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## PREPARATION AND STANDARDISATION OF PANCHA HARITHAKADI CHURNA BY HPTLC

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### Keywords:

PHC, HPTLC, Digestion, Physical parameters, Ayurvedic formulation

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**ABSTRACT:** Standardization of herbal formulation is essential to assess the quality of drugs for its therapeutic efficacy. Pancha Haritha kadi Churna (PHC) is a traditional poly herbal formulation meant for digestion which consists of five ingredients having digestive property. It is used for the treatment of Constipation and Bloating. Churna's will play an important role in gastro intestinal problems and they are having greater bioavailability because of smaller particle size. It consists of fine powder (sieve 100 size) of Ginger rhizomes, Fennel fruits, Myrobalan fruits, Senna leaflets and Pink Rock salt in equal proportions (1:1:1:1:1) are mixed well. PHC is formulated by standard procedures and evaluated by physical parameters, phytochemical analysis and HPTLC studies, the values are compared with that of marketed churna. Physical parameters were found to be within the standards, phytochemical analysis shows the presence of Alkaloids, Terpenoids, Steroids, Tannins, Saponins, Coumarins, Quinones, Flavones, Flavanones, Phenols and Carbohydrates whereas in HPTLC fingerprinting profile, seven peaks of PHC were matching with marketed churna.

**INTRODUCTION:** Ayurveda and other Indian systems of medicine may be explored with the modern scientific approaches for better leads in the health care <sup>1</sup>. Ayurvedic formulations have numerous uses which help to rectify three dos has

in the body <sup>2</sup>. The development of these traditional systems of medicines with the perspectives of safety, efficacy and quality will helps not only to preserve the traditional heritage but also to rationalize the use of natural products in health care. Standardization is the need of an hour in Ayurvedic system of medicine.

The present study is to standardize PHC which is used to treat gastro intestinal problems. AS per the literature we have formulated and evaluated for physical parameters, phytochemical analysis and HPTLC studies <sup>3</sup>.

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**MATERIALS & METHODS:**

**Preparation of Churna**<sup>4</sup>: The raw materials such as Ginger rhizomes (1part), Fennel fruits (1part), Myrobalan fruits (1part), Senna leaflets (1part) and Pink Rock salt (1part) were used for the preparation of PHC. The raw materials of PHC were purchased from the market and authenticated by the Botany Department Head of Hindu College, Market Centre, Guntur, Andhra Pradesh-522002 based on the microscopical characters of powdered drugs. All the ingredients were powdered separately, passed through sieve number 100 and mixed together in specified proportions. The churna was packed in an air tight glass container.



FIG. 1: PANCHA HARITHAKADI CHURNA

**Standardization Parameters:** The various standardization parameters of PHC studied were physical parameters, phytochemical analysis and HPTLC studies.

**Physical Parameters**<sup>5, 6, 7</sup>: Physical characteristics like Bulk Density, Tapped Density, Angle of Repose, Hausner's Ratio, Carr's Index and pH were determined for PHC.

**Bulk Density:** 10g of churna was taken in a graduated measuring cylinder and tapped on a wooden surface. Bulk density is calculated by using the formula

$$\text{Bulk Density} = (\text{Weight of Churna}) / (\text{Bulk Volume})$$

**Tapped Density:** Tapped density of churna was determined after 50 tapping's with the help of tapped density apparatus. Tapped density is calculated by using the formula

$$\text{Tapped Density} = (\text{Weight of Churna}) / (\text{Tapped Volume})$$

**Angle of Repose:** Angle of repose was determined by using funnel method. The powder was allowed

to flow through a funnel fixed on a stand to form a heap. The height and the radius give the angle of repose.

$$\text{Angle of Repose } (\theta) = \tan^{-1} (h/r) \text{ Where, } h = \text{height of heap} \\ r = \text{radius of heap}$$

**Hausner's Ratio:** It is related to inter particle friction and as such can be used to predict the powder flow properties. Powders with low inter particle friction such as coarse spheres have a ratio of 1.2, where as more cohesive, less flowable powders such as flakes have a ratio greater than 1.6.

$$\text{Hausner's Ratio} = (\text{Tapped Density}) / (\text{Bulk Density})$$

**Compressibility / Carr's Index:** This is calculated by using the formula

$$\text{Carr's Index} = (\text{Tapped Density} - \text{Bulk Density}) / (\text{Tapped Density}) \times 100$$

**Determination of pH**<sup>8, 9</sup>: The pH of 1% w/v and 10% w/v churna solution in distilled water was determined using glass electrode of pH meter.

TABLE 1: PHYSICAL PARAMETERS OF PHC

S. no.	Parameters	Observation	
		PHC	Marketed Churna
1	Bulk Density (g/mL)	0.570	0.478
2	Tapped Density (g/mL)	0.764	0.659
3	Angle of Repose	34°	33°92'
4	Hausner's Ratio	1.086	1.370
5	Carr's Index	15	27.46
6	pH	5.0	5.0

**Phytochemical Analysis**<sup>10, 11, 12</sup>: Preliminary qualitative phytochemical analysis of PHC was carried out by employing standard conventional protocols.

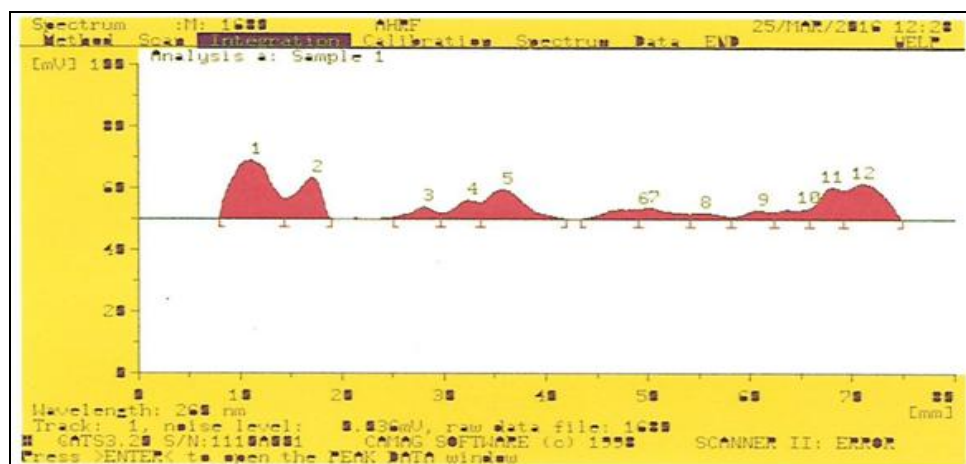
TABLE 2: PHYTOCHEMICAL ANALYSIS OF PHC

S. no.	Test	PHC	Marketed Churna
1	Alkaloids	+	+
2	Coumarins	+	+
3	Steroids and Triterpenoids	+	+
4	Tannins	+	+
5	Saponins	+	+
6	Quinones	+	+
7	Flavones and Flavanones	+	+
8	Carbohydrates	+	+
9	Phenols	+	+
10	Proteins and Amino acids	-	-
11	Anthocyanins	-	-

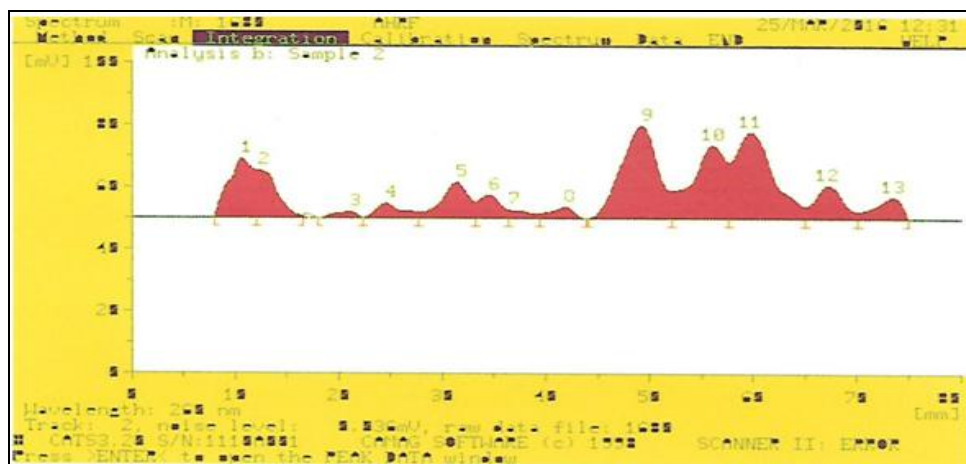
**HPTLC Studies**<sup>13, 14, 15</sup>: The HPTLC fingerprint profile was performed by spotting PHC and marketed churna samples on aluminium coated silica gel 60 MerckF 254 (10 cm × 10 cm with thickness of 250 μm) using CAMAGLinomat IV sample applicator and 100 μL Hamilton syringe. The samples in the form of bands of length 5 mm, were spotted 15 mm from the bottom, 10 mm apart, at a constant application rate of 15 nL/s using nitrogen aspirator. Plates were developed using mobile phase consisting of Hexane: Toluene: Ethyl acetate: Methanol: Formic acid (3:3:3:0.5:0.5). Subsequent to the development, TLC plates were dried in a current of air with the help of an air-dryer. Densitometric scanning was performed on CAMAG TLC scanner III at the absorbance of 254 nm. The HPTLC finger print profiles were presented.



A = Marketed Churna, B = PHC  
**FIG. 2: HPTLC OF MARKETED CHURNA AND PHC**



**FIG. 3: HPTLC FINGERPRINTING CHROMATOGRAM OF MARKETED CHURNA**



**FIG. 4: HPTLC FINGER PRINTING CHROMATOGRAM OF PHC**

**RESULTS:** PHC was standardized by physical parameters, phytochemical analysis and HPTLC studies. Physical parameters like Bulk Density,

Tapped Density, Hausner's Ratio and Carr's Index indicates that the churna is having good flow when compared to the marketed churna. Phytochemical

analysis shows the presence of Alkaloids, Terpenoids, Steroids, Tannins, Saponins, Coumarins, Quinones, Flavones, Flavanones, Phenols & Carbohydrates and absence of Anthocyanins, Proteins & Amino acids in both the churna's. HPTLC fingerprinting profile of PHC were developed in Hexane: Toluene: Ethyl acetate: Methanol: Formic acid (3:3:3:0.5:0.5) solvent system under 254 nm. Marketed churna showed 12 spots with R<sub>f</sub> values of 0.11, 0.17, 0.28, 0.32, 0.36, 0.49, 0.50, 0.55, 0.61, 0.66, 0.68 and 0.72. PHC showed 13 spots with R<sub>f</sub> values of 0.11, 0.12, 0.21, 0.25, 0.31, 0.35, 0.36, 0.42, 0.49, 0.56, 0.60, 0.67 and 0.74, seven peaks of PHC were matching with marketed churna.

**DISCUSSION:** PHC was subjected to standardization by physical parameters, phytochemical analysis and HPTLC studies. Physical parameters supporting that the PHC is having good flow when compared to the marketed churna. The phytochemical analysis shows that both the PHC and marketed churna were having same chemical composition.

The HPTLC fingerprinting has shown several peaks with different R<sub>f</sub> values in short wave UV 254 nm, seven peaks of PHC were matching with marketed churna. The results obtained in these studies may be considered as tools for assistance to the regulatory authorities, scientific organisations and manufacturers for developing standard formulation of great efficacy.

**CONCLUSION:** PHC has been standardized by modern scientific quality control measures. The physical parameters were found to be within the standards. HPTLC fingerprinting profile is quite helpful in setting up of standards. These preliminary tests can be prescribed as standards to fix the quality control test of the churna. They can also be used to perform quality control and quality assurance in the pharmaceutical laboratories. Future investigation and isolation of compounds is

necessary to establish the exact chemical constituents responsible for digestive activity.

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**CONFLICTS OF INTEREST:** Nil

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