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STANDARDIZATION OF PANCHKOLA CHURNA – A PHARMACEUTICAL AND CHEMICAL STUDY

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ABSTRACT

In Ayurvedic classics, many categories of formulations are described, among which *Churna* is one. *Churnas* with single or multiple plant-origin drugs as ingredients are narrated in Ayurvedic texts for curing many diseases. The present research work deals with the preparation of *Panchkola churna* and its analysis for establishing the Pharmacopoeial standard as since now, no tests and measures are being worked out for assuring its quality parameters by the existing Ayurvedic Pharmacopoeial Commission Govt. of India, Ministry of AYUSH. The two batches of this particular *Churna* are made following the Standard operative process (SOP). The physio-chemical standards of these two batches PC-I & PC-II, were worked out along with TLC & HPTLC. The LOD, Ash Acid Insoluble Ash, Alcohol & water-soluble extractive, and a pH of 10% aqueous solution of the drug were worked out, and a range was established for giving the standards. The shelf-life period was also studied for the above samples concerning the tests and standards compared at 0, 6 and 12-month intervals. It was found that the values of most of the physio-chemical standards remain more or less the same. Still, a massive change in alcohol & water-soluble extractives after 12 months was observed, which signifies that under ordinary packing conditions, it can be kept for 12 months without losing its efficacy. The HPTLC standards at 200nm, 350nm, and 400nm of successive Rf are also worked out for knowing the standards.

Keywords: *Panchkola churna*, HPTLC.

INTRODUCTION

Ayurveda and Vedic medicine are based perfectly on empirical observation and practice rather than philosophy alone. *Ayurveda* considers all substances as medicine if used for specific indications known for their therapeutical presentations, and approximately 450 plant-origin drugs are being used and best known for medicinal purposes. The various parts of plants, like leaves, stems, roots, flowers, fruit, and seed, have their own characteristics and are used to cure various ailments. The pharmaceutical preparation concerned with various *Kalpanas* are being categorized as *Churna, Vati, Arks, Asava/Arishta* etc.

The present formulation named *Panchkola Churna* is one such preparation that falls in the *Churna* category of Ayurvedic formulations. It has got five ingredients which are shown in Table-1. Two batches of this formulation were prepared to establish the Pharmacopoeial standards as well as knowing the stability of the drug with the passage of time. Generally, after 6 and 12 months the worked-out data was again monitored to assess the findings.

Table – 1 Ingredients of *Panchkola Churna*

Composition of *Panchkola Churna*

1.	*Pippali*	*Piper longum*	Fr.	1part
2.	*Chavya*	*Piper retrofractum*	St.	1part
3.	*Sunthi*	*Zingiber officinalis*	Rz.	1part
4.	*Pippali mool*	*Piper longum*	Rt.	1part
5.	*Citraka*	*Plumbago zeylanica*	Rt.	1part

MATERIAL AND METHOD

Grinder, Sieve 85 mesh size, steel trays & PVC air-tight containers, weighing machine etc. are required for the preparation process of *Churna.*

First of all, the ingredients from sr. no. 1 to 5 are cleaned, dried and grinded to fine powder separately for their respective quantities and sieved by sieve no. 85 mesh size to get the fine particle of successive ingredients. The respective quantities of various ingredients are mixed properly to get a homogenous mixture and is transferred to an air-tight container. A light brown colour fine particle which is obtained has the characteristic of slightly pungent odour and acrid & bitter taste. Two batches of this formulation are prepared, labelled as PC-1 and PC-2 for establishing the pharmacopoeial standards so as to judge the quality of medicine.

OBSERVATION

Thin layer chromatography: The alcoholic extracts of *Panchkola churna* are prepared by extraction with alcohol four times and the extract is concentrated in the water bath. The sample spots are made on a silica Gel G plate using chloroform; methanol (9:1) and the spots obtained are dried and Rf are measured. 04 spots Rf 0.00 (Reddish brown) 0.07 (orange) 0.35 (green) and 0.98 (light green) were observed. On exposure to I_2 vapours 2 spots Rf 0.00 & 0.41 brown colour appears.

Drug sample PC-I and PC-II were subjected to a physio-chemical study i.e. loss on drying, Total Ash, Acid insoluble Ash, Alcohol soluble extractives & water-soluble extractives along with pH (10% aqueous solution) were worked out followed by standard method of API/IP and the data are recorded and mentioned in Table- 2

Table- 2 showing physio-chemical standards for sample PC-I & PC-II

Description	Sample PC I	Sample PC-II	Pharmacopoeial Standards for *Panchkola churna*
Loss on Drying (110°c)	8.66 8.68	3.02 3.42	Not more than 10%

	Avg. 8.67	Avg. 3.21	
Total Ash %	6.63 6.65 Avg. 6.64	6.85 7.03 Avg. 6.94	Not more than 8%
Acid Insoluble Ash %	1.08 1.10 Avg. 1.09	1.15 1.20 Avg. 1.18	Not more than 1.5%
Alcohol soluble Ext.%	8.65 8.40 Avg. 8.52	9.86 9.75 Avg. 9.80	Not less than 7.0%
Water soluble Ext. %	18.36 18.44 Avg. 18.4	22.80 23.24 Avg. 23.02	Not less than 16%
pH (10% aqueous)	4.52 4.42 Avg. 4.446	4.32 4.26 Avg. 4.29	4 to 5

High Performance Thin Layer Chromatography

The prepared *Panchkola churna* was also subjected to better separation of organic compounds presents in it through HPTLC technique. For applying the sample, the known amount of sample is extracted with alcohol 4 to 5 times and the extract is concentrated and kept for spotting on the silica Gel 60F 254 coated Aluminium sheets. CAMAG LINOMAT 5 type instrument is used with detection unit. CAMAG TLC SCANNER -3 in the analysis. 10X10 cm plates having thickness 0.2 µl sample is injected through 100µl Hamilton micro litre syringe for band length 8mm separated by a distance 10mm distance each. Generally Ethyl alcohol is used for extraction of *Panchkola churna* and a Mobile phase of a mixture of chloroform: diethyl ether: xylene (5:1:5) was used in the derivation i. e. Densitometer and study was made with the software for respective Rf at 250, 350 and 400nm wavelength. The graphical plots observed were shown in fig. 1, 2 & 3.

A summarised table of the HPTLC study for maximum Rf for three wavelengths shown in table -3

Table- 3 showing various Rf with variation of wavelength.

Wavelength	Tracks	HPTLC Rf for *Panchkola churna*
250nm	3 4	0.16,0.20,0.28,0.33,0.60,0.73 0.16,0.19,0.27,0.33,0.58
350nm	3 4	0.16,0.20 0.15,0.19
400nm	3 4	0.16,0.20,0.42,0.74 0.15,0.20,0.41,0.72

Shelf-life Determination

Generally, it has been narrated that plant related *Churna* medicine can only be kept for one season i. e. up to 6 months to 1 year, the researcher was eager to the scientific outlook for this reference and for that the physiochemical parameters which were carried out earlier were repeated for the time of 9th and 12th month. The various physio-chemical findings observed are shown in Table-4

Table – 4 showing physio-chemical standards of PC-I

Description	0 month	9 months	12 months
LOD	8.68	8.87	9.42
Total Ash	6.63	6.61	6.43
Acid Insoluble Ash	1.07	1.06	1.04
Alcohol Soluble Extractive	8.65	8.92	11.04
Water Soluble Extractive	18.45	18.88	19.65
pH (10% aq)	4.46	4.60	4.68

DISCUSSION

The above observation reveals that the worked-out physio-chemical standards up to 9th month were observed same but the alcohol soluble extractives and water-soluble extractives standard data were found to be greater than the initial months observations. This signifies that after 9th month, the stability was not said to be same observation confirms that the values of standards changed. These findings scientifically validate the textual version of the shelf life of *Churna* formulations under normal conditions can be stable for up to 01 year. This can be prolonged by keeping this medicine in vacuum packing. The Rf values shown in the table obtained through HPTLC for the three different wavelengths and the TLC values simply observed for respective Rf values are clear standards for a better-quality control of this formulation. These values are shown in Table 3 respectively and a graphical observation is also given in figure1, 2 & 3 in favour of the Table 3 findings. The observed physio-chemical standards for the two samples PC-I and PC-II shown in table-2 are helpful for establishing the range of successive worked-out parameters, which can be used as a pharmacopoeial standard for quality assurance and control of this particular formulation which is a very common formulation used in day-to-day clinical practice by Ayurvedic physician.

INFERENCE

The present work for standardization of *Panchkola Churna* will be most helpful in quality control of this particular formulation for working scientists and laboratories which are engaged in quality assurance of the Ayurvedic formulation.

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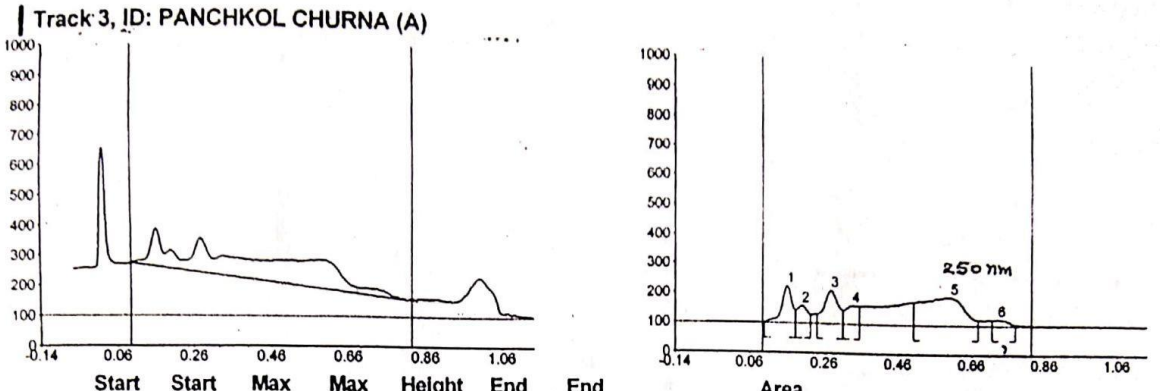
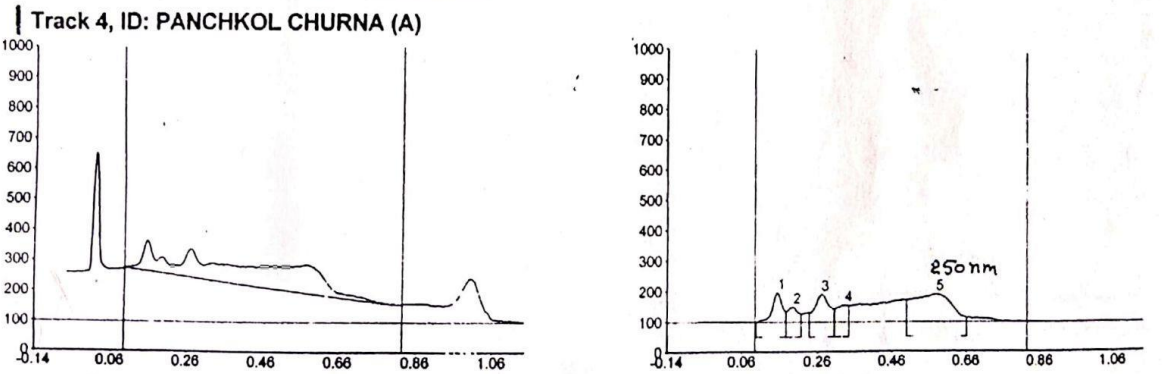
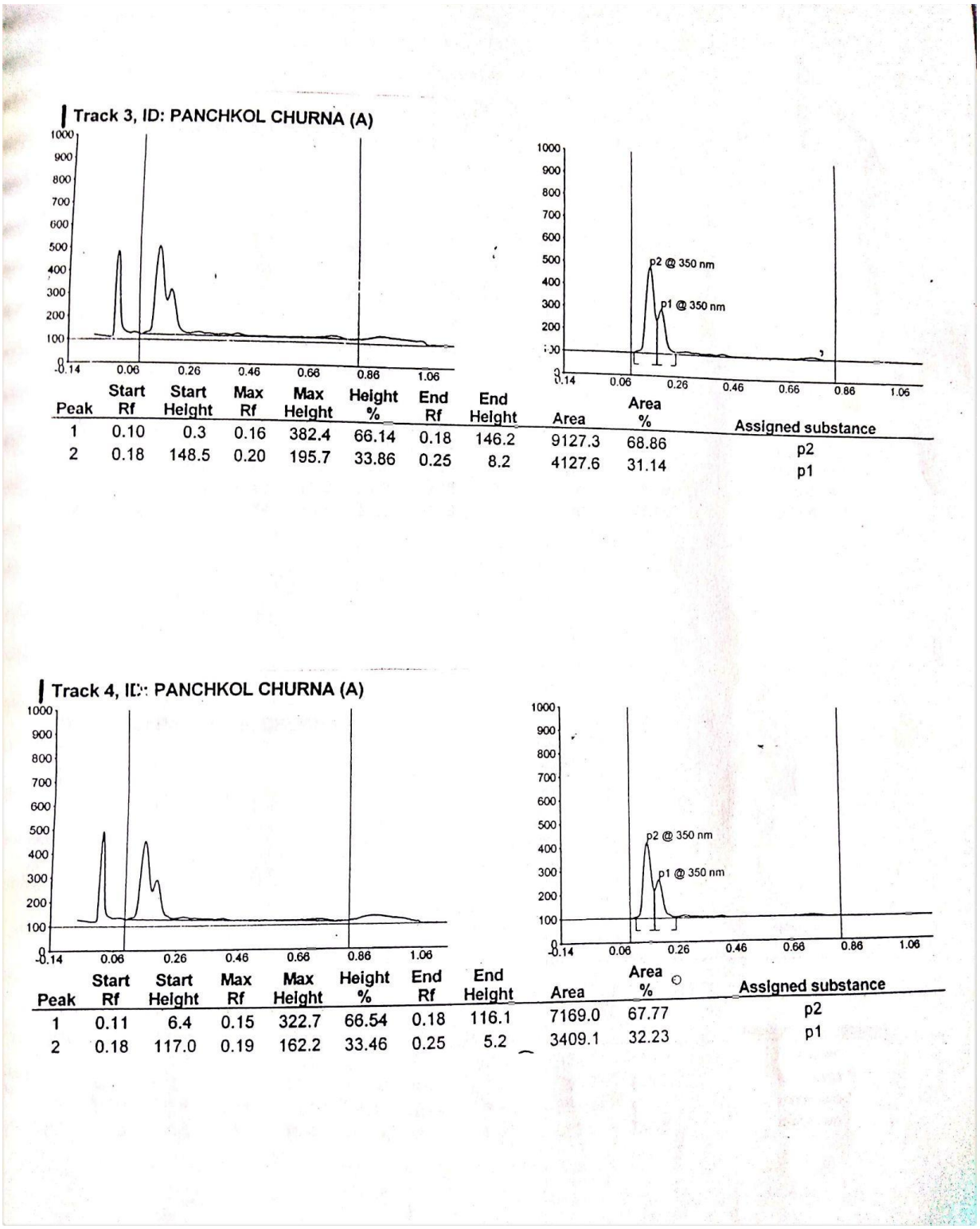


Peak	Start Rf	Start Height	Max Rf	Max Height	Height %	End Rf	End Height	Area	Area %	Assigned substance
1	0.10	2.0	0.16	124.9	26.21	0.18	43.6	2799.9	14.56	unknown *
2	0.18	43.7	0.20	58.4	12.26	0.22	29.1	1352.0	7.03	unknown *
3	0.24	31.4	0.28	113.3	23.77	0.31	47.2	3491.9	18.16	unknown *
4	0.31	47.3	0.33	63.1	13.24	0.35	59.6	1850.0	9.62	unknown *
5	0.50	76.9	0.60	95.3	20.01	0.68	18.6	9023.7	46.92	unknown *
6	0.72	19.3	0.73	21.5	4.51	0.78	3.6	714.1	3.71	unknown *



Peak	Start Rf	Start Height	Max Rf	Max Height	Height %	End Rf	End Height	Area	Area %	Assigned substance
1	0.10	1.3	0.15	96.9	25.27	0.17	34.4	2087.9	13.73	unknown *
2	0.18	34.8	0.19	49.2	12.83	0.21	26.7	1096.3	7.21	unknown *
3	0.24	30.4	0.27	90.8	23.70	0.30	43.3	2866.3	18.84	unknown *
4	0.30	43.4	0.33	55.5	14.47	0.34	53.2	1440.7	9.47	unknown *
5	0.50	72.8	0.58	90.9	23.72	0.66	13.5	7720.3	50.75	unknown *

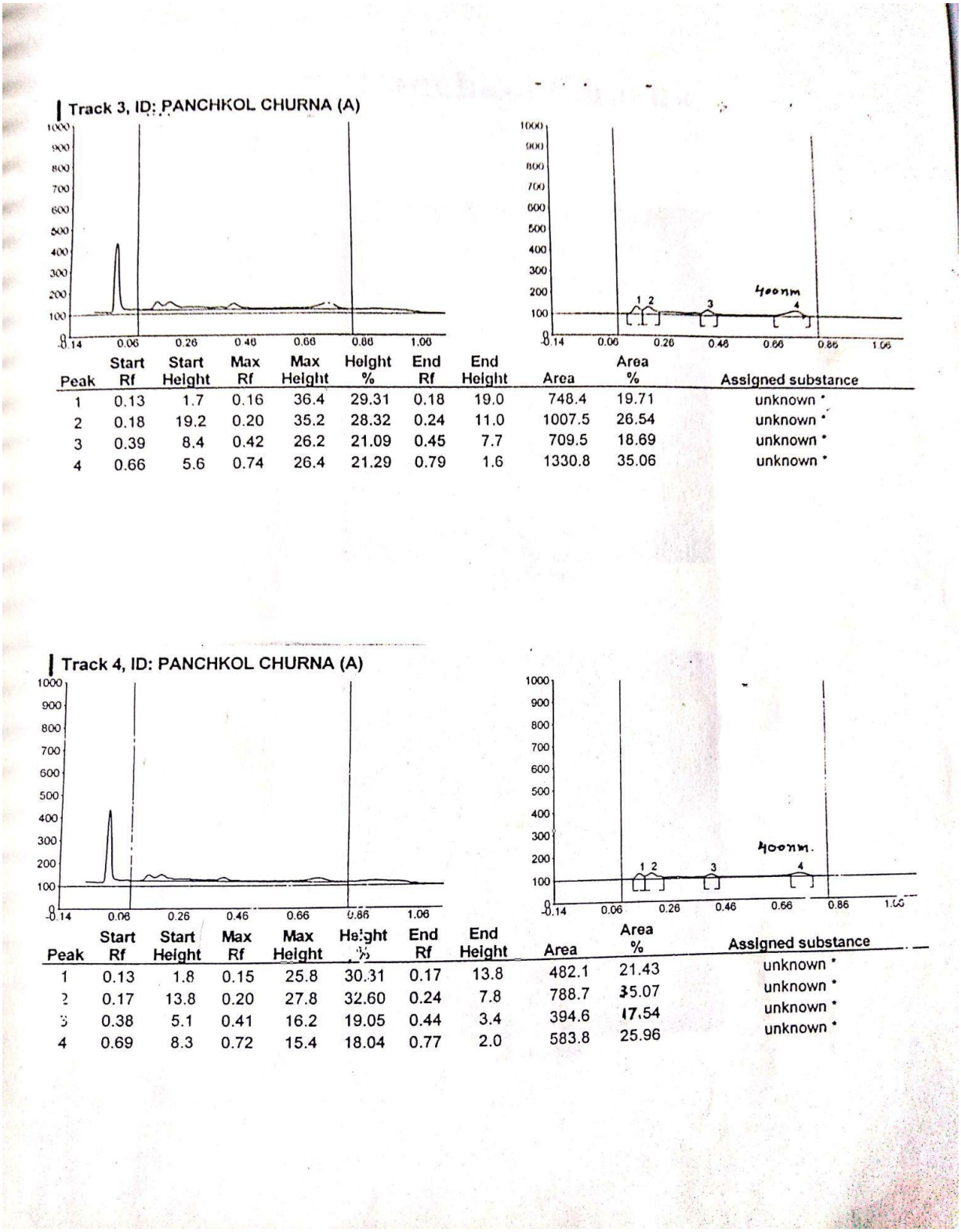
Fig. 1



Peak	Start Rf	Start Height	Max Rf	Max Height	Height %	End Rf	End Height	Area	Area %	Assigned substance
1	0.10	0.3	0.16	382.4	66.14	0.18	146.2	9127.3	68.86	p2
2	0.18	148.5	0.20	195.7	33.86	0.25	8.2	4127.6	31.14	p1

Peak	Start Rf	Start Height	Max Rf	Max Height	Height %	End Rf	End Height	Area	Area %	Assigned substance
1	0.11	6.4	0.15	322.7	66.54	0.18	116.1	7169.0	67.77	p2
2	0.18	117.0	0.19	162.2	33.46	0.25	5.2	3409.1	32.23	p1

Fig. 2



Peak	Start Rf	Start Height	Max Rf	Max Height	Height %	End Rf	End Height	Area	Area %	Assigned substance
1	0.13	1.7	0.16	36.4	29.31	0.18	19.0	748.4	19.71	unknown *
2	0.18	19.2	0.20	35.2	28.32	0.24	11.0	1007.5	26.54	unknown *
3	0.39	8.4	0.42	26.2	21.09	0.45	7.7	709.5	18.69	unknown *
4	0.66	5.6	0.74	26.4	21.29	0.79	1.6	1330.8	35.06	unknown *

Peak	Start Rf	Start Height	Max Rf	Max Height	Height %	End Rf	End Height	Area	Area %	Assigned substance
1	0.13	1.8	0.15	25.8	30.31	0.17	13.8	482.1	21.43	unknown *
2	0.17	13.8	0.20	27.8	32.60	0.24	7.8	788.7	35.07	unknown *
3	0.38	5.1	0.41	16.2	19.05	0.44	3.4	394.6	17.54	unknown *
4	0.69	8.3	0.72	15.4	18.04	0.77	2.0	583.8	25.96	unknown *

Fig. 3