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COMPARATIVE ANALYTICAL STUDY OF PATOL (*Trichosanthes dioica Roxb.*) AND TIKTA PATOL (*Trichosanthes cucumerina Linn.*) LEAVES COLLECTED FROM FIELD AND MARKET SAMPLE

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ABSTRACT

In ancient time, collection of drugs was usually done directly by physician or learners, so there was no need for identifying plant parts. But in recent era, actual collectors are different than physicians, so there is confusion in identification of proper plant or plant part due to lack of exposure and prevailing controversies. **Aim**- To compare the field and market samples of Patola leaves i.e. commonly used species of Trichosanthes on the basis of Pharmacognocy and Physico- chemistry. **Obejctives-** 1) To collect the field samples in flowering season i.e. Sharada Rutu and market samples from three markets. 2) To analyze the field and market samples on the basis of Pharmacognocy and Physico- chemistry. 3) To find out adulterants if observed in the market samples. **Materials and Methodology-** Collection of samples. Authentication of Drug done from recognised institute by Government of India. Then Pharmaconostical study Physico-chemical Study were carried out. **Observation and Results**- By analyzing Field and market samples of Patol (*Trichosanthes dioica Roxb.*) and Tikta Patol (*Trichosanthes cucumerina Linn.*) it is observed that both the samples are Pharmaconosticaly Physico-

chemicaly different but there are variations in market samples. **Conclusion**- The pharmacognostical and physico-chemical study shows that chemical constituents in *T. dioica and T. Cucumerina* are nearly same *T. Cucumerina* being more tikta with all pats, it should be used in medicine and *T.dioica* and *T.aguina* should be used in diet.

Keywords: Patol, Tikta Patol, Pharmacognostical, Physico-chemical study, *T. dioica, T. Cucumerina*

INTRODUCTION

Dravyaguna vigyan is fundamental, inseparable branch of Ayurveda which deals with study of such dravyas (Herbal Drugs) & its properties, actions, dose, time of drug administration and various preparations of these drugs. Through centuries, the science has gradually developed with new experiences and facts getting incorporated and old principles which could not with stand the test of authenticity, being discarded. The significance of drug assessment has increased manifold in recent times due to prevalence of spurious materials in the market. In ancient time, collection of drugs was usually done directly by physician or learners, so there was no need for identifying plant parts. But in recent era, actual collectors are different than physicians, so there is confusion in identification of proper plant or plant part due to lack of exposure and prevailing controversies. Screening of medicinal plant part for ensuring its quality is a need of time. Trichosanthes, a genus of family Cucurbitaceae is an annual or perennial herb distributed in tropical Asia, Polynesia, & Australia. Over 20 species are recorded in India of which two namely *T. anguina* & *T. dioica* are cultivated as vegitable. Other important species found in the world are *T. palmata, T. cordata, T. nervifolia, T. Cucumerina, T. wallichiana, T.cuspida, T.incisa, T. laciniosa, T. kirilowii* etc. [1].

The drug" Patola" is described by in classical literature by different names as Patola, Patoli, Chichinda, Swadu and Tikta Patola [2, 3]. Trichosanthes dioica Roxb. (Cucurbitaceae), called pointed gourd in English, Potol in Bengali, Palval in Hindi, and Patola in Sanskrit, is a dioecious climber found wild throughout the plains of north and North-East India from Punjab to Assam and Tripura states. It is particularly cultivated in Uttar Pradesh, Bihar, West Bengal, and Assam states of India, for its fruits, a common culinary vegetable in India. In India, all parts of this plant have been used traditionally for several medicinal purposes [4].

As per Vaghbatta – Patoli (*Trichosanthes dioica* Roxb) is edible Patola which is used as a vegetable [5]. For medicinal purpose *T. cucumerina* Linn. known as "vana patola" is

used in South, which is bitter in taste. In Bhavprakash nighantu Bhavamishra has mentioned two varieties" swadu" and "tikta patola." The swadu patola is called as CHICHIND [2]. From ancient time "Patola "is most potent with widely practically applicable drug.

There are several species of Trichosanthes like T. dioica, *T. Cucumerina*, *T. palmata, T. bracteata, T. wallichi* etc. In present situation the collection of authentic samples of "Patola "is very difficult because of it differs from market to market, so adulteration is seen in herbal material in the various local markets. Patola (Trichosanthes dioica Roxb.) which is easily available and frequently found in market but rarely found in field of maharashatra state and south India. So, there is need to evaluate the adulteration and substitute of *T. dioica* in market. Till now no work has been done from the pharmacognosticaly in the aspect of Dravyaguna vigyan on the species Trichosanthes. However, there are no reports on the pharmacological studies on its root and rarely on leaf. To fulfill this lacuna whole work is dedicated for pharmacognostical, physico-chemical study of field and market samples of Trichosanthes dioica leaves.

MATERIALS AND METHODOLOGY

Methodology

In the present study, Ayurvedic parameters of Dravya Parikshan i.e Panchabhautik

Materials- The leaves of Patola i.e Trichosanthes dioica Roxb were selected for the study as follows

Collection of Sample Place

1)The field samples of Patola i.e Trichosanthes dioica Roxb were collected from Varanasi Uttar Pradesh, Kamalnagar Dist. Bidar Karnataka, tal. Khultabad Dist. Aurangabad Maharashtra.

2)The market samples of Patola i.e Trichosanthes dioica Roxb were collected from Varanasi Uttar Pradesh, Kottakal market sample and Pune market sample. Authentication of sample The field sample of Patola i.e. Trichosanthes dioica Roxb were authenticated from the Botanical Survey of India, Pune.

Selection of the Rutu

Field samples were collected in flowering and fruiting season i.e. June to October Sharad Rutu Market samples were collected in same season i.e. June to October

Sampling of the Drug

Field Sample Sample collected from North India – 'AF'

Sample collected from South India – 'BF'

Sample collected from Maharashtra – 'CF'

Market Samples Sample collected from North India – 'AM'

Sample collected from South India – 'BM'

Sample collected from Maharashtra – 'CM'

Parikshan and modern pharmacognostical and physicochemical methods were used.

Panchabhautik Parikshan - Examination done with the help of Pancha-Dnyanendriya (Five Senses) helps us to determine Shabda, Sparsha, Roopa, Rasa and Gandha of the Dravya. It helps to determine the qualities of the Dravya (Rasadi properties) and in turn its action.

Physico-chemical analysis -

The physical standards help in the assessment of crude drugs. These are rarely constant but help in the evaluation of drug. In present study Determination of foreign matter, Moisture content (Loss on drying), Ash values, Elemental Ash Analysis, Determination of water-soluble extractives, Alcohol soluble extractives, High Performance Thin Layer Chromatography, Flurocense Analysis, Microchemical Analysis in which Carbohydrates, Alkaloids, tannin, Saponin, Glycosides, Protein / Amino acids tests were conducted.

OBSERVATIONS AND RESULT

Panchbhautik Parikshan (Organoleptic study) Macroscopy were carried out and results are given in Table 1.

Microscopy- While performing Macroscopic and Microscopic parameters, sample AM, CM resembles with Sample AM and sample BM, CF resembles with Sample BF.

Powder Microscopy- All sample shows presence of stomata, Crystals/ calcium oxalate, trichomes, Epidermal cells. Vascular bundles are seen in sample AF,

AM, BM, CM not seen in BF and in CF. Phloem fibres are seen in AF, BF, BM, CF.

Histochemistry- In Histochemistry various reagents were passed through sample T.S. to observe micro chemicals. In all samples it shows the presence of Glycosides, Carbohydrates, Tannin, Starch, Proteins, and absence of alkaloids

In Elemental Ash analysis it shows absence of copper in all samples and Potassium present in sample AF, AM but absent in remaining samples.

Table 2 Presents the results of Physicochemical study.

Table 3 Shows the Extractive values in Aqueous and alcohol. Ph and Specific gravity test were carried out in Aqueous extract.

Microchemical test were carried out for Aqeous and Alcochol extract for presence of various phytochemicals which are mentioned in **Table 4, 5**.

HPTLC Analysis

Table 6 is HPTLC result for Sample AF and AM- After analyzing sample AM and AF on HPTLC plate with two spots as 5 µl and 10 µl under 366 nm and 245 nm uv light, it shows same Rf Values and constituents present in that. That means both samples are same.

Table 7 is HPTLC result for Sample BF And BM - After analyzing sample BM and BF on HPTLC plate with two spots as 5 µl and 10 µl under 366 nm and 245 nm uv light, it

shows same Rf Values and constituents present in that. That means both samples are same.

Table no 8 is HPTLC result for Sample CF And CM- After analyzing sample BM and BF on HPTLC plate with two spots as 5 µl and 10 µl under 366 nm and 245 nm uv light, it shows different Rf Values and constituents present in that. That means both samples are different.

CONCLUSION

The pharmacognostical and physico-chemical study shows that chemical constituents in *T. dioica* and *T. Cucumerina* are nearly same.

In pharmacognostical study sample CM showed resemblance with sample AF, AM. And sample CF showed resemblance with BF, BM respectively, from the entire pharmacognostical and physic-chemical study it is observed that the species available in the three field respective areas are same species in the respective market area.

From physico chemical study it is very difficult to arrive some conclusion because variables in present readings. In chromatographic study sample AF and AM are same. Same as sample BF and BM are same but sample CF and CM are not same because of variable in Rf values. Sample CM is different from BF, BM, and CF. Sample CM resembles same with sample AF, AM pharmacognostically. From these the all observations it can be said that market

samples were collected from that particular area only CM sample i.e. market sample of Maharashtra was identified as *T.dioica* . The difference was seen because the market sample of Maharashtra was originally recruited from the north India Ludhiyana region. This information was received later by the distributor itself.

The field samples AF (i.e. Varanasi field sample) BF (i.e. South India field sample) compared with respective market samples of the same region sample AM (i.e. Varanasi market sample), sample BM (i.e. Kottakal Market sample) were resembled with each other. The North field and market samples were of *T.dioica roxb*. and south field and market both samples were of *T.cucumerina*. The third sample CF (i.e. Maharashtra field sample) was found as *T. Cucumerina Linn.* while CM (i.e. Maharashtra market sample) was found as *T.dioica* .

From the above Observation it is difficult to arrive at a definite conclusion regarding the identification of various other varieties of Trichosanthes species of patola which are not collected and mentioned in various classical texts.

T. Cucumerina being more tikta with all pats, it should be used in medicine and *T.dioica* and *T.aguina* should be used in diet as pathya shaka for diseases in which patola is choice of drug because other various verities of Trichosanthes are not collected in present study.

Table 1: Panchbhautik Parikshan

Characters	AF	AM	BF	BM	CF	CM
Shabda	Short	Short	Short	Short	Short	Short
Sparsh	Khar	Khar	Alpa Khar	Alpa Khar	Alpa Khar	Khar
Roop	Cordate	Cordate	Palmatifid	Palmatifid	Palmatifid	Cordate
Rasa	Tikta	Tikta	Tikta	Tikta	Tikta	Tikta
Gandha	Non Specific	Non Specific	Non Specific	Non Specific	Non Specific	Non Specific

Table 2: Physicochemical Study

Parameters	AF	AM	BF	BM	CF	CM
Foreign matter %	-	-	-	5gm	-	25gm
Moisture %	7.86	8.37	7.82	9.73	8.41	9.47
Total ash %	16.61	20.04	19.92	22.84	18.76	19.40
Aqueous Soluble Extract %	16.60	14.74	22.31	51.84	14.63	15.11
Alcohol Soluble Extract %	7.13	6.24	9.18	4.67	5.34	7.34

Table 3: Extractive Values

Sample	Aqueous extract			Alcohol extract
	% Aqueous Extract	Ph	Specific Gravity	% Alcohol Extract
AF	16.60%	7.34	1.0058	7.134%
AM	14.74%	7.66	1.0012	6.244%
BF	22.31%	7.10	1.0050	9.18%
BM	51.84%	8.12	1.00467	4.67%
CF	14.63%	7.70	1.00467	5.343%
CM	15.11%	8.45	1.003	7.347%

Microchemical testing of Aqueous Extract

Table 4: Microchemical testing of Aqueous Extract

Test performed	AF	AM	BF	BM	CF	CM
Alkaloids	+Ve	-Ve	-Ve	-Ve	-Ve	-Ve
Glycosides	+Ve	+Ve	+Ve	+Ve	+Ve	+Ve
Carbohydrates	+Ve	+Ve	+Ve	+Ve	+Ve	+Ve
Phytosteron	+Ve	+Ve	+Ve	+Ve	+Ve	+Ve
Saponin	+Ve	+Ve	+Ve	+Ve	+Ve	+Ve
Phenolics	+Ve	+Ve	+Ve	+Ve	+Ve	+Ve
Tanin	+Ve	+Ve	+Ve	+Ve	+Ve	+Ve
Protiens	+Ve	+Ve	+Ve	+Ve	+Ve	+Ve
Amino acids	-Ve	-Ve	+Ve	-Ve	-Ve	-Ve
Reducing sugar	+Ve	+Ve	+Ve	+Ve	+Ve	+Ve
Starch	+Ve	+Ve	+Ve	+Ve	+Ve	+Ve

Microchemical testing of Alcohol Extract

Table 5: Microchemical testing of Alcohol Extract

Test performed	AF	AM	BF	BM	CF	CM
Alkaloids	+Ve	+Ve	+Ve	+Ve	+Ve	-Ve
Glycosides	-Ve	-Ve	-Ve	-Ve	-Ve	+Ve
Carbohydrates	-Ve	-Ve	-Ve	-Ve	-Ve	+Ve
Phytosteron	+Ve	+Ve	+Ve	+Ve	+Ve	+Ve
Saponin	-Ve	-Ve	-Ve	-Ve	-Ve	+Ve
Phenolics	+Ve	+Ve	+Ve	+Ve	+Ve	+Ve
Tanin	+Ve	+Ve	+Ve	+Ve	+Ve	+Ve
Protiens	+Ve	+Ve	+Ve	+Ve	+Ve	+Ve
Amino acids	+Ve	+Ve	+Ve	+Ve	+Ve	-Ve
Reducing sugar	+Ve	+Ve	+Ve	+Ve	+Ve	+Ve
Starch	+Ve	+Ve	+Ve	+Ve	+Ve	+Ve

Table 6: Sample AF and AM

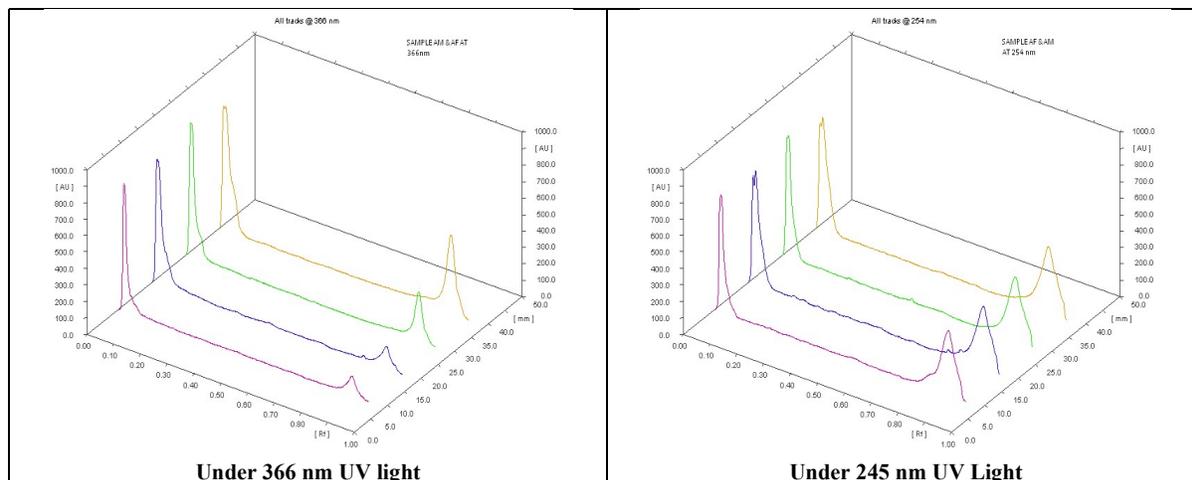| Sr. No.	Sample	Rf	Area at 254 nm	Area at 366 nm
1.	AM 5 µl	0.02	14551	13171
		0.88	23326	4400
2.	AM 10µl	0.02	19434	20955
		0.88	20984	5339
3.	AF 5µl	0.02	16765	19425
		0.88	23689	9657
4.	AF 10µl	0.02	23565	26737
		0.88	25941	16924

Under 366 nm UV light   **Under 245 nm UV Light**

Table 7: Sample BF And BM

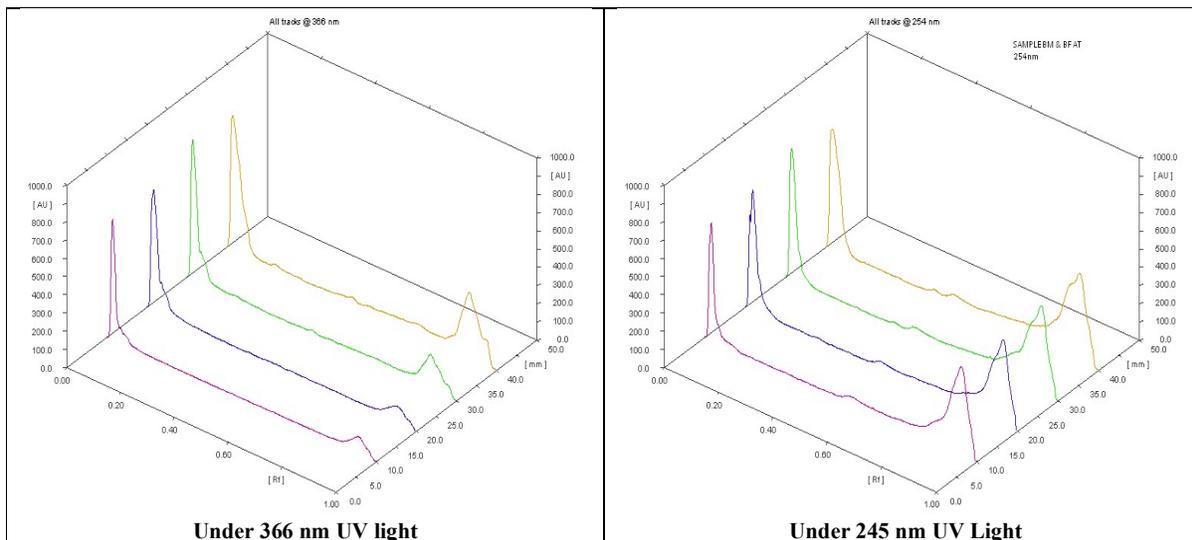| Sr. No.	Sample	Rf	Area at 254 nm	Area at 366 nm
1.	BM 5 µl	0.02	11996	11550
		0.92	31424	4851
2.	BM 10µl	0.02	17408	17239
		0.92	15820	5079
3.	BF 5µl	0.02	16900	18005
		0.92	23588	9333
4.	BF 10µl	0.02	21997	25186
		0.92	34408	18840

Under 366 nm UV light   **Under 245 nm UV Light**

Table 8: Sample CF And CM

Sr. No.	Sample	Rf	Area at 254 nm	Area at 366 nm
1.	CM 5 µl	0.02	9370	5448
		0.70	1084	1342
		0.88	23841	4137
2.	CM 10µl	0.02	11591	12160
		0.70	1991	2415
		0.88	24996	6103
3.	CF 5µl	0.02	14615	17398
		0.88	25595	14636
4.	CF 10µl	0.02	82570	21345
		0.88	26808	22424

Under 366 nm UV light   Under 245 nm UV Light
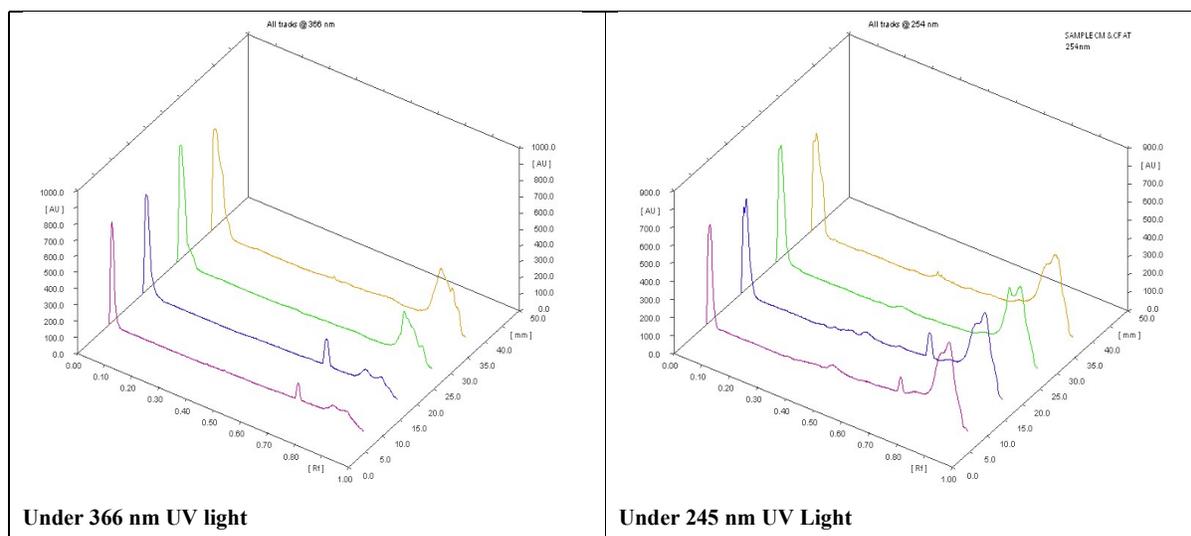
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