PIJAR
Paryeshana International Journal of Ayuredic Reserach
www.pijar.org
ISSN:2456:4354

AN ANALYTICAL STUDY OF SAPTHACHAKRA (SALACIA CHINENSIS LINN) WITH SPECIAL REFERENCE TO MARKET SAMPLES IN SOUTHERN INDIA

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Abstract: The present study focused on the Pharmacopoeial parameters like pharmacognostical characterization and preliminary phytochemical screening of Southern Indian market samples of Sapthachakra. Which were found to be sufficient to evaluate the raw material and can also be used as reference standards for the quality control/quality assurance purposes. The pharmacognostic study revealed that there are specific diagnostic features for distinguishing the market samples.The external morphology of the all market samples are also shows variation in their colour, odour and taste.*Salacia chinensis* belongs to family *celestraceae family* has various pharmacological activities including anti-ulcer, anti- inflammatory, anti-oxidant and anti-cancer. Pharmacognostic studies, phytochemical analysis including HPTLC profiles were carried out in the present study to ensure the authenticity and quality of *Salacia chinensis*. The microscopic studies of *Salacia chinensis* shows presence of xylem, cork and other active principles

Key words – Sapthachakra, pharmacognostic study, *Salacia chinensis*

Introduction

With the emerging worldwide interest, in adopting traditional practices, in the healthcare systems by exploiting there potential, the evaluation of the botanicals in these systems of medicine in India is utmost important. The development of these traditional systems of medicines with the perspectives of safety, efficacy and quality will help not only to preserve this traditional heritage, but also to rationalize the use of natural products in the healthcare.

Standardization is to ensure that every packet of medicine that is being sold has the correct amount and will induce its therapeutic effect. *Salacia chinensis*

is used as acrid, bitter, anti-inflammatory, liver tonic, and stomachic. It is useful in vitiates conditions of diabetes, hemorrhoids, skin diseases, amenorrhea, dysmenorrhea, wounds and ulcers.

Hence In present study botanically identified Saptachakra from reliable source will be collected, powdered, screened for physico chemical evaluation and compared with that of different market samples of south India. Saptachakra grown in different parts of South India will be collected and screened for its standard medicinal values. Shelf life of genuinely prepared Saptachakra will also be done.

Materials and Method:

Table 1 : Showing different market samples of *Sapthachakra* and sample codes

Sl No.	Place of Collection	Code Given
1	kottakal pharmacy, Kerala	S1
2	Chamundi Pharma, Tamilnadu	S2
3	Govindaraj Shetty and Sons's DD Urs Road, Mysuru, Karnataka	S3
4	Genuine Drug from wild sources	S4

Each of the test drug was subjected to following procedures.

1. Pharmacognostic study
   a) Macroscopic study
   b) Microscopic study
2. Preliminary Physicochemical Screening
   a) Physical evaluation
   b) Chemical evaluation
   c) Qualitative evaluation
3. Comparative study of samples
4. Simple feasible confirmatory techniques.

Results :

Table 2 : Showing Comparative microscopic study of different market samples of Sapthachakra

Characters	S1	S2	S3	S4
Cork	Cork is thick walled, oval; cork cambium is radially elongated, square shaped.	Cork cells are 5-6 layers, cells are tangentially elongated rectangular cells with dark brown deposits in the outer most layers. Inner layers contain yellowish depositions	Cork is thick walled, oval; cork cambium is radially elongated, square shaped.	Cells are suberised and rectangular in shape which is highly thickenend.
Cortex	Stone cells are present in the cortex, cortical cells slightly thick, tangentially elongated and oval shaped. Presence of ceratenchyma cells or obligatory cells traverses through the cortex.	Cortical cells are thick walled , oval, round and tangentially elongated, with brown content and starch grains	Stone cells are present in the cortex, cortical cells slightly thick, tangentially elongated and oval shaped. Presence of ceratenchyma cells or obligatory cells traverses through the cortex.	8-12 rows of oval or rounded thick walled cells with brown colour content. All the cells are fully filled with starch grains
Phloem	Phloem ray is present with rosette crystals.	Comparatively more wide, traversed with phloem groups of phloem fibres and uniseriate and triseriate phloem rays	Phloem ray is present with rosette crystals.	Wide, is transversed with uniseriate phloem ray
Xylem	Xylem composed of usual xylem	Xylem composed of usual xylem elements. Vessels solitary rarely in groups of 2	Xylem composed of usual xylem	Xylem tissue is traversed with 5-7 concentric

	elements. Xylem cells are mostly solitary rarely in groups of 2 to 3.Vessels are comparatively large and some of them contain reddish brown depositions		elements. Xylem cells are mostly solitary rarely in groups of 2 to 3.Vessels are comparatively large and some of them contain reddish brown depositions	rings of non lignified parenchymatous tissues. Vessels solitary and in groups of 2 to 3
Xylem rays	Xylem rays uniseriate, oval in shape. Many of the medullary ray cells contain red contents and starch grains	Xylem rays uniseriate, rarely biseriate and triseriate	Xylem rays uniseriate, oval in shape. Many of the medullary ray cells contain red contents and starch grains	Xylem biseriate
Cell inclusions	Starch grains compound or simple. Rosette crystals are present in the cortex and phloem. Prismatic crystals are also present in cortex.	Rosette crystals and acicular (needle like) crystals are found in wood parenchyma. A powdery substance is present in it. Cortex is with brown content and starch grain. No crystals are present in phloem.	Starch grains compound or simple. Rosette crystals are present in the cortex and phloem. Prismatic crystals are also present in cortex.	Brown coloured contents in medullary rays, cortex region and in pericycle region Rosette crystals of calcium oxalate in cortex and phloem cortical cells, ray cells

Table 3 : Showing Quantitative study of different market samples of Sapthachakra

Vessels	S1	S2	S3	S4
Length (µm)	394.28 ± 187.89	294.71 ± 159.34	394.28 ± 187.89	293.14 ± 137.5
Width (µm)	120.43 ± 58.68	39 ± 22.91	120.43 ± 58.68	93.29 ± 31.04

Fibers	S1	S2	S3	S4
Length (µm)	487 ± 161.19	366.71 ± 112.65	487 ± 161.19	290.43 ± 114.3
Width (µm)	17 ± 3.65	17.71 ± 3.35	17 ± 3.65	18.28±5.47

Table 4 : Showing Physical Characters of Extracts of different market samples of Sapthachakra

Sample	Extracts	Colour	Odour	Taste
S1	Alcohol	Dark Yellow	Characteristic	Bitter
	Aqueous	Dark Yellow	Characteristic	Bitter
S2	Alcohol	Yellowish Brown	Characteristic	Astringent
	Aqueous	Yellowish Brown	Characteristic	Astringent
S3	Alcohol	Dark Yellow	No Characteristic	Bitter
	Aqueous	Dark Yellow	No Characteristic	Bitter
S4	Alcohol	Dark Yellow	Characteristic	Bitter
	Aqueous	Dark Yellow	Characteristic	Bitter

Table 5 : Showing Physico-chemical analysis of different market samples of Sapthachakra.

Parameters	S1	S2	S3	S4
Total ash%	3.33	4.03	2.29	3.33
Acid insoluble ash%	2.65	2.47	2.65	2.18
Water soluble extractive value%	10.86	12.7	19.28	10.86
Alcohol soluble extractive%	13.54	13.24	24.66	13.54
Moisture content%	9.96	11.35	9.92	9.96

Table 6 : Showing Chemical analysis of different market samples of Sapthachakra.

Chemicals	S1		S2		S3		S4	
	Alc	Aqu	Alc	Aqu	Alc	Aqu	Alc	Aqu
Alkaloids	+	+	+	+	+	+	+	+
Flavanoids	+	+	+	+	+	+	+	+
Triterpanoids	+	+	+	+	+	+	+	+
Glycosides	+	+	+	+	+	+	+	+
Steroids	-	-	-	-	-	-	-	-
Saponins	-	-	-	-	-	-	-	-
Tannins	+	+	+	+	+	+	+	+
Carbohydrates	+	+	+	+	+	+	+	+
Proteins	+	+	+	+	+	+	+	+

Table 7 : Showing the Inorganic components of different market samples of Sapthachakra.

Test	S1	S2	S3	S4
Iron	+	+	+	+
Sodium	+	+	+	+
Calcium	+	+	+	+
potassium	+	+	+	+

Table 8 : Showing the Comparative Rf values of TLC Profile of *Salacia* ssp.

Rf values of *Salacia* spp. studied (UV at 254 nm)							
S1		S2		S3		S4	
Rf value	Colour	Rf value	Colour	Rf value	Colour	Rf value	Colour
0.60	Dark green			0.60	Dark green		
0.67	Dark green			0.67	Dark green		
0.80	Dark green	0.80	Dark green	0.80	Dark green	0.80	Dark green
Rf values of *Salacia* spp. Studied (UV at 366 nm)							
0.15	Light green	0.73	Light blue	0.15	Light green		
0.33	Brown yellow	0.93	Dark blue	0.33	Brown yellow		
0.39	Pale			0.39	Pale		

	yellow				yellow		
0.53	Yellow			0.53	Yellow		
0.66	Dark green			0.66	Dark green		
0.73	Light blue			0.73	Light blue	0.73	Light Blue
0.80	Dark yellow			0.80	Dark yellow		
0.93	Dark blue			0.93	Dark blue	0.93	Dark blue
Rf values of *Salacia* spp. studied (After Derivatization)							
0.34	Dark blue			0.34	Dark blue		
0.48	Dark blue			0.48	Dark blue		
0.54	Violet			0.54	Violet		
0.59	Dark blue	0.59	Dark blue	0.59	Dark blue	0.59	Dark blue
0.61	Purple			0.61	Purple		
0.70	Light blue			0.70	Light blue	0.70	Light Blue
0.78	Dark blue			0.78	Dark blue		
0.87	Pale blue			0.87	Pale blue	0.83	Blue

Discussion

Shelf life is a time in which any given product remain satisfactorily without changing in its qualities, when stored under directed storage conditions.

The sample subjected for shelf life study was genuine drug collected from the wild sources and it was processed according to the standard processing methods. The readings of the values

were taken at different intervals of time, they showed almost similar properties after 3 months of preservation. There was light increase in the moisture content of the powder of Sapthachakra.

Conclusion

In the present study the physicochemical screening of genuine Sapthachakra and different market samples of Sapthachakra were done to know the quality of the market samples of the drug.

The values were compared to that of standard values of the genuine sample collected from the wild sources, the values of Kerala samples and Karnataka samples were nearly similar to that of the genuine sample. The values of the Tamilnad samples were less in quality.

Depending on the structure of flavonoids, UV 365 nm exposure of the TLC plate yields bands of dark yellow, green, or blue fluorescence respectively. The active moieties of the flavonoids might be one of the contributors for characteristic fluorescent bands in TLC and HPTLC analysis. Besides this, the Methanolic and Ethanolic extracts showed a very close band pattern during HPTLC, indicating possibility of almost similar pharmacological modes of action of these two extracts if, given for the treatment of various diseases. The presence of known active constituents like Mangiferin (a xanthone glucoside) and several others in various Salacia chinensis extracts indicates its use with pharmacological relevance in reducing blood glucose levels or in bringing about significant changes in the blood glucose metabolism related signaling pathways through specific target approach.

Our study also provides an option for further research into additional studies on other plant parts of *Salacia chinensis* to detect the presence or absence of the phytoconstituents and study their pharmacological and commercial use, with a broader perspective of whether the plant parts actually work synergistically in all the functions of it. The difference might lie in the concentrations of phytocompounds present within-plant parts, or different varieties/species grown at different places at different time period.

The present study therefore, is an

attempt to establish the phytoconstituent profile of Salacia chinensis, which may further help to compare and standardize this plant for several formulations and identification purpose.

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Source of Support: NIL
Conflict of Interest : None declared