ISSN 2456-432X SJIF: 4.819 JIF: 0.9127

IJOOAR

INDIAN JOURNAL OF ODYSSEY OF AYURVEDIC RESEARCH

EFFECT OF ABHRAKA SATVA BHASMA IN ALLAXON INDUCED HYPERGLYCEMIA

Dr. Ajit Jagannath Kadam [1], Dr. T. Maheshwar[2], Dr. C.B. Jha[3]

1. Professor, Department of Rasa shatra ,
Swami Vivekananda Ayurved Medical College, Shrigonda, Maharashtra

Dr. Vijay Dange [4],

4. Assistant Professor ,Hon.Shri.Annasaheb Dange Ayurved Medical Coolege,Sangli

ABSTRACT

In the matter of standardization Ayurveda lags behind seriously. So far as the Ayurvedic pharmaceutics is concerned it can be said that though it was quite rational at ancient time but in the present time it definitely requires a through reorientation. Because of lack of standardization nobody knows about the nature of metallic bhasmas and presence of free metals in them. However, it is well known that when the Ras-aushadhis are prepared as per the texts they don't produce any side effect. Also the pharmaceutical process of bhasma preparation is not uniform all over India, hence the quality of bhasmas varies from place to place, and reproducibility of the results becomes impossible. Again it requires longer duration of time to prepare good quality medicines by traditional methods.

In this connection it may be mentioned that, mass production of standardized and efficient metallic preparation is definitely needed for the propagation and practice of Ayurveda. Without such undertaking, practice of Ayurveda can neither be encouraged amongst the physicians nor popularized amongst the sophisticated public.

Key Words: ***Abhrak Bhasma .Maran Process, demographic factors***

INTRODUCTION

If we see the chronological development of Bhaishajya Kalpana & Rasa-Shastra, these branches were in the first stage of development during classical Ayurvedic period. At that time mainly herbal & few mineral medicines were in use. With the development of Rasa-Shastra the by-products produced during alchemical processes were found to be highly useful in preventing & curing diseases. Being highly efficacious in small doses & having long shelf life, mineral medicines became very popular among Ayurvedic physicians in short period of time. In the later period, the scholars observed that, the metal extracted from the minerals were many times effective than original material for Alchemical as well as therapeutic purpose. Keeping this in view they developed metal extraction method, denoted as 'Satvapatana' and the metal extracted as 'Satva' . Actually the history of satvapatana is as old as history of metals. In 'Yajurveda' the origin of metals has been claimed through yajnya karma. Because of continuous heating at high temperature during yajnya karma metallic compounds in the earth crust reduced to metal. Here we are dealing with Abhraka Satva patana & Abhraka Satva.

DESCRIPTION OF ABHRAKA :

Abhraka is the second most important drug of Rasa Shastra (R.S.). In the texts of Rasa-Shastra it is claimed that medicines prepared from Abhraka are very efficacious & highly potent. Gautam 2nd cen. A.D. in Nyaya Sutra has mentioned Abhraka for the first time. India during 1st country started use of Abhraka for various Alchemical & therapeutic purpose. All the Rasa texts have placed Abhraka next to Mercury on the basis of its role in mercurial processings. Chakradatt was the first physician who started internal use of Abhraka. Out of various types of Abhraka, Krishna Vajra Abhraka is said to be the best variety for therapeutic and alchemical processes.

Abhraka in Modern Science : It is known as MICA.

(i) Definition : 'MICA is a particular family of mineral, consisting essentially silicates of Aluminium with varying proportion of Alkalis Iron oxide, Magnesia etc.

and are characterized by a highly natural crystal to be readily split into very thin plates.'

(ii) Chemically : Micas are silicates & in most cases cause orthosilicates of Aluminium with potassium & Hydrogen etc.

Abhraka Satva (A.S.) : Abhraka Satva is a metallic extract of Abhraka. According to R.R.S. no other substance in the world is better than Abhraka Satva for making Hg thermo stable. It is said that Abhraka Satva Bhasma is 8 time (Ref. R.H.T.)/10 times (Ref. Rasarnava) more potent than Abhraka bhasma (Abhraka Bhasm.) About 10 methods and 40 various drugs described for this process. Here for extraction Abhraka Satva, the standard procedure we adopted from the thesis "Study on satvapatan with special reference to Abhraka & Makshika by Dr. C.B. Jha et at (1990).

AIM & OBJECT :

Though being a highly effective & no medicine Abhraka Satva Bhasma (A.S.B.) hardly used in routine practice. The reason behind this seem to be a tedious process of satvapatana and small amout of satva recovered. The present study was undertaken to reveal facts & figures for the users of this drug on the basis of scientific up-to-date knowledge. The problem has been studied at its literary level, pharmaceutical standardization, chemical analysis and at the level of experimental study.

Pharmaceutical Study : (Abhraka Satva Patana) :

Material -

1. Krishna Vajra Abhraka
2. Musali
3. Furnace
4. Graphite Crucible
5. Lining Material
6. Tankana

Methods –

1. Shodhana
2. Dhanyabhrakikaran
3. Pelletization
4. Preparation of crucible
5. Smelting
6. Collection of Satva
7. Satva Marana

DISCUSSION :

1. Preparation of Charge Material and Pelletization :

Krishna vajrabhraka was taken for satva patina. Its shodhana was done by healing to red hot & quenching into decoction of Triphala for seven times. After that Dhanyabhraka was made to get homogeneous Abhraka particles & to remove impurities Dhanyabhraka was mixed with 1/4th part of Tankana & decoction of 1/4th part of Musali powder, triturated and small spherical balls were made & dried in Sun.

2. Crucible Preparation :

Instead of musa. standard graphite crucible, obtained from local market was used. The inner & outer surface of the crucible were lined with a mixture of Alumina, 3% sodium silicate & water. After lining it was dried, first in sun & then kept in drying oven at 200°C for 6 hours. Lining was given to resist high temperature and to prevent the reaction between graphite & charge material during smelting.

3. Heating Schedule :

Temperature was given in electric muffle furnace (Silicon Carbide electric Muffle furnace) having capacity to raise the temperature upto 1700°C. The prepared spherical balls were kept in a crucible & it was kept Inside the electric furnace.

The temperature was raised slowly 5°C/min. & maintained at 1000°C for 3 hours after the temperature raised upto 1400°C and maintained for 1 hour. The furnace was

put off to allow the charge material to cool in the furnace by itself. On next day slag & metal were separated from curcible.

4. Preparation of Abhraka Satva Bhasma:

The pharmaceutical process of ASB may be divided into three parts :

(i) Mridukarana (Softening)

(ii) Shodhana

(iii) Marana (incineration)

A) Abhraka Satva Mridukarana –

For this the hard satva material was heated to red hot in a big iron spoon & was dipped into Honey, Oil, Fat (vasa) & Ghee for 10 times in each liquid. After Completion of the process the hard metal in button form turned into soft & brittle material.

B) Abhraka Satva Shodhana –

It includes samanya & vishesha shodhana.

(a) Samanya Shodhana - In this process, softened satva heated to red hot & dipped in freshly prepared decoction of triphala. This process was repeated for 7 times. (R.T.).

(b) Vishesha Shodhana – The samanya shodita Abhraka Satva was again heated to red hot in a big iron spoon & dipped in Kanji containing grass & immediately crushed in an iron mortar. This process was repeated for several times till it gets converted into fine powder. This powder was fried with Ghee & Amalaki Swarasa for 3 times. After each frying the powder was ground well.

5. Abhraka Satva Marana :

There are two method for Abhraka Satva Marana (i) Putapaka (ii) Kupipakva Vidhi. Of which Kupipakva Vidhi was selected. Abhraka Satva was mixed with ½ part samaguna kajjali & triturated well with Kanji, after drying the powder was filled in kachekupi having seven coatings of cloth smeared with mud. Then it was subjected to

heat through electric furnace. Temperature was given upto 700°C. The whole process was repeated for 7 times. Bhasma shows all character of good bhasma. e.g. Rekhapurnata, Varitaratva, Nischandratva, Apunarbhava.

Properties of Abhraka Satva Bhasma it is said that :

अभ्रसत्वं सुषिषिरं मधुरं रुचीरं परमं।
सुस्निग्धं केश्यं आयुष्यं त्रिदोषघ्नं रसायनं।। र.त.

Colour of Abhraka Satva :

Ras Hriday Tantra- Lohanibha, Suwarvarna Devamukhtulya

Ras Prakasha Sudhakara - Kamsyanibha

Properties of Abhraka Satva Bhasma –

Rasa - Madhura,

Vipaka – Madhura

Virya- Atishteeta

Doskarma - Tridoshaghna

Karma- Rasayan, Vajikarana, Keshya, Aushya, Santanakara, Punsatva, Janana, Vayasthaapana.

Chemical Analysis of Abhraka Satva Bhasma

Table showing the chemical composition of Abhraka Satva & Slag :

Abhraka Satva		**Slag**	
Fe	98.2%	Fe	10.7%
Al	0.8	Al2O3	87.3
Si	0.45	SiO	40.2
Mg	Nil	MgO	7.2
Ca	Nil	CaO	0.8
Ti	0.1	TiO	0.3%

Trace Elements in Abhraka Satva & Stag - (in ppm)

	Cu	Co	Ni -	Mg	Al	Sn	K	V
Satva	3+	60	Trace+	+	+	+	Trace	12.5 ppm
Slag	260	nil	nil	trace	nil	nil	+	nil

EXPERIMENTAL STUDY :

Introduction –

The present day trend demands the scientific research for the drug effects. Experimental model is the tool of research and it is scientific approach to investigate effects of a drug. So in order to verify the claims on scientific lines the animal experimentation is prima- acle necessary to be supplemented by clinical research for a valid conclusion.

Materials :

Animals - Albino rats of either sex weighing 150-200 gm.

Drugs - Abhraka Bhasma

Abhraka Satva Bhasma

Glibenclemide

Gum acacia powder

Chemical - For blood sugar estimation SPAN blood sugar estimation locks.

For induction of Diabetes, Allaxon monohydrate.

Method :

The present study has been divided into following three experiments –

I (a) Study on the effect of Abhraka Bhasm on normo-glycemic Albino rats

(b) Study on the effect of Abhraka Satva Bhasma in normo-glycemic Albino rat

II. (a) Study on the prophylactic effect of Abhraka Bhasma in albino rats

(b) Study on the prophylactic effect of Abhraka Satva Bhasma in albino rats.

III. (a) Study on the effect of Abhraka Bhasma on allaxon Induced hyperglycemia in albino rats.

(b) Study on the effect of Abhraka Satva Bhasma on allaxon induced hyperglycemia in albino rats.

Dosage Schedule – Minimum 25mg/Kg & maximum 50mg/kg of animal.

Exp. 1

Evaluation of effect of AB & ASB in normoglycemic rates :

5 groups were made, 6 animals each

Group A = Control treated with ----------mucilage.

Group B = Treated with 25 mg/kg A.B.

Group C = Treated with 25 mg/kg A.S.B.

Group D = Treated with 50 mg/kg A.B.

Group E = Treated with 50 mg/kg A.S.B.

The blood suger level was estimated before starting treatment and on 3rd, 6th,and 10th day after treatment.

Table :Showing Effect of drugs on normo-glycemic Rates (Data represent mean BSL:±SE,' t' ,' p' values.)

Gr.	Initial	3rd day	6th day	10th day	' t' ' p' value
Control	92.33±3 A_1	90.66±2.47 A_2	91.33±2.47 A_3	91.5 ±2.14 A_4	A_1:A_2=0.49 › 0.05 NS A_1:A_3=0.225 › 0.05 NS A_1:A_4=0.22 › 0.05 NS
AB 25mg/kg	86.5±4.58 B_1	92.33±3 B_2	89.0±3.16 B_3	89.0±3.16 B_4	B_1:B_2=1.06 › 0.05 NS B_1:B_3=0.45 › 0.05 NS B_1:B_4=0.45 › 0.05 NS
ASB 25mg/kg	30.6±4.58 C_1	92.31±3 C_2	89.0±3.16 C_3	84.83±4.72 C_4	C_1 :C_2=2.02 › 0.05 NS C_1 :C_3=1.43 › 0.05 NS C_1 :C_4=0.60 › 0.05 NS
AB 50mg/kg	76.5±3.8 D_1	89±3.16 D_2	79±4.83 D_3	79.1±4.82 D_4	D_1 :D_2=2.53 › 0.05 NS D_1 :D_3=0.40 › 0.05 NS D_1 :D_4=0.42 › 0.05 NS
ASB 50mg/kg	77.6±3.6 E_1	79±4.83 E_2	84.0±4.72 E_3	83.16±4.36 E_4	E_1 :E_2=0.22 › 0.05 NS E_1 :E_3=1.05 › 0.05 NS E_1 :E_4=0.91 › 0.05 NS

Exp No. 2

Evaluation of prophylactic effect of AB & ASB in albino rats.

3 groups were made each containing 6 rats.

Gr. 1 = Control

Gr. 2 = Treated with 50 mg/kg AB

Gr. 3 = Treated with 50 mg/kg ASB

Treatment was given for 10 days. Then allaxon was administered & BSL was estimated before starting treatment, 24 hr., 48 hr. & 10 days after allaxon administration.

Table : Showing prophylactic effect of Abhraka Bhasma & Abhraka Satva Bhasma
(Data represent means BSL±SE ' t' , 'p' values on 1, 2, 10 days after allaxon administration)

Gr.	Initial B.S.L.	After Pre treatment	After 24hr	After 48 hr	After 10 Days	' t' ' p' value
Control	79.0 ±4:83 A_1	78.04 ±4.72 A_2	236.14 ±0.97 A_3	286.9 ±.86 A_4	290 ±12.96 A_5	A_1:A_2=0.14 <0.05 NS A_1:A_3=81.93 <0.001NS A_1:A_4=42.25 <0.001NS A_1:A_5=15.25 <0.001NS
AB 50mg/kg	74.83 ±2.38 B_1	76.45 ±3.8 B_2	234.5± 0.63 B_3	284.5± 0.63 B_4	288.2 ±15.86 B_5	B_1:B_2=0.36 <0.05 NS B_1:B_3=66.87 <0.001NS B_1:B_4=85.23 <0.001NS B_1:B_5=13.9 <0.001NS
ASB 50mg/kg	83.16 ±4.36 C_1	80.56 ±4.61 C_2	234.5 ±0.37 C_3	285.6 ±0.57 C_4	284.1± 13.0 C_5	C_1:C_2=0.40 <0.05 NS C_1 :C_3=34.63 <0.001HS C_1:C_4=46.21 <0.001HS C_1:C_5=14.65 <0.001HS

Exp. No. 3

Evaluation of effect of AB & ASB on allaxon induced hyperglycemia in albino rates. 6 groups were made each consisting 6 rats.

Gr. A = Control, Gr. B = Treated with 25 mg/kg A.B.. Gr. C = Treated with 25mg/kg A.S.B., Gr. D = Treat with 50 mg/kg A.B., Gr. E = Treated with 50 mg/kg A.S.B., Gr. F = Treated with Glibenclamide 2 mg/kg.

The BSL was estimated before starting experiment, then the rats were kept under fasting for 24 hrs after that the diabetes was lnduced in usual manner. BSL was estimated after 2, 7, 14, 21 days of allaxon administration.

Table : Showing prophylactic effect of Abhraka Bhasma & Abhraka Satva Bhasma
(Data represent means BSL±SE ' t' , 'p' values on 0, 2, 14, 21 days after allaxon administration)

Gr.	Initial	2nd Day	7th Day	14th Day	21st Day	' t' ' p' value
Control	75.0±	274.0±	283.4±	278.5±	269±	A_1:A_2=13.0 <0.001HS
	2.3	15.03	4.13	12.89	14.03	A_1:A_3=0.47 >0.05 NS
	A_1	A_2	A_3	A_4	A_5	A_1:A_4=0.22 >0.05 NS
						A_1:A_5=0.23 >0.05 NS
AB	77.13	281.8	284.4	268.2	251.9	B_1:B_2=12.52 <0.001HS
25mg/kg	±4.1	±15.8	±12.94	±12.20	±10.00	B_1:B_3=0.27 >0.05 NS
	B_1	B_2	B_3	B_4	B_5	B_1:B_4=0.68 >0.05 NS
						B_1:B_5=1.59 >0.05 NS
ASB	78.45	285.85 ±17.45	272.0 ±12.22	264.8 ±13.86	241.4 ±12.89	C_1:C_2=11.45 <0.001HS
25mg/kg	±4.80	C_2	C_3	C_4	C_5	C_1 :C_3=0.65 >0.05 NS
	C_1					C_1:C_4=0.94 >0.05 NS
						C_1:C_5=2.04 >0.05 NS
AB	75.62	302.5 ±14.08	301.45 ±15.77	284.9 ±16.08	220	D_1:D_2= 15.92 <0.001HS
50mg/kg	±2.4	D_2	D_3	D_4	±8.27	D_1 :D_3=0.64 >0.05 NS
	D_1				D_5	D_1:D_4=0.82 >0.05 NS
						D_1:D_5=5.42 >0.05 NS
ASB	76.52	289.9	285.88	241.3	191.4	E_1:E_2= 15.75 <0.001HS
50mg/kg	±3.8	±13.0	±15.86	±12.37	±4.99	E_1: E_3=0.48 >0.05 NS
	E_1	E_2	E_3	E_4	E_5	E_1: E_4=2.71 <0.001HS
						E_1: E_5=7.2 <0.001HS
Glibenclamide 2mg/kg	78.07	296.3	251	243	212.82	F_1:F_2=15.82 <0.001HS
	±4.72	±12.96	±15.16	±13.23	±8.27	F_1: F_3=2.27 >0.05 NS
	F_1	F_2	F_3	F_4	F_5	F_1: F_4=2.88 <0.001HS
						F_1: F_5=5.42 <0.001HS

CONCLUSION OF EXPERIMENT :

In normoglycernic animals none of the two bhasmas showed any significant hypoglycemic effect in 25 mg/kg to 50 mg/kg dose.

Both Abhraka Bhasma & Abhraka Satva B. do not show prophylactic effect when given in 50mg/ kg for.10 days prior to allaxon administration.

For curative study AB & ASB were administered for 21 days in allaxon induced hyperglycemic rats, in two doses i.e., 25 mg/kg & 50 mg/kg. After 14 days of treatment significant fall is BSL was observed in group treated with ASB 50mg/kg & reference group. Also significant hypoglycemia was observed in the Gr. treated with AB 50mg/kg on 21st day. The results suggest that the claim of our ancient physicians seems to be more correct. However, this experiment was of preliminary in nature, hence extensive studies at the level of mechanism of action and clinical studies are required.

References & Abbreviations

R.T. = Rasa Tarangini, RRS = Rasa Ratna Samucchaya R.Chu. = Rasendra Chudamani, A.K. = Anand Kand, R. Chi. = Rasendra Chintamani, RHT = Rasa Hriday Tantra.

REFERENCES

1. Dr. Damodar Joshi et. al, Pharmaceutical and Pharmacotherapeutic studies on Abhrak bhasma with special reference to Amlapitta.A. Ph.D .Thesis I.M.S. B.H.U., 1973
2. Nagarjuna: Ranendra Mangala, Rasashala Aushadhashram , Gondal(Gujarat) 1940 . Chakradatta text
3. Sharma P.V . Translation,Chaukhamba Orientalia ,Varanasi, 1994.
4. Dravyaguna Vigyana Volume 1by Sharma, P.V
5. Chaukhamba Sanskrit Series, Varanasi ,1983 .
6. Sushruta Samhita ,Shastri Ambika Datta
7. Chaukhamba Sanskrit Sansthan ,Varanasi ,1987.
8. Gada Nigraha,by Shodala, Bhandarkar Oriental Research Institute, Pune .

9. Ayurvediya Rasa Shastra by Siddhinandan Mishra,published by Chaukhambha Orientalia, Varanasi ,1962.

10. The Holistic principle of medicine, by Singh R.H.: 1st edition 1998, Chaukhamba Sanskrit Pratishthan ,New Delhi .

11. Glossary of Vegetable drugs in Brihatrayi by Singh Balwant and Chunekar K.C,Chowkhamba Publication, Varanasi .

12. Sri Durga et all.: Pharmaceutical experimental and clinical studies on makaradhwaja., M. D. (Ay)Thesis, Department of Rasa Shastra, IMS , BHU.

13. C. B. Jha et al: Study on Satvapatana,. Ph. D . Thesis, Department of Rasa Shastra, I. M. S. B. H. U. 1990 .

14. Sushruta : Sushruta Samhita, English translation and commentary by P.V . Sharma , Chaukhamba, Varanasi .

15. The Merck Index.11th edition 1989, Mere and Co -Inc Rahway-NJ, USA .

16. The Wealth of India: Publication and information Directorate CSIR. New Delhi ,1976 .

17. Trace elements in human nutrition and health, 1996 , published by World Health Organisation , Geneva .

18. Bhrihadyoga , by Trimallabhatta:Ananda Sharma ,press Poona.

19. Thirutharu et_al : Determination of free metal in Ayurvedic bhasmas by employing various methods with special reference to Loha bhasma , Varanasi (1991)

20. Ayurveda Prakasha , Upadhyay Mahadev ,Edited by Gulraj Sharma and Mishra, 2nd edition ,Agrawal press , Aligarh .

21. Raja Nighantu, by Vaidya Narhari, Anand Ashram Mudranalaya, Pune, 1935.

22. A textbook of Inorganic Qualitative Analysis and A Textbook of Inorganic Quantitative Analysis ,Vogel,A.I.,3rd edition, E.L.B.S .and Langman ,1969.

23. Wealth of India, Industrial Products, Part II, Publication and Information Directorate ,CSIR, New Delhi.

24. Sanskrit English Dictionary by Williams M.M.:Published by Motilal Banarasi Das Publications 1988.