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ORIGINAL RESEARCH ARTICLE

PHYTOCHEMICAL EVALUATION OF CHURNA OF VIDARI (*PUERARIA TUBEROSA*, ROXB.)

Mithila Vijaykumar Amin[1], Azizahmed Imamsab Arbar[2]

[1]Final Year PG. Dept. of Kaumarabhrutya KLEU's Shri B.M.K, Ayurveda, Mahavidyalaya, Belgaum, Karnataka.

[2]HOD Dept. of Kaumarabhrutya, KLEU's Shri B.M.K, Ayurveda, Mahavidyalaya, Belgaum, Karnataka.

Corresponding author email address: dr.mithila_amin@yahoo.in

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ABSTRACT

Background: *Vidari* (*Pueraria tuberosa*) has been used throughout ages as a tonic, rejuvenator and galactogogue. This was an analytical study carried out to authenticate raw drug *Vidari*. **Aims:** This study aims to determine the Phyto-chemistry of the *Vidari* tubers when collected as per the Ayurvedic Principles. **Methods and Material:** *Vidari* tubers were collected from *akaashiya bhumi* (~land predominant in vacuum primordial element), in the *sharadartu* (~autumn), and during *Mrigashiranakshaktra* (constellation), and dried powder (*churna*) was prepared and evaluated phyto-chemically by subjecting it to various tests like physico-chemical, qualitative analysis, and TLC. **Results:** Qualitative tests revealed the presence of carbohydrates, reducing sugars, monosaccharides polysaccharides, hexose sugars, steroids, alkaloids, glucosides and flavonides, calcium, etc. and TLC also inferred positive Rf values, indicating the presence of puerarin. **Conclusion:** The results of phyto-chemical evaluation of churna of *Vidari* (*Pueraria tuberosa)* tubers collected as per the Ayurvedic rules, prove the presence of the active principles which support its therapeutic efficacy.

Key-words: *Vidari*, *Pueraria tuberosa* Roxb. ex Willd., Puerarin, Galactogogue.

INTRODUCTION:

Pueraria tuberosa is an important and potential medicinal plant in traditional and folklore systems commonly known as *Vidari*. In Ayurveda, the flowers are used as cooling agents and as aphrodisiacs, while roots act as a demulcent and refrigerant in fevers. The root tuber is sweet, unctuous, cooling, tonic, and effectively used as aphrodisiac, galacatagogue and diuretic. It is also used to cure leprosy, diseases of blood and urinary discharges. It is employed as an emetic, tonic and also believed to be a galactagogue.[1]Puerariatuberosa (Roxb. ex Willd.) DC. is a member of Fabaceae family known as *Vidari* in Sanskrit, and *Bhilaikhand* in Hindi. It is a deciduous climbing shrub distributed almost throughout India ascending upto 1200 meters except in very humid and arid regions.[2] *Acharya* Charaka categorised it in *balya* (strength promoting), *kantya* (one which is beneficial for throat), *varnya* (complexion enhancer), and *snehopaga* (oleating adjunctive) *mahakashayas* (groups), while *Acharya* Sushruta has mentioned it as *Stanyavardhaka* (the one which augments breast milk).[3] Adulterants or substitutes of *Vidari* include *Adenia palmata*, *Trichosanthes cordata*, *Lettsomiasetosa*, *Solanum verbascifolium*,

T.palmata, *Cycas circinallis, Cycas rumphii, Cycas pectinata, Cycas beddomei*.[4] Another variety of *Vidari* known as *Kshirvidari* is botanically known as *Ipomea digitata* from the Convolvulaceae family.[5] However *Pueraria tuberosa* is accepted as genuine *Vidari* and is used in our study. B-sitosterol, Stigmasterol, Daidzein, Puerarin, C-glycoside 4', 6"-diacetylpuerarin, pterocarpanone, tuberosin, pterocarpanone-hydroxy-tuberosone, coumestan-tuberostan, puerarone, coumestan-puerarostan have been isolated from the tubers of *Vidari*.[6] Physico-chemical evaluation of the tubers when collected as per Ayurvedic principles was found to show presence of additional chemical constituents like flavonoids and steroids as compared to the previous studies.[7,8]

MATERIALS AND METHODS:

Materials: Ideal plants (*prashashtaaushadas*) were selected as mentioned in Ayurvedic texts which were endowed with appropriate *rasa* (taste) and *gandha* (smell), not moth-eaten, nor contaminated with toxins, not injured by weapons, nor burnt by the sun or fire, not affected by intense breeze, not decayed in water, not grown in inauspicious land like crematorium, grown in favourable season and eastwards[9] were collected.

The land from which the tubers were collected satisfied the definition of *prashastabhumi* (ideal habitat) as explained in the texts that, is the land which is clean, fertile, which has favourable cold weather, sunlight, winds as well as rains, which is away from graveyards and temples, which is devoid of anthills and is not over-shadowed by other big trees.[10,11]

Collection of the drug was according to rules in the Ayurvedic classics as follows-

Virya (Potency): *Vidari* has *sheeta virya* (cold potency) and the drugs possessing cold potency should be collected in *Saumya rtu* (cold season) that is in either *Varsha* (rainy), *Sharada* (autumn) or *Hemanta* (winter).[12]

Karma (Action): *Vidari* is a *Shamaniya aushada* (pacifying drug) and pacifying drugs should be collected from *Aakaashiya bhumi* (land predominant in vacuum primordial element).[13]

Upyutkaanga (Part used): The useful medicinal part of *Vidari* is *Kanda* (tuber) and the season for collection of tubers is *Sharada rtu* (autumn season).[14]

Nakshatra (constellation): The constellations in which the drugs are potent are *Pushya Ashwini* and *Mrigashira*.[15]

With due consideration of all the points mentioned in Ayurvedic Classics pertaining to drug collection, the matured and undamaged tubers of *Vidari* were collected from its natural habitat with the permission from concerned authorities of Uttan Vanaushada Sanshodhan Sansthan Keshav shrushti Uttan Bhayander Dist. Thane which was a *aakaashiya bhumi* (land predominant in the vacuum primordial element) falling in the western coastal region of Maharashtra. It was collected in the month of October, in *Sharada rtu* (autumn) and during *Mrigashira nakshaktra* (constellation). The tubers were washed by running tap water to remove the adherent soil dust etc. Morphological and microscopic characteristics were studied and its authentication was done at the Central Research Faculty of BMKAM. Shade dried cut pieces of the peeled tubers were subjected to fine powdering as per standard methods[16]. The powder was then stored in airtight plastic packets for further study.

Methods: Parameters like loss on drying , ash value , acid insoluble ash , water soluble extractive, alcohol soluble extractive, and qualitative tests for organic parameters like- reducing sugars monosaccharides, pentox sugars, hexose sugars, proteins, steroids, cardiac glycosides, anthroquine glycosides, saponin glycosides, cyanogenetic glycosides, coumarin glycosides, flavonoids, alkaloids, tannins and inorganic parameters like –

calcium, magnesium, sodium, potassium, ferrous, sulphates, phosphates, chlorides, carbonates, nitrates, were carried out by following standard methods[17].

In TLC study, a drop of ethanolic extract of *P.tuberosa* was loaded on precoated silica gel 60 F 254 [E-Merck] plates of 0.2 mm thickness and Chloroform: Methanol: Acetic Acid (8:2:1) was used as a solvent system.[18]

The solvent was allowed to run for a distance of 8cm and the plate was observed under short and long wavelengths and the distance of the bands were noted down and the Rf value of the bands were calculated.

RESULTS:

Analysis of Physico-Chemical Parameters

The physico-chemical analysis revealed the following results. [Table 1]

Table 1: Showing Analytical Data Of Physico-Chemical Parameters Of *Vidarikanda Churna*

Parameter	Result
Loss On Drying	9.1%
Ash Value	3.88%
Acid Insoluble Ash	0.09%
Water Soluble Extractive	44%
Alcohol Soluble Extractive	13.6%

Analysis Of Organic Qualitative Parameters

Qualitative tests revealed the presence of reducing sugars, monosaccharides polysaccharides, hexose sugars, steroids, alkaloids, glucosides and flavonides. [Table 2]

Table 2: Showing Analytical Data Of Organic Qualitative Tests of *Vidarikanda Churna*

Component	**Test**	**Result**	
		Alcohol soluble extractives	**Water soluble extractives**
Carbohydrates	Mollish Test	Positive	Positive
Reducing Sugars	Benedicts Test	Positive	Positive
Mono Saccharides	Barfoeds Test	Positive	Positive
Poly Saccharides	Iodine Test	Positive	Negative
Hexose Sugars	Selwinoffs Test	Positive	Positive
Pentox Sugars	BialsOrcinol Test	Negative	Negative
Non-Reducing Sugars	Fehlings Test	Negative	Negative
Proteins	Millions Test	Negative	Negative
Fats And Oils	Microscope Test	Negative	Negative
Steroids	Salkowskis Test	Positive	Positive
Alkaloids	Dragendroffs Test	Positive	Positive
Anthraquinone Glycosides	Modified Borntrageners Tests	Positive	Positive
Saponin Glycosides	Foam Test	Positive	Positive
Cardiac Glycosides	Keller Killiani Test	Negative	Negative
Cyanogenetic Glycosides	Guinard Reaction Test	Negative	Negative
Coumarin Glycosides	Fluorescence Test	Positive	Negative

Flavonoids	Lead Acetate Test	Positive	Positive
Tanins	Lead Acetate Test	Negative	Negative

Analysis of routine inorganic qualitative parameters

Qualitative tests revealed the presence of calcium. [Table no. 3]

Table 3: Showing analytical data of inorganic qualitative tests of vidarikandachurna

Component	Test	Result
Calcium	Calcium Oxalate Test	Positive
Magnesium	Ammonium Carbonate Test	Negative
Sodium	Flame Test	Negative
Potassium	Sodium Cobalt Nitrate Test	Negative
Ferrous	Ammonium Thiocyanate	Negative
Sulphates	Barium Sulphate Test	Negative
Phosphates	Ammonium Phospho-Molybdate Test	Negative
Chlorides	Lead Acetate Test	Negative
Carbonates	Magnesium Sulphate Test	Negative
Nitrates	Copper Test	Negative

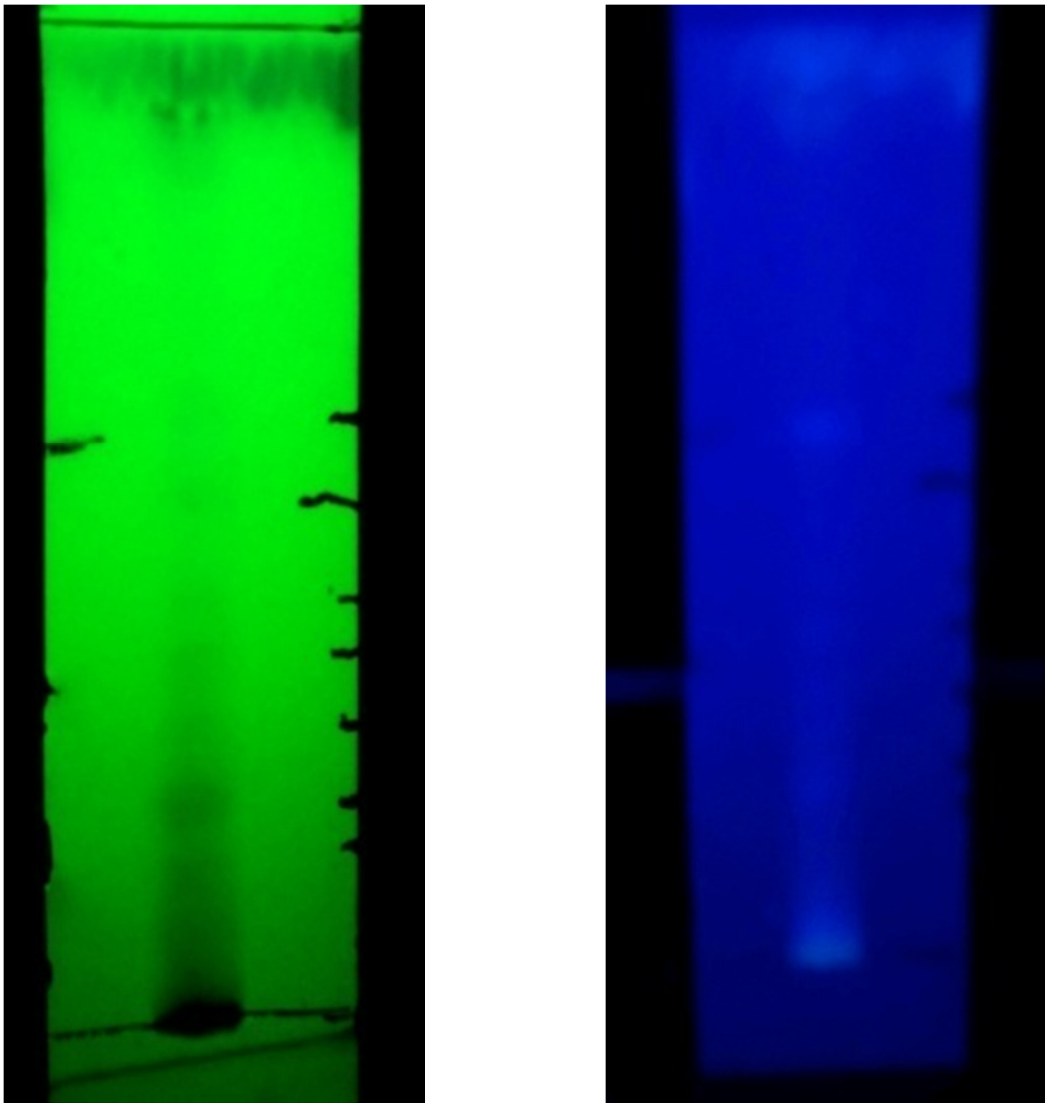
Analysis on TLC separation of ethanolic extract

TLC analysis of the extract showed 5 resolved bands [Rf – 0.18, 0.23, 0.3, 0.51, 0.59] in the short wave and 1[Rf – 0.58] in the long wave, the colour of which was fluorescent blue which was matching with the standards.[19] (Table 4. Figure 1.)

Table 4: Showing TLC Results of Ethanolic Extracts of *Vidarikanda Churna*

UV 254		**UV 366**			
STANDARD Rf VALUE	**TEST Rf VALUE**	**STANDARD Rf VALUE**	**TEST Rf VALUE**	**COLOUR OF BAND IN STANDARD**	**COLOUR OF BAND IN TEST**
0.13	0.17	0.54	0.57	BLUE FLUORESCENCE	BLUE FLUORESCENCE
0.25	0.22				
0.29	0.30				
0.54	0.51				
0.59	0.59				

Figure 1: Showing TLC Results Of Ethanolic Extracts Of *Vidarikanda*



DISCUSSION:

Qualitative analysis of Vidarikanda churna revealed presence of carbohydrates which may be responsible for Madhura ras as found in classical references.[20]

The results from preliminary phytochemical screening revealed that water and ethanol extracts showed the presence of flavonoids, which are known to exhibit antimicrobial and spasmolytic activities. [21,22,23]

The resolution of 5 different bands in the TLC is indicative of 5 different chemical constituents 1 among which is puerarin which resolved at Rf = 0.51. Puerarin has proven pharmacological activities like: hepatoprotective, estrogenic, anticancer, antioxidant ,neuroprotective which have been reported.[24,25,26,27,28]

Results from the present study indicate that *P. tuberosa* root tuber collected , as per the rules for collection of the tuber mentioned in classics, appears to be a promising source for, estrogenic, antimicrobial, antioxidant, neuroprotective compounds in accordance with the Ayurvedic claims on the therapeutic properties of the crude drug.

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