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PHARMACOGNOSTICAL AND PHARMACEUTICAL EVALUATION OF *MEDHYA CHURNA*–W.S.R. TO CEREBRAL PALSY

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ABSTRACT

Cerebral Palsy is the most common motor disability in children. Cerebral Palsy (CP) is defined as a group of permanent disorders of the development of movement and posture, causing activity limitations that are attributed to non-progressive disturbances occurred in the developing fetal or infant brain. *Medhya Churna* is an *Anubhoota Yoga* used in the department of Kaumarbhritya, IPGT & RA in the management of Neuropsychiatric disorders since longtime. The present study was carried out to standardize the finished product *Medhya Churna* to confirm its identity, purity and quality. All attempts have been made to evaluate its Phamacognostical and physico-chemical profile. *Medhya Churna* was analyzed through Pharmacognostically and also it was analyzed through qualitative and quantitative analysis of physicochemical parameters. High Performance Thin layer Chromatography study (HPTLC) was also studied. Study of drug, Coloenchyma cells, Cork cells, Starch grains, Covering trichome, Crystal fibers, Pitted vessels etc were present characteristic features of observed. Physicochemical analysis shows loss on drying 8.09% w/w, Ash value is 14.60%w/w water soluble extract is 17.02% w/w, alcohol soluble extract is 10.05%w/w and PH is 6.5(5% aqua solution). High Performance Thin Layer Chromatography (HPTLC) showed 6 spots at 254 and 7 spots at 366 nm. This shows the presence of certain definite constituents in the *Medhya Churna* and is helpful for the easy separation of these constituents.

KEYWORDS: Cerebral Palsy, HPTLC, *Medhya Churna*, Pharmacuetics, Pharmacognosy

INTRODUCTION

Cerebral Palsy as it is commonly known is the most common cause of physical disability in children. It encompasses a group of non progressive disorders causing physical disability mainly in the various areas of body movement. Despite all the progresses in newborn care, its prevalence remains at 2-2.5 per 1,000. The prevalence in India is not definitively established. Although Cerebral Palsy is described as static encephalopathy, the neurological features may change over time.[1] Cerebral Palsy is often accompanied by the disturbances of sensation, perception, cognition, communication and behavior, epilepsy and secondary musculoskeletal problems. There is no exact reference in Ayurveda texts that resembles with Cerebral Palsy. Considering the signs and symptoms of Cerebral Palsy; this disease entity seems very closer to the presentation of *Vata Vyadhi*. Most of the drugs of *Medhya Churna* are having *Madhura Tikta Rasa, Guru, Snigdha Guna, Madhura Vipaka, Kapha Vata Shamana*. *Vacha* Acts on intelligence and speech, *Pipali* act as *Deepana Rasayana*[2], *Shakhpushpi* is *Visheshata Medhya*[3] and *Bramhi* is *Smrutiprada*. These Ingredients have quality like *Medhya, Balya, Jeevaniya, Rasayana* which is effective in Cerebral Palsy.

There has been increasing acceptance of natural products and therapies in the world during the past few decades and also increase in use of Ayurvedic remedies globally. So, quality control for efficacy and safety of herbal products is of main purpose.[4] Standardization assures that products are reliable in terms of quality, efficacy, performance and safety. The World Health Assembly - in resolutions WHA31.33 (1978), WHA40.33 (1987) and WHA42.43 (1989) - has emphasized the need to ensure the quality of medicinal plant products by using modern control techniques and applying suitable standards.[5] Standardization and quality control of herbal as well as the Ayurvedic products is most essential for the acceptance on the modern parameters.[6] Ayurveda emphasizes the importance of standardization of medicinal herbs as well as the finished products on the basis of physical and chemical parameters like the shape, texture, smell of the useful part. Therefore, an attempt has been made to standardize *Medhya Churna* by Pharmacognostical, Physico-chemical and HPTLC profile.

AIM AND OBJECTIVES

To know the impact of cellular and ergastic content present in the finished product by evaluate Physico-chemical, Phytochemical & Microscopical profiles.

MATERIALS AND METHODS

All the raw drug materials required for *Methya Churna* were collected from the pharmacy of Gujarat Ayurved University, Jamnagar.

Preparation of *Medhya Churna*

The *Churna* was prepared as per the procedure given in Ayurvedic Formulary of India. All the ingredients were powdered separately, and then mixed together in specified proportions to get uniformly blended *Churna*. The collected Raw material (according to ratio of part use) mixed. After that, the drugs were packed and kept in air tight container and dry place at room temperature.

Table 1: Ingredients of *Medhya Churna.*

No	Ingredients	Botanical Name	Part Used	Ratio
1.	*Bramhi*	*Bacopa moneri* Linn	*Shuska Panchanga*	1 part
2.	*Shankhpushpi*	*Convolvus pluricaulis* Chois	*Shuska Panchanga*	1 part
3.	*Yashtimadhu*	*Glycirhiza glabra* Linn	*Shuska Kanda*	1 part
4.	*Guduchi*	*Tinospora cordifolia* Willd.	*Shuska Kanda*	1 part
5.	*Pippali*	*Piper longum* Linn	*Shuska Phala*	1/4 part
6.	*Vacha*	*Acorus calamus* Linn	*Shushka Mula*	1/4 part

Pharmacognostical Study: Drugs were identified and authenticated by the Pharmacognosy laboratory, I.P.G.T. & R.A, GAU, Jamnagar, as per Ayurvedic Pharmacopeia of India. The identification was carried out on the basis of organoleptic features, morphological features and powder microscopy of drug. Powder dissolved in small quantity of distilled water was filtered through filter paper, filtrate studied under the microscope attached with camera, with and without stain. The microphotographs were also taken under the microscope.[7]

Physicochemical Parameters: Physico-chemical Analysis

Physico-chemical analyses were carried out by following the parameters. The common parameters were mentioned for Ayurvedic Pharmacopia of India and CCRAS guidelines. Physico-chemical analysis like loss on drying at 110°C[8], pH value[9], ash value[10], water soluble extractive[11] methanol soluble extractive[12] were recorded.

Preliminary Phytochemical Investigation

Preliminary phytochemical investigations are carried out by following standard procedure of API.[13]

High Performance Thin Layer Chromatography

HPTLC was performed as per the guideline provided by API. Methanolic extract of drug sample was used for the spotting. HPTLC was performed using toluene + ethyl acetate (9:1 v/v) solvent system. The colour and Refractive values of resolved spots were noted. In study of High-Performance Thin Layer Chromatography, Methanol extract of sample was spotted on pre-coated silica gel GF254 aluminium plate as 6 mm bands, 5 mm apart and 1 cm from the edge of the plates, by means of a Camag Linomate V sample applicator fitted with a 100 µL Hamilton syringe. Toluene (7ml), Ethyl acetate (2ml), formic acid (0.5ml) was used as the mobile phase. After development, Densitometric scanning was performed with a Camag TLC scanner III in reflectance absorbance mode at 254 nm and 366 nm under control of win CATS software (v1.2.1 Camag). The slit dimensions were 6 mm x 0.45 mm and the scanning speed was 20 mm.[14]

OBSERVATIONS AND RESULTS

Pharmacognostic Study

Organoleptic Evaluation

Various parameters of the material such as colour, odour, touch and taste of the *Medhya Churna* were observed and recorded**.**

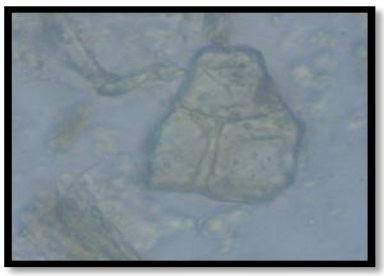
Table 2: Organoleptic characters of *Medhya Churna.*

No.	Organoleptic Characters	Results
1.	Color	Greenish ash
2.	Taste	Sweet bitter
3.	Odor	Slightly aromatic
4.	Touch	Smooth
5.	Appearance	Powder

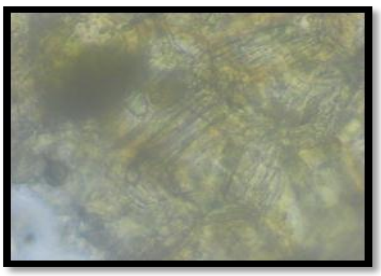
Microscopic study

The powder microscopy of *Medhya Churna* confirmed the features of Pitted vessels of *Guduchi*, Coloenchyma cells of *Guduchi*, Cork cells of *Guduchi*, Pitted vessels of *Yasthimadhu*, Crystal fibers of *Yasthimadhu*, Trichome of *Shankhapushpi*, Oleiorasin of *Pippali*, Wavy parenchyma cells of *Bramhi*, Parenchyma cells with starch grains of *Vacha*, Scaleryform vessels of *Vacha*, which are depicted in Plate 1.

Pitted vessels of *Guduchi*



Coloenchyma cells of *Guduchi*



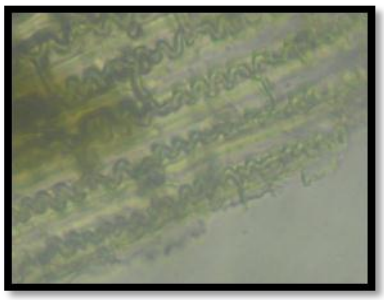
Cork cells of *Guduchi*

Pitted vessels of *Yashtimadhu*

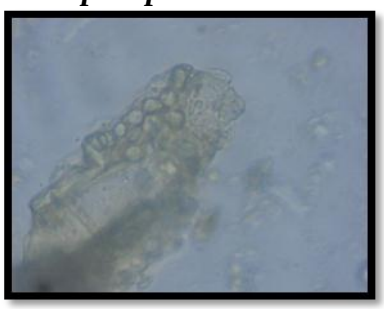
Crystal fibers of *Yashtimadhu*

Covering Trichome of *Shankhpushpi*

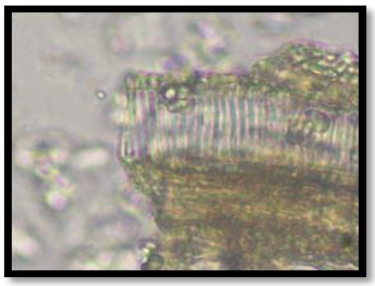
Oleioresin of *Pippali*



Wavy parenchyma cells of *Bramhi*



Parenchyma cells with starch grains of *Vacha*



Scaleryform vessels of *Vacha*

Plate 1: Microscopic Characters of *Medhya Churna.*

Physicochemical Parameters: Physico-chemical parameters of the *Medhya Churna* like Ash Value, Loss on drying, pH, Water soluble extract, Alcohol soluble extract, HPTLC were performed and evaluated.[15] Shows loss on drying 13.09% w/w, Ash value is 14.60%w/w water soluble extract is 17.02% w/w, alcohol soluble extract is 10.05%w/w and PH is 6.5(5% aqua solution). The results are placed as below.

Table 3: Physico-chemical Constants of *Medhya Churna.*

Test	Result
1. Loss on Drying (110 C)	8.09% w/w
2. Ash Value	14.60%w/w
3. Water Soluble Extract	17.02% w/w
4. Methanol Soluble Extract	10.05% w/w
5. pH (5% Aqua solution)	6.5

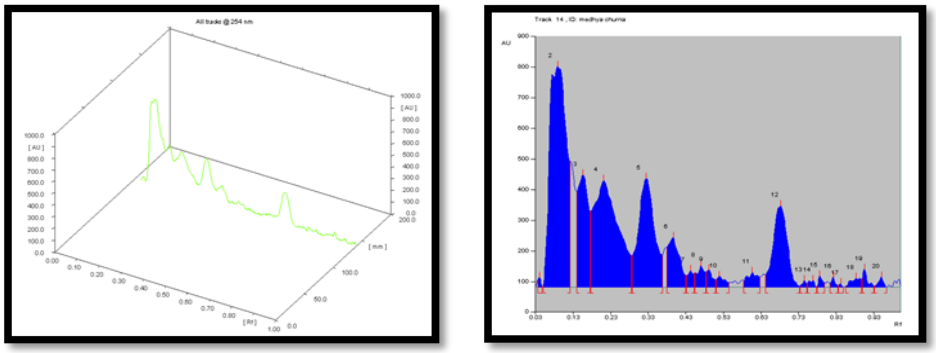
High Performance Thin Layer Chromatography (HPTLC)

In HPTLC, in short UV-254 nm, maximum 6 spots were observed in *Medhya Churna*. Similarly in long UV-366nm, maximum 7 spots were observed also. **[Table 4] [Plate 2].**

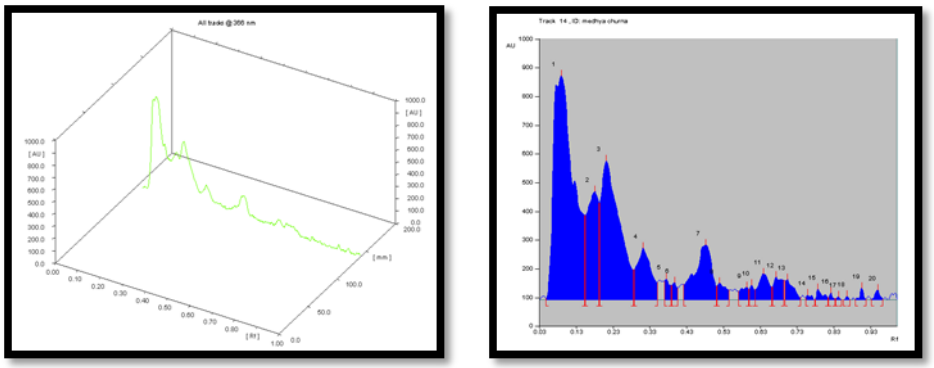
Table 4: Chromatographic results of *Medhya Churna.*

Conditions	R_f values
Short ultra violet (254 nm)	0.03, 0.05, 0.14, 0.17, 0.28, 0.38
Long ultra violet (366 nm)	0.05, 0.15, 0.19, 0.28, 0.37, 0.39, 0.42

Nature of adsorbed components, if with different polarity, formerly total number of components and respective Reference values also differs. In short, nature of different matrix modulates both the studied parameters.



AT 254nm



AT 366nm

Plate 2: Hptlc Results.

DISCUSSION

Coarse Powder microscopy of *Medhya Churna* revealed the diagnostic characters like Pitted vessels of *Guduchi*, Coloenchyma cells of *Guduchi*, Cork cells of *Guduchi*, Pitted vessels of *Yasthimadhu*, Crystal fibers of *Yasthimadhu*, Trichome of *Shankhapushpi*, Oleiorasin of *Pippali*, Wavy parenchyma cells of *Bramhi*, Parenchyma cells with starch grains of *Vacha*, Scaleryform vessels of *Vacha*, which authenticate genuineness of the raw drugs of *Medhya Churna*. Taste of *Medhya Churna* was *Tikta*, *Madhura Rasa* and Odour is slightly aromatic. Moisture contents should be of minimum to prevent degradation of product. Excess of water in formulation encourage microbial growth, presence of fungi or insects and deterioration following hydrolysis. Loss on drying was 8.09%w/w, these shows long shelf life and prevents microbial growth. Ash values are the criteria to judge the identity and purity of crude drugs were total ash, water soluble are considered. *Medhya Churna* contained 14.60% w/w total ash. The results showed that *Medhya Churna* is free from unwanted organic compounds and production site was good enough keeping sample free from dust and other solid matters. The 17.02% w/w of water soluble extractives and 10.05%w/w methanol soluble extractives were present in *Medhya Churna* indicating that the drug is having good solubility in water. In HPTLC study 6 spots at 254 nm and 7 spots 366 nm were obtained, indicating its possible components of matrix which may possess its therapeutic effect.

CONCLUSION

The ingredients were identified Pharmacognostically and were used for the preparation. The formulation was subjected to Pharmacognostical, physicochemical, HPTLC studies. Most of the cellular constituents i.e. Coloenchyma cells, Cork cells, Starch grains, covering trichome, Crystal fibers, Pitted vessels are freely distributed. It is inferred that the formulation meets the minimum quality standards as reported in the API at a preliminary level. Additional important analysis will be required for the identification of active chemical constituents of the *Medhya Churna***.**

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