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PHARMACOGNOSTICAL EVALUATION OF CULTIVATED SAMPLE AND MARKET SAMPLESOF DRUG DANTIMOOL

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ABSTRACT

Ayurveda is a gift to the mankind since the *Veda-kala* and is based on the principals of eternal life and longevity. Ithas rich heritage of herbal preparations which are extensively used from continues with highly effective results; so whole the industry and intellect are concentrating towards it anxiously. But the deforestation and extinction of many species (biodiversity) and incorrect identification of many plants has been resulted in adulteration and substitution of raw drugs. To recover this factor needed a major treat in the research on commercial natural products, like to promote the cultivation methods of the green plants. The aim of this research is to evaluate and compare the Pharmacognosticalproperties of the cultivated and market samples of *Dantimool.* (*Baliospermummmontanum* Muell. Arg.' roots). The samples were studied Pharmacognosticallythrough API and other methods. Like Foreign matter study, Macroscopic study Microscopic study etc. All the results were compared with API for authenticity and also with each other. On the bases of this study it can be understand that cultivated *Dantimool* has more efficacy and cultivation may be a good alternate or source for herbal therapeutic demand.

KEYWORDS: *Dantimool, Baliospermummmontanum* Muell. Arg., Pharmacognostical, API, Cultivation.

INTRODUCTION

Ayurveda is an invigorating science that deals with the existence cycle of person and an incredible consciousness on the earth and the purpose behind their reality on earth. This superannuated and unique medicinal science is designed to romote human lives happiness at physical, mental and spiritual level.

Charaka, sushruta and all ayurvedacharya accepted dravya as the supreme matter. The trisutra1– hetu, linga, aushadha & the padachatushta2- vaidya, rogi, aushadha, paricharaka; these two evidence are enough to provethe superiority of Dravya.

In current period everyone be aware of the potency and adverse effect of synthetic drugs and lead their interest increasing in *Ayurvedic* proprietary–herbal medicine, Thisworthless preparations are utilized since a long period without any doubts. But the deforestation, extinction of many species and incorrect identification of many plants has been resulted in adulteration and substitution of raw drugs.[3]

All the herbal plants are used as a dry form in the pharmaceuticals and individual practising. So a method to assess their authenticity in the dryform is necessary. Although there is a vast document discover with regards to morphology of green drugs. However depend on markets for the procurement of plants; raw materials are not too much relevance even having sound knowledge of green drugs. The present study is carried out to collect some information and methods for identification of *Dantimool* samples with the help of Pharmacognostical study.

REVIEW OF LITARATURE

Drug Review
Latin name – *Baliospermum Montanum* Muell. Arg.[4]
Family - Euphorbiaceae
Genus - *Baliospermum.* Species - *Montanum* Sanskrit - *Danti, Hastidanti*[5]
Gujarati - Dantimul, Jamalgota English -Red physic nut, Wild castor, Wild croton & Wild sultan seed
Kula- Eranda Kula
Gana- Charaka-Virechaniya; *sushruta- adhobhagahara,*

syamadi, Mulini

Literature Review

Udumbaraparni (leaves resembles the shape of *Udumbara)*, *Erandaphala* (the seeds are similar or acts as *purgative* like *eranda*), *Nikumbha, Chitra, Upachitra, Madhupushpa* etc. synonyms for *Danti*stated in the *granthas.*[6]

The drug *Danti* holds: *katu rasa, ushnavirya, tikshna – vikasiguna, katuvipaka*and *vyavayi-vikasi-asukariprabhava*properties.[7]

It is documented for many beneficial effects like virechana, pachana, bhedana, rochana, kaphapitthara, Raktadoshaharaetc. It is discovered that Dantihas been demonstrated diseases like arsha, udararoga, kustha, kandu, krimiand so many.

Formulations: Danti-HaritakiAvaleha, Dantyarishta, Dantighrita, Dantyasava, Kangayanagudika, Dantimooladilepa, Danti- Trivritadichoorna etc.

Doses: Root powder-1 to 3gm; Seed powder-125 to 250mg; Seed oil-2 to 5 drops.[8]

Dantishodhan -- *Danti* roots are pasted by *pippalichurna*and honey, then *kusha [Desmostachyabipinnatastapf.]* is wrapped and then coated by *mritika* [mud] and give *agnipaka*, separate the root and do *chhayashushka*. In this way its *vikasiguna* goes down.[9] Thus *Danti* is one of the potential helpful medication in *Ayurveda*.

MATERIALS AND METHODS

Cultivated Sample: (Sample PU 1) 500gm genuine – cultivated drug sample of green and fresh *Dantimool* was collected from Botanical Garden of Parul University.

Market samples: They were collected 250gm each raw drug city markets of Gujarat.

Sample AM 2 - Ahmedabad; **Sample VM 3-** Vadodara; **Sample SM 4 -** Surat.
The drug authentication for all four samples of drug *Dantimool* was done at M S University, Botanical Dept. Vadodara. Powder of all four samples of *Dantimool* was prepared in *Dravyaguna*department. After well drying the cultivated Sample PU 1, the foreign matter study was done for all the dry whole four samples. Then they were pounded and filtered to achieve the fine powder. Sufficient *churna* were measured and kept in the airtight jar and stored properly for further study.

Study design: Pharmacognostic study

1. Determination of foreign matter
2. Organoleptic study
3. Macroscopicstudy
4. Microscopic study

Method of Foreign Matter Study:[10] Any material other than the part used is called as foreign matter. Sample of Dantimool was taken and spread into layer. It was examined for the presence of foreign matter like mud, stones, leaves or other part of the plant etc. with the help of hand lens. The foreign matters were separated and the sample was weighed again. Percentage of foreign matter was calculated by using following formula. The procedure was repeated for remaining samples.

% Foreign- matter = Weight of foreign matter
----------------------------------X100Weight of sample

Method of organoleptic study

The *rasadi* properties of the *dravyas*are depandson *Panchamahabhootas*; *Prithvi, Jala, Teja, Vayu, Akasha*. The organoleptic- *Panchabhautika* study; The *Shabda, Sparsha, Rupa, Rasa* and *Gandha* of the drugs were defined with the help of *Panchagnyanendriya;* Five senses- Ear, Skin, Eye, Tongue & Nose.

Method of Macroscopic study

All samples were subjected to evaluation by observation with naked eyes, by tactile and other sensory inspection. A magnifying lens with a dissecting microscope was used for evaluation of surface characters.

Methods for Microscopic study 11: Socking and softening of dry samples. Fixation of samples in FAA, Formalin: Acetic Acid: Alcohol 70% (10 ml: 5 ml: 85ml) (if freshly collected). Sectioning using Sliding microtome. Staining with safranin & astra blue combination. Dehydration using alcohol and xylene gradation series. Mounting of section using DPX (Diphthalate xylene) mount solution. Observation and microphotography.
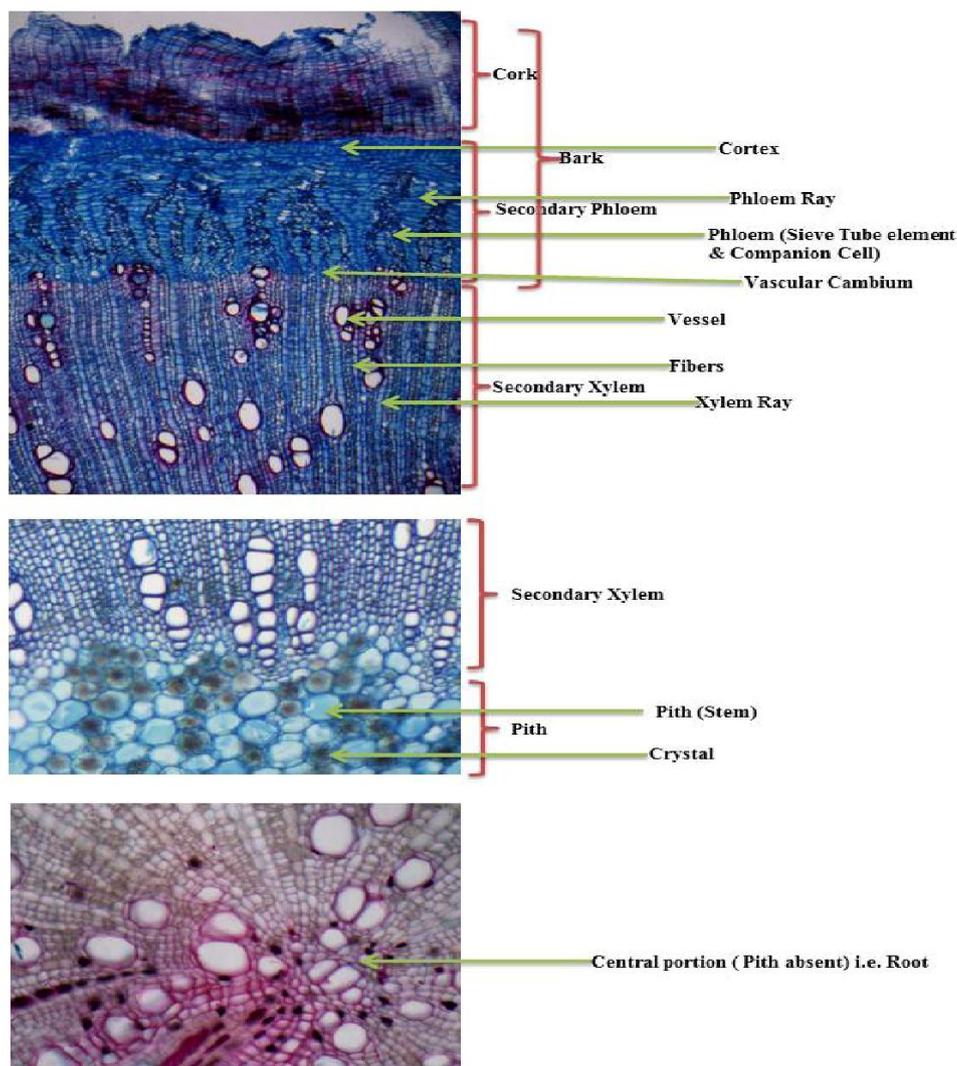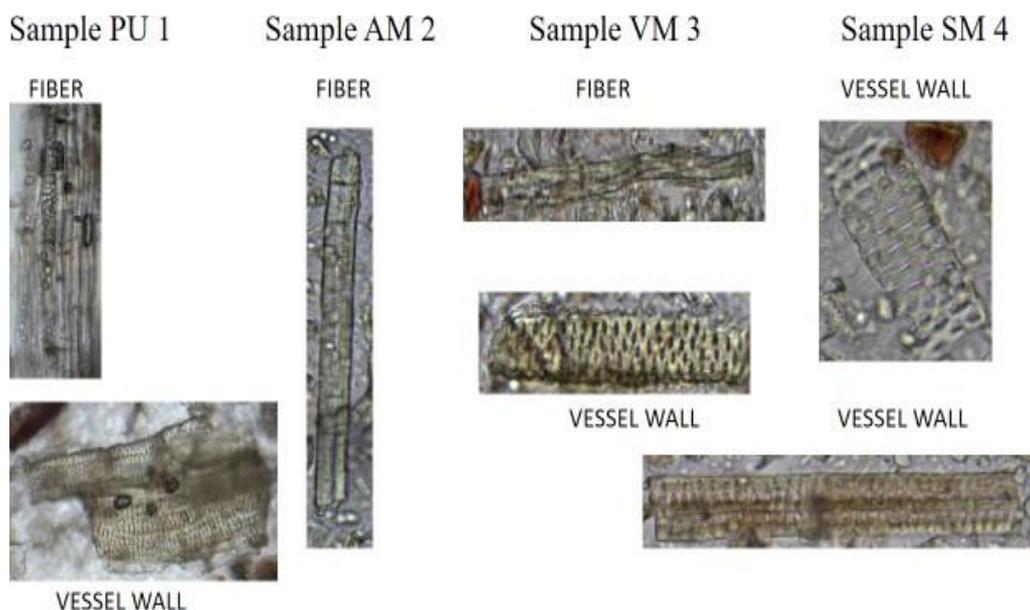
OBSERVATIONS AND RESULTS

Foreign matter study

Sample no.	S. PU 1	S. AM 2	S. VM 3	S. SM 4
% of Foreign matter	0.86%	0.24%	0.29%	1.02%

Organoleptic study

Features	Sample PU 1	Sample AM 2	Sample VM 3	Sample SM 4
Texture	Coarse	Coarse	Coarse	Coarse
Touch	Rough	Rough	Rough to smooth	Rough
Color	Dark cream	Yellowish Brown	Greenish Brown	Creamish Brown
Taste	Pungent	Pungent	Less Pungent	Pungent,Astringent
Odor	Not specific	Not specific	Sweetish smell	Different smell

Macroscopic study

Parameters	Sample PU 1	Sample AM 2	Sample VM 3	Sample SM 4	
Shape	Cylindrical, mostly straight	Mostly cylindrical	Cylindrical, slight curved	Not cylindrical	very
Size	Width: 0.6 to 1.6 cm Length:18-22 cm	Width: 0.5 to 1.2 cm; Length : 4- 8 cm	Width: 0.3 to 0.9 cm; Length : 3-7 cm	Width : 0.4 to 0.6cm Length:2- 5cm	
Bark	Thin, dark cream, Can't easily peeled, internally light Brown	Thin, yellowish brown, internally light brown, can't easily peel	Thin, both side brown, can easily peel	Thin, both side dark brown, can easily peel	
Fractures	Very hard, regular with more fibers	Hard regular fibers and with	Slight hard, regular with some fibers	Soft, easy break	to
Surface	Rough to having longitudinal striations, transverse scars and cracks	slight rough with cracks	Rough and slight smooth	Rough smooth wrinkles	to with

Microscopicstudy: Section-Microscopy

Sample PU 1　　　Sample AM 2　　　Sample VM 3　　　Sample SM 4

FIBER　　　　　　　FIBER　　　　　　　FIBER　　　　　　　VESSEL WALL

VESSEL WALL　　　　　　　　　　　　　VESSEL WALL　　　　VESSEL WALL

Section Microscopy: Sample PU 1: Transverse section is taken from the root showed the secondary xylem and phloem. The Sec. Xylem's section was taken tangentially and radially Longitudinal. Ray parenchyma cells are filled with sand-like particles. Phloem Parenchyma cells, Companion cells and sieve tubes elements were in Phloem. Many layered corks also. The cortical parenchyma is filled with phenolic compounds as dark spots. Sec. Xylem diffuse porous, vessels are solitary in radial multiples of 2-8, angular in outline. Vessels having simple perforation plates, inter-vessel pits showing scalariform perforation. Libriform fibers containing deposition of a gelatinous layer, fiber lumen is relatively broader with a thin wall. Pith is completely absent. Phloem & xylem parenchyma are filled with storied starch. Xylem rays areuni, bi to rarely tri-seriate, contains upright and procumbent cells. Ray parenchyma cells are unlignified with thin walls.

Sample AM 2: Selected two different pieces of drug sample. TS of first piece showing the secondary xylem. The other characters are same as the sample 1. Secondary Xylem's T S showed absence of pith. It indicates the root portion. In TS of second piece, secondary xylem, the presence of pith indicating the stem portion. Sample VM 3: Selected two pieces of the sample. Transverse & tangential longitudinal sections of it observed. Secondary Xylem was present in both sections. T S was taken of Secondary Xylem and pith portion. Presence of pith indicates the stem portion. TS passing through pith showed the Internal Phloem presence in pith. Sample SM 4: When Sample SM 4 was socked for softening, for sectioning, it got very soft and it's so difficult to sectioning. After observation of the whole sample under the Microscope, it was noticed that the piece has opposite decussate leaves.

Powder Microscopy: Sample PU 1: Starch grains, Druses i.e. Ca. Crystals, cork, Parenchyma cells, Secondary xylem fibers, Parenchyma with storage of Phenolic compounds, bark portion with Phenolic compounds, pitted and reticulate vessels, phloem fibers etc. Sample AM 2: Cork, Starch grains, sclereids, secondary xylem fibers, parenchyma with Phenolic compounds, Trichomes, vessels etc. Sample VM 3: Starch grains, Druses (crystals), Xylem-fibers, vessels, sclereids, parenchyma etc. Sample SM 4: Starch grains with Prismatic crystals, vessels, xylem fibers, parenchyma with Phenolic compounds and Trichomes also.

DISCUSSION

(1)　Foreign matter study Differences
Foreign matter is not more than 2% on the basis of API. It were found in three Samples PU 1, AM 2, VM 3: 0.86%, 0.24%, 0.29% respectively which were not more than 1 % and in limits of API. While in Sample SM 4 it was found 1.02%, which was also in API limits, but more than other samples.

(2)　Organoleptic study Differences
The texture of all Samples were coarse due to the scars on it, In touch Sample PU 1, AM 2 & SM 4 were rough, while VM 3 was rough to slight smooth. Sample PU 1 was dark cream, while the other three samples were on brown shade. The taste of Sample PU 1, AM 2 & VM 3 were pungent, while SM 4 was little astringent with pungent taste. There was not any specific smell noticed in Sample PU 1 & AM 2. But in VM 3 little sweetish smell, while SM 4 had some different odour.

(3)　Macroscopic study Differences
All the samples were cylindrical while the Sample SM 4 wasn't properly like that. All the samples were differ in size. Sample PU1 was longest and thickest than market samples because they were cut down in small pieces. The bark of Sample PU 1 was dark cream while the market samples were slightly on brown shade. The fracture of Sample SM 4 was soft, while the other three

had hard. All they were coarse in the texture.

(4)   Microscopic study Differences

Section Microscopy: Sample PU 1showed the absence of pith indicates that the sample is root portion. The vessels are diffuse with single, clusters of two, rarely up to eight. Vessels out line is angular, with simple perforation plate and intervessel pits are round to scalari form. Ray parenchyma cells are filled with sands. Xylem and Phloem parenchyma were filled with storage starch. SAMPLE AM 2showed that the similar secondary xylem and phloem characteristics with absence of pith i.e. root portion. Other piece showed similarity in sec. xylem and Phloem but presence of pith proves that the sample is of stem instead of root portion. Sample - VM 3 showed all the sec. xylem - phloem characters are very similar with Sample 1 except the presence of pith; which indicates the stem portion instead of root. Along with this, other piece of sample shows very different xylem structure i.e. vessel, fiber and xylem parenchyma pattern and phloem present in pith; indicates that the sample piece is of some other plant instead of original one. The internal phloem-vessel pattern indicates it is the climber stem of Apocynaceae family. SAMPLE SM 4: When sample was socked for softening for sectioning, it got very soft and it's so difficult to sectioning. After observation of whole sample by microscope, it was noticed that the leaves were opposite decussate leaves means that is of some other plants stem.

Powder Microscopy: The fibre pattern was different in all the four Samples. In Sample PU 1, there were plenty of fibres with thinner wall and the lumen was broad. While in Sample AM 2 and Sample VM 3 there were the fibres with thicker fibre-wall and narrow lumen. The vessel pattern was also different in all the four Samples. The two samples- Sample PU 1 and Sample VM 3 showed the numerous starch grains with druses – Ca. crystals, but in Sample SM 4 the Starch grains observed with Prismatic crystals. In Sample AM 2, Sample VM 3 and Sample SM 4, the trichoms were seen, it's proved that the stem portion was also present in it.

CONCLUSION

Analysis and comparison of whole study of four samples of drug *Dantimool* shows that; the cultivated Sample PU 1exactly matched with the API standard at every aspect. The market Sample AM 2 also matched with API and Sample PU 1 Parameters but it might be the stem portion of the *Dantimool* mixing with the root sample. The market Sample VM 3 not exactly matched with Sample PU 1 and API, but it has some similarity with them. It might be some mixing of other substances with original drug sample of *Dantimool*. The Sample SM 4 does not match with API standard and not with the other samples of *Dantimool*, it might be due to adulteration of the other drug.

So; it can be concluded that the cultivated *Dantimool* PU 1 has significant values in comparison to other Samples. Due to adulteration, the market samples were not to be trusted every time blindly. So for the therapeutic use of the raw drug – cultivated *Dantimool* has been more effective and cultivation may be a good alternate or source for herbal demand. It may be an alarm to save our endangered species.

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