurovascular ailment with a significant impact on quality of life. It simulates with the *Shiroroga* (diseases of head) called *Ardhavybedaka* in Ayurveda. *Pathyadi Kwatha* is a very famous and commonly prescribed classical formulation in *Ardhavybedaka* and various other types of headache. Despite the fact that the formulation is mentioned in the classical texts in the form of *Kwatha* (decoction), it was converted to the tablet (*Ghana Vati*) form as it is palatable, easy to dispense, and has prolonged shelf life.

**Objective and methods:** The present study was designed to standardize the finished product, *Pathyadi Ghana Vati*, by evaluation of its organoleptic, Physico-chemical, phytochemical and chromatographic parameters.

**Results:** Physico-chemical analysis revealed pH value 7.0, Alcohol soluble extract 29.10%, water-soluble extract 82.05 %, Ash value 2.15%, and phytochemical analysis showed the presence of alkaloids, amino acids, saponins, phenolic compound, and tannins.

**Conclusion:** The parameters presented in this paper may serve as a standard reference for the quality control analysis of *Pathyadi Ghana Vati*.

**Keywords:** *Pathyadi Kwatha*, *Ghana Vati*, Phytochemical, Migraine



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**How to cite this article:** - Dr. Mansi, Dr. Shamsa Fiaz, Phytochemical Analysis And Standardization Of Pathyadi Ghana Vati - An Ayurvedic Polyherbal Formulation For Migraine, IRJAY, April: 2021, Vol-4, Issue-4;58-67 ; [Doi: https://doi.org/10.47223/IRJAY.2021.4411](https://doi.org/10.47223/IRJAY.2021.4411)

## INTRODUCTION

Migraine is a recurrent headache disorder manifesting in attacks lasting 4–72 hours. Typical characteristics of the headache are unilateral location, pulsating quality, moderate or severe intensity, aggravation by routine physical activity and association with nausea and/or photophobia and phonophobia.<sup>1</sup> Migraine simulates with a clinical entity called *Ardhambhedaka* (headache) in *Ayurveda* which is one among the 11 types of *Shiro-rogas* (diseases of head)<sup>2</sup> mentioned by *Acharya Sushruta*. It is the second most common cause of headache, and has become a challenging issue in the modern era as a result of changing lifestyle and food habits. According to the WHO, migraine is 19th among all causes of years lived with disability. It has been labeled the seventh disabler because of its significant effect on patient quality of life (QOL).<sup>3</sup> The medications used in modern science to treat migraine have their own side effects, and long-term use leads to drug dependency, drug withdrawal syndrome, headache relapse, and the transition from episodic to chronic migraine. Considering these facts, Ayurveda formulation, *Pathyadi Ghana Vati* was selected for oral administration in Migraine as it is having *Vednasthapana* (analgesic), *Raktashodhana* (blood purifier), *Tridoshahara*, analgesic and anti-inflammatory properties which may help in alleviating the symptoms of Migraine.

*Pathyadi Kwatha* is commonly prescribed in clinical practice in all types of headache due to its significant efficacy. It is

described in *Madhyam Khanda* of *Sharangdhar Samhita* in *Kwatha Kalpana* chapter. It is indicated in *Shirahshoola* (headache), *Bhru* (eyebrow)-*Sankha* (temporal region)-*Karna* (ear) *Shoola* (Pain), *Ardhashirso-Ruja* (Migraine), *Suryaavarta* (Frontal Sinusitis), *Shankhaka* (temporal arteritis), *Naktandhyaya* (night blindness) and other *Netragata Roga* (eye diseases). This polyherbal formulation contains seven herbs - *Haritaki*, *Bibhitaka*, *Aamlaki*, *Bhunimba*, *Haridra*, *Nimba*, and *Guduchi*.<sup>4</sup> In the text, it is advised to use in the form of *Kwatha* (decoction) with addition of *Guda* (Jaggery). But in this study, to address the issues of palatability, shelf life and dose standardization it was converted into *Ghanavati* (tablet) form. Moreover, the demand for Ayurveda medicines has increased due to their natural origin and lack of side effects. Therefore it has become the need of the hour to testify the polyherbal formulations as per modern research parameters to standardize and evaluate their quality. Organoleptic, physicochemical and chromatographic evaluation of drugs helps in authenticating the quality and eliminates adulteration issues. Therefore the present study was designed to standardize the finished product, *Pathyadi Ghana Vati*, by evaluation of its organoleptic, physico-chemical, phytochemical and chromatographic parameters.

## MATERIAL AND METHODS

### Collection of Raw drugs

The ingredients of *Pathyadi Ghana Vati* (Table 1) were collected by confirming their identities

as described in the literature from the Pharmacy of National Institute of Ayurveda, Jaipur. Due to non-availability of *Bhunimba* (*Chirayata-*

*Swertia chirayata*), its substitute drug, *Kalmegha* (*Andrographis paniculata*) was used for the drug preparation.

**Table 1: Contents of *Pathyadi Ghana Vati***

Sr. No.	Drug Name	Botanical Name	Part Used	Ratio
1	<i>Haritaki</i>	<i>Terminalia chebula</i>	Fruit pulp	1
2	<i>Bibhitaka</i>	<i>Terminalia bellarica</i>	Fruit pulp	1
3	<i>Amlaki</i>	<i>Embllica officinalis</i>	Fruit pulp	1
4	<i>Bhunimba*</i> ( <i>Kalmegha</i> )	<i>Andrographis paniculata</i>	Whole plant	1
5	<i>Haridra</i>	<i>Curcuma longa</i>	Rhizome	1
6	<i>Nimba</i>	<i>Azadirachta indica</i>	Whole plant	1
7	<i>Guduchi</i>	<i>Tinospora cordifolia</i>	Stem	1

### Preparation of *Pathyadi Ghana Vati*

The drug was prepared in the Pharmacy of National Institute of Ayurveda, Jaipur. According to the classical guidelines, all the seven drugs were taken in equal quantity in *Yavakuta* form and *Kwatha* was prepared. Then the *Kwatha* was boiled till it gets converted into the *Ghana* form and *Ghana Vati* (tablets) were prepared from it. Then the analytical study of the finished drug *Pathyadi Ghana Vati* was performed in the Laboratory of P.G. Department of Dravyaguna Vigyan, National institute of Ayurveda, Jaipur.

### Macroscopic study

The collected sample was studied organoleptically i.e. with the help of sense organs and various parameters like size, shape, colour, touch and odour of the finished product were observed and recorded.

### Physico-chemical Evaluation<sup>5</sup>

Different physicochemical parameters like pH, moisture content, water soluble extractive value, total Ash value, Acid insoluble ash etc. were determined using standard Pharmacopoeia methods.

### Phytochemical Analysis<sup>6</sup>

Extracts prepared from the research

drug- *Pathyadi Ghana Vati*, were tested for the presence of various active phyto compounds like phenols, tannin, flavonoid, protein, carbohydrates, saponin, alkaloids etc. as per the Pharmacopoeia of India.

### Thin layer Chromatography<sup>7</sup>

Alcoholic Extract of the sample drug was used for the spotting. T.L.C. plate coated with 0.25 mm layer of silica gel 60 F<sub>254</sub> with fluorescent indicator was used. Plates were dried in hot oven at 105<sup>0</sup> C for one and half hour for activation. Mobile solution was prepared using Toluene : Acetone : Formic acid (11:6:1) and visualized in the reagent- Iodine and the distance of each spot from the point of its application was measured and calculated Rf. Value.

## RESULTS

Organoleptic characteristics of *Pathyadi Ghana Vati* are shown in Table 2. Physicochemical analysis of *Pathyadi Ghana Vati* revealed pH value 7.0, Alcohol soluble extract 29.10%, and water soluble extract 82.05 %, Ash value 2.15% etc. as shown in Table 3. Phytochemical analysis showed presence of alkaloids, amino acids, saponins, phenolic

compound and tannins in *Pathyadi Ghana Vati* as given in the Table 4. The results of

Chromatographic analysis of *Pathyadi Ghana Vati* are shown in Table 5.

**Table 2: Organoleptic parameters of *Pathyadi Ghana Vati***

Sr. No.	Macroscopic study	Observations
1	Colour	Black
2	Odour	Characteristic
3	Taste	Bitter
4	Touch	Hard

**Table 3: Physico-chemical analysis of *Pathyadi Ghana Vati***

Sr. No.	Test	Result
1.	Moisture content	9.14%
2.	pH	7.0
3.	Alcohol Soluble Extract	29.10%
4.	Water Soluble Extract	82.05%
5.	Total Ash	2.15%
6.	Acid Insoluble Ash	0.46%
7.	Water Soluble Ash	0.9 %

**Table 4: Phyto-chemical analysis of *Pathyadi Ghana vati***

Sr. No.	Constituent	Test/ Reagent	Aqueous extract	Alcohol extract
1.	Carbohydrate	Molish test	-	+
		Benedict test	+	-
		Fehling test	+	+
		Barfoad test	-	-
2.	Alkaloids	Dragendorff test	+	-
		Wagner's test	+	-
		Hager's test	-	-
3.	Amino acids	Ninhydrine	+	-
4.	Protein	Biuret test	+	-
		Xanthoprotic test	+	+
		Millon test	-	-
5.	Saponin	Foam test	+	-
6.	Glycosides	Borntrager's test	-	-
7.	Phenolic compound	Phenolic test	+	+
8.	Steroids	Salkowaski	-	-
9.	Tannins	FeCl <sub>3</sub>	+	+
		Lead acetate	+	-
		Pot. Dichromate	-	-

**Table 5: Chromatographic study**

Sample	Distance of Solvent	Distance of Spot	Rf Value	Image
<i>Pathyadi Ghana Vati</i>	5.8cm	5.7cm	0.98	
		4.2cm	0.72	
		3.4cm	0.58	
		1.5cm	0.25	
		0.9cm	0.15	

## DISCUSSION

The organoleptic analysis of *Pathyadi Ghana Vati* like bitter taste, black color etc. aids in its preliminary quality assessment. Physicochemical parameters like pH, moisture content, water and alcohol soluble extract values, total Ash etc. can be used for identifying formulations, routine evaluation at manufacturing sites, and provide information for future researches. The treasure of chemicals or plant derived secondary metabolites can be opened by phytochemical analysis. Secondary metabolites such as alkaloids, amino acids, saponins, phenolic compound, and tannins were found in the phytochemical analysis of *Pathyadi Ghana Vati* showing its cumulative pharmacological properties. Polyherbal formulation is a complex mixture of more than one herb in a specific proportion. The absence of any component, or the presence of an unwanted component, whether intentionally or unintentionally, can result in reduction of therapeutic value, as well as serious health complications. Thin layer chromatography (TLC) is a technique used to separate and identify the chemical constituents present in a

formulation. Therefore *Pathyadi Ghana Vati* was subjected to chromatographic analysis by TLC method for assurance of its quality and purity.

## CONCLUSION

Standardization of Polyherbal formulations as per modern research parameters has now become very important. Moreover, quality assurance promises delivery of the proper quantity and efficacy of the medicine. Therefore the phytochemical, physicochemical and chromatographic analysis of *Pathyadi Ghana Vati* showed in the present study may serve as a reference for standardization and quality control analysis in further researches.

**Acknowledgment:** Nil.

**Financial Support:** Nil.

**Conflict of Interest:** Nil

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