

ANALYTICAL EVALUATION OF ROOTS OF DRUG *BALIOSPERMUM MONTANUM* MUELL. ARG.'S (DANTIMOOL) CULTIVATED SAMPLE AND MARKET SAMPLES**Dr. Minal J. Vaidya^{*1}, Dr. Rekha Parmar² and Dr. Satej Banne³**¹P.G. Scholar, Department of Dravyaguna; Parul Institute of Ayurveda; Parul University, Limda, Vadodara; Gujarat – 391760 (India).²MD (Ayu.) HOD & Professor, Department of Dravyaguna; Parul Institute of Ayurveda; Parul University, Limda, Vadodara; Gujarat – 391760 (India).³MD (Ayu.), Ph.D. Scholar, Asst. Professor. Department of Dravyaguna; Parul Institute of Ayurveda; Parul University, Limda, Vadodara; Gujarat – 391760 (India).***Corresponding Author: Dr. Minal J. Vaidya**

P.G. Scholar, Department of Dravyaguna; Parul Institute of Ayurveda; Parul University, Limda, Vadodara; Gujarat – 391760 (India).

Article Received on 21/06/2019

Article Revised on 11/07/2019

Article Accepted on 01/08/2019

ABSTRACT

Ayurveda has 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 Phytochemical properties of the cultivated sample and market samples of *Dantimool*. (*Baliospermum montanum* Muell. Arg.' roots). The samples were studied Analytically through API and other methods. Like Ash-values, Alkaloids, Soluble extractive, HPTLC 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 adulteration is the very big burning problem in herbal industries. To recover it, cultivation may be a good alternate or source for herbal therapeutic demand.

KEYWORDS: *Dantimool*, *Baliospermum montanum* Muell. Arg., Analytical, HPTLC, Adulteration, API.**INTRODUCTION**

The fundamental objective of *Ayurveda* is counteractive action just as the advancement of the body's very own ability for upkeep and equalization. *Ayurvedic* medication plans to coordinate and adjust the body, psyche, and soul. This equalization is accepted to prompt bliss and wellbeing and to help anticipate ailment. *Ayurvedic* prescription additionally treats explicit physical and psychological well-being issues. Fundamentally, in *Ayurveda*, there are three basic faculties of amusingness. *Vata*, *Pitta*, and *Kapha*. Blood is included as fourth silliness.^[1]

Charak Samhita has accepted *Dravya* as the Supreme Matter, by describing *trisutra*^[2] – *hetu*, *linga*, *aushadha* & the *padachatushtha*^[3]– *vaidya*, *rogi*, *aushadha*, *paricharaka*. *Sushruta* has specifically mentioned about the superiority of *Dravya*. According to *Sushruta*, *Dravya* is more important than the *Rasa*, *Guna*, *Virya* & *Vipaka*.^[4]

From thousands of year *Ayurveda* is a most accepted path for healthy long life. Because of the adverse effect of synthetic modern medicines, whole the population diverted their interest on those drugs, which are harmless

and natural. This may leads to attract them towards the rich herbal heritage of *Ayurveda*. These herbs are echo-friendly, more effective, safe, pure, natural and can easily available locally. All the deforestation, incorrect identification of raw drugs and threatening of many herbal species become the reasons for the adulteration in the raw drugs. Adulteration causes degradation and deterioration of the herbal preparations, which creates disbelief in the natural – enormous ancient traditional system. Now a day, it is necessary to evaluate the methods for search-out the adulteration in raw drugs. The present research is carried out to help to identification of *Dantimool* samples with the help of Analytical study.

REVIEW OF LITARATURE**Drug Review**Latin name - *Baliospermum Montanum*Muell. Arg.^[5]

Family - Euphorbiaceae

Genus - *Baliospermum*. Species - *Montanum* Sanskrit - *Danti*, *Hastidanti*^[6]

Gujarati - Dantimul, Jamalgota English - Red physic nut, Wild castor, Wild croton & Wild sultan seed

Kula - *Eranda Kula**Gana*- *Charaka*- *Virechaniya*; *sushruta*- *adhobhaga*

hara, 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*.^[7]

The drug *Danti* holds: *katu rasa, ushna virya, tikshna – vikasi guna, katu vipaka* and *vyavayi-vikasi-asukariprabhava* properties.^[8]

It is documented for many beneficial effects like *virechana, pachana, bhedana, rochana, kaphapitthara, Raktadoshahara* etc. It is discovered that *Danti* has been demonstrated diseases like *arsha, udararoga, kushtha, kandu, krimi* and so many.

Formulations: Danti-Haritaki Avaleha, Dantyarishtha, Dantighrita, Dantyasava, Kangayana gudika, Dantimooladi lepa, Danti-Trivritadi choorna etc.

Posology: Root powder - 1 to 3 gm. Seed powder - 125 to 250 mg. seed oil - 2 to 5 drops.^[9] Also used leaves & fruits.

Danti shodhan - Danti roots are pasted by *pippali churna* and honey, then *kusha [Desmostachya bipinnata stapf.]* is wrapped and then coated by *mritika [mud]* and give *agnipaka*, separate the root and do *chhayashushka*. In

this way its *vikasi guna* goes down.^[10]

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 were collected from raw drug city markets of Gujarat, 250gm each.

Sample AM 2– Ahmedabad; **Sample VM 3** - Vadodara; **Sample SM 4** -Surat.

The authentication for samples of drug *Dantimool* was done at M S Uni, Bot. Dept, Vadodara. After well drying the cultivated Sample, the foreign matter study was done for dry whole four samples. Then they were powdered and filtered. Sufficient *churna* were measured and kept in the airtight jar and stored properly for further study.

Study design

1. Determination of Loss on Drying
2. Total Ash value Determination
3. Det. of Acid insoluble Ash
4. Det. of Water Soluble Extractive
5. Det. of Alcohol Sol. Extractive
6. Qualitative Test (Assay of Total Alkaloids)
7. Determination of pH Value
8. Qualitative Identification of Functional Group
9. HPTLC

Methods of Analytical study^[11]

Parameter	Method reference
% Loss on drying	API Appendix 2.2.9
% Total Ash	API Appendix 2.2.3
% Acid insoluble ash	API Appendix 2.2.4
% Water soluble extractive	API Appendix 2.2.7
% Alcohol soluble extractive	API Appendix 2.2.6
% of Alkaloid	Vasu research centre
pH	Indian Pharmacopoeia 2.4.24
Qualitative Identification of Functional Group	API Appendix 2.2.18
TLC	API Appendix 2.2.12

OBSERVATIONS AND RESULTS

Test-Parameter	Sample PU 1	Sample AM 2	Sample VM 3	Sample SM 4
% Loss on drying	8.75%	8.58%	6.89%	8.20%
% Total Ash	4.03%	9.58%	8.44%	10.61%
% Acid insoluble ash	0.75%	1.05%	2.63%	4.30%
% Water soluble extractive	7.16%	10.83%	8.02%	5.89%
% Alcohol soluble extractive	6.77%	5.65%	3.96%	2.41%
% of Alkaloid	0.62%	0.72%	0.60%	0.82%
Ph	6.4	6.5	6.2	6.0

Tests of Qualitative Identification of Functional Group

Phytochemicals	Test	S. PU 1	S. AM 2	S. VM 3	S. SM 4
Alkaloid	Dragendroff's test	+	+	+	+
Glycoside	Molischs Test	+	+	+	-
Steroid	Salkowski reaction	+	+	+	+
Tannins	Lead-acetate solution	+	+	-	+
Flavonoids	Shinoda Test	+	+	+	-
Saponin	Foam Test	-	-	-	+
Triterpenoids	Libremanns Burchardt	+	+	+	-

Results of HPTLC Study

Observation at 254 nm

Spot No.	Rf in PU 1	Rf in AM 2	Rf in VM 3	Rf in SM 4
1	0.04	0.05	0.04	0.05
2	0.08	0.08	0.07	0.07
3	0.11	-	-	-
4	0.16	-	-	-
5	0.46	-	-	-
6	0.62	0.60	0.61	0.60
7	0.69	-	-	-
8	-	0.76	-	-

Observation at 366 nm

Spot No.	Rf in PU1	Rf in AM 2	Rf in VM 3	Rf in SM 4
1	-	0.12	0.13	0.10
2	0.15	-	-	-
3	0.21	-	-	-
4	-	-	0.25	0.25
5	0.32	0.32	0.33	0.31
6	0.37	-	-	0.38
7	-	-	0.48	-
8	0.54	0.55	0.54	0.52
9	-	-	0.59	-

Observation at 540 nm

Spot No.	Rf in PU 1	Rf in AM 2	Rf in VM 3	Rf in SM 4
1	0.06	0.06	-	-
2	0.09	0.09	-	-
3	0.16	0.13	-	0.16
4	0.20	-	-	-
5	-	0.23	-	-
6	0.32	0.33	0.32	-
7	0.38	0.39	0.39	0.38
8	0.43	0.42	0.42	0.41
9	0.48	0.49	0.49	0.50
10	-	0.57	0.59	-
11	0.62	-	-	-
12	0.74	-	-	-
13	-	0.76	-	-
14	0.82	0.82	0.81	0.83

DISCUSSION

Comparison table for the study;

Test Parameters	API Limit ^[12]	S. PU 1	S. AM 2	S. VM 3	S. SM 4
% Loss on drying	Not available	8.75%	8.58%	6.89%	8.20%
% Total Ash	NMT 10.0%	4.03%	9.58%	8.44%	10.61%
% Acid insoluble ash	NMT 3.0%	0.75%	1.05%	2.63%	4.30%
% Water soluble extractive	NLT 3.0%	7.16%	10.83%	8.02%	5.89%
% Alcohol soluble extractive	NLT 1.5%	6.77%	5.65%	3.96%	2.41%
% of Alkaloid	Not available	0.62%	0.72%	0.60%	0.82%
pH	Not available	6.4	6.5	6.2	6.0
HPTLC	Rf value 0.51	0.54	0.55	0.54	0.52
	Rf value 0.65	0.62	0.60	0.61	0.60

{1} **Loss on drying** is the parameter for moisture content of the drug. Its value is not available in API for Danti root. It were found to be 8.75%, 8.58%, 6.89% and 8.20% for sample PU 1, AM 2, VM 3 & SM 4 respectively, which all were nearer.

{2} **Total Ash value** is not more than 10.0% as API. Its values were in Sample PU 1- 4.03%, AM 2 – 9.58%, VM 3- 8.44% & SM 4- 10.61%. That means it was higher in Sample SM 4 (more than API limits), and in Sample PU 1 it was in limit than the other two market samples.

{3} **Acid insoluble Ash** is not more than 3.0% as API. It were found in Sample PU 1- 0.75%, AM 2-1.05%, VM 3-2.63% & SM 4- 4.30%. So it should be taken that the Acid insoluble Ash value of Sample SM 4 was more than API limits.

{4} **Water soluble extractive** value is not less than 3.0% as API. Its value for all the samples were in this criteria. It were founded in Sample PU 1 – 7.61%, AM 2 – 10.83%, VM 3 – 8.02% & SM 4 – 5.89%. It was higher (good) in the Sample AM 2 and lower in Sample SM 4.

{5} **Alcohol soluble extractive** value is not less than 1.5% as API. Its value for all the samples were in the API limit. It were found in Sample PU 1 – 6.77%, AM 2 – 5.65%, VM 3 – 3.96% & SM 4 – 2.41%. Cultivated Sample PU 1 showed highest Alcohol soluble extractive value.

{6} **Total % of Alkaloids** value is not available in API. Its value were founded in Sample PU 1- 0.62%, AM 2 – 0.72%, VM 3 – 0.60% & SM 4 – 0.82%. Alkaloids were presents in all 4 samples.

{7} **pH value** is also not mentioned in API for Dantimool. pH of all Samples were – PU 1- 6.4, AM 2 – 6.5, VM 3 – 6.2 & SM 4 – 6.0. It can showed that Samples PU 1 & AM 2 were less acidic then Samples SM 4 & VM 3.

{8} Tests of Qualitative Identification of Functional Group

Alkaloid were present in all 4 Samples. Glycoside were present in Samples PU 1, AM 2 & VM 3, but absent in Sample SM 4.

Steroid were present in all 4 Samples.

Tannins were present in Samples PU 1, AM 2 & SM 4, but absent in Sample VM 3.

Flavonoids were present in Samples PU 1, AM 2 & VM 3, but absent in Sample SM 4.

Saponin were present in Sample SM 4, but absent in Samples PU 1, AM 2 & VM 3.

Triterpenoids were present in Sample PU 1, AM 2 & VM 3, but absent in Sample SM 4.

{9} Discussion on HPTLC study

High performance thin layer chromatography study was done under three UV length.

Under UV 254 nm: Sample PU 1 shows 7 peaks. Sample AM 2 shows 4 peaks. Sample VM 3 shows 3 peaks. Sample SM 4 shows 3 peaks.

Under UV 366 nm: Sample PU 1 shows 5 peaks. Sample AM 2 shows 3 peaks. Sample VM 3 shows 6 peaks. Sample SM 4 shows 5 peaks.

Under UV 540 nm: Sample PU 1 shows 11 peaks. Sample AM 2 shows 11 peaks. Sample VM 3 shows 6 peaks. Sample SM 4 shows 5 peaks.

Maximum 11 peaks were in Samples PU 1 & AM 2 and minimum 3 peaks were in Samples AM 2, VM 3 & SM 4. In all UV length total peaks of Sample PU 1 – 23, Sample AM 2 – 18, Sample VM 3 – 15 and Sample SM 4 – 13.

Analysis and comparison of whole study of four samples of drug Dantimool shows; the cultivated **Sample PU 1** of *Dantimool* exactly 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 market **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.

CONCLUSION

After analysing all the samples of *Dantimool*, it can be concluded that; the Sample of 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.

pot.com/2014/06/danti-baliospermum-montanum.htmls10.

REFERENCES

1. Satya, "Importance of Ayurvedic Medicine." [Online]. Available: <https://www.indiastudychannel.com/resources/145624-Importance-Of-Ayurvedic-Medicine.aspx>. [Accessed: 11-Feb-2019].
2. <https://archive.org/details/CharakaSamhitaTextWithEnglishTanslationP.V.Sharma/ka.12/5/page/n604>
3. API Part 2 Volume 2 Pg. no. 40-47.
4. API Part 3 Volume 2 Pg. no. 41.
5. Acharya Agnivesh, Charakasamhita. Re vised by Charaka and Dridhabala with Vidyotini Hindi commentary, edited by Sri Satyanarayana Sastri, part 1 Chaukhambha Bharati Academy, Varanasi, Edition Twenty first, 1995, Sutrasthana, 1st Adhyaya, Shloka no. 24, Page no. 8.
6. Acharya Agnivesh, Charakasamhita. Revised by Charaka and Dridhabala with Vidyotini Hindi commentary, edited by Sri Satyanarayana Sastri, part 1 Chaukhambha Bharati Academy, Varanasi, Edition Twenty first, 1995, Sutrasthana, 9th Adhyaya, Shloka no. 3, Page no. 191.
7. Dravyaguna Vijanana, Fundamental principle of Pharmacotherapeutics in Ayurveda Volume I, J. L. N. Sastry. 2009. Pp.13-21.
8. <http://wikipedia.org> 6.
9. <http://easyayurveda.com/2014/12/14/baliospermum-montanum-danti-uses-research-side-effects/>
10. Acharya RN, nomenclature of medicinal plants through classical technical term par-yaya (synonyms) – A review. New Delhi: Sabdayana Commission for Scientific and Technical Terminology, Ministry of Human Resource Development, Department of Higher Education, Govt. of India, 2011; 121-126. 35.
11. <https://archive.org/details/CharakaSamhitaTextWithEnglishTanslationP.V.Sharma/ka.12/6/page/n605>
12. <http://ayurvedaandpanchakarma.blogspot>