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LITERARY REVIEW ON YASAD (ZINC) W.S.R. IN AYURVEDIC RESERVE

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ABSTRACT

The Puti-Lohas, whichhave now been accepted, are the Naga (Lead), Vanga (Tin) and Yasada (Zinc),Yasada, being not known clearly to the world till the seventeenth century.With increasing knowledge of risk of nanomaterials, it becomes imperative to assess the safety of Nano particulate Ayurvedic medicines using toxicity models. Drug yashada*pushpa*which showed significant size reduction in cotton pellet granuloma model, indicates its anti-inflammatory and anti proliferative effect[6]. In the pharmaco clinical study on *Madhumeha*, *Yashada*compound was observed to have a marginally better effect than *Shilajatu.* We are using zinc as aimmunomodulator in current scenario Covid-19. Yasadbhasma is the form of a zinc so yasadbhasm can use as a immunomodulatory. Many researches have proved as aImmunomodulatory. Yasadbhasm also can use in Diabetes mellitus, Vicharchika&SwetapradaraThe therapeutic dose was ranging in between 300 mg – 1 gm. Different preparations of *Yashadabhasma.Yashadamritamalahara*might have contributed in reducing the symptoms of *Vicharchika*on external application.

KEYWORDS: Yasad, Zinc.

INTRODUCTION

The metals form a big group of inorganic elements that make up the body building tissues. The metals available in nature are in various forms and in combination with undesired other elements, or in improper and non-consumable form. These forms are unwelcome by the internal milieu of the human body. All modifications and development in Rasa Sastra are for the purpose of making these foreign and wild elements, body friendly and tamed to provide maximum benefit. The basic processes adopted for the same as found throughout the texts are of Sodhana and Marana. There are various other intermediate processes, which being mandatory, do not find mention separately. A category of Dhatu in Rasa Sastra is the one of PutiLoha. Puti meaning of low quality, putrefied, giving some undesirable smell, not upto the mark, reflecting lesser qualities or low qualities than their category of substances or not having their constitution as per their ideal category. The Puti-Lohas, which have now been accepted, are the Naga (Lead),Vanga (Tin) and Yasada (Zinc), Yasada, being not known clearly to the world till the seventeenth century. Some reasons for the delay in unmasking the metal Zinc:

- ✓ Though Naga and Vanga have melting points lesser than Zinc the affinity oflatter to other non-metals have prevented the world from identifying this metalas a separate entity.
- ✓ If very clean, it resembles Naga or Vanga at many places.
- ✓ Its parent ore - Rasaka was known to give out a Satva which was easy to melt,comparatively soft and much like Naga or Vanga (RCu, RPS)
- ✓ Scattered references of Yasada being called Rasaka and vice versa left the medieval period unaware of existence of Yasada as a separate metal. All this reflects a lethargic attitude of the medieval workers - the Rasa Sastris of the medieval period, so much so that, it was not till the seventeenth century that Ayurveda Prakasa dared to explain its individual separate existence.
- ✓ Equated to Ghosa at times In Pandemic COVID-19, Zn is using as a immunity boast up material in modern era. Thus I have selected these topic for detail review of Yasadbhasm (Zn) in ayurvedic context.

Aims & Objectives

- ✓ To Know about Historical review, Synonyms, Derivation, Grahalaxana&AgrahaLaxan of Yasad.
- ✓ To know selection of specific processes for YasadaSodhana, Jarana and Marana.

Utpatti

In a very destructive war between the Deva and Asura, from the body of three Daityas, two types of Kharpara were given rise to, Jasada and Savaka. From among these, Jasada is to be used for Rasayana Karma.

Derivations and debut mentions

- ✓ Yasada "YenaVayunaSiyateIti " (SKD) - That which controls the Vayu.'Girij'(AP)Giver of Success (yasa) (RC)
- ✓ MadanapalaNighantu - 15th cent BC
- ✓ Adhamalla - 16th cent BC (S –Di)
- ✓ BhavaPrakasa - 16th cent AD
- ✓ Ayurveda Prakasa - 17th cent AD
- ✓ According to Dr. Thomson Ainslie, the west was unaware of Zinc extraction from ore till 1721 AD.
- ✓ Zinc was supposed to be extracted independently by the West for the first time in 1746 AD by a German - Andreas Sigismund Marggraff.
- ✓ Though Zinc was not extracted earlier, directly melting Copper and heating Calamine with it prepared Brass.
- ✓ Dr. DattatrayaAnantaKulkarni through his Bharatiya Rasa Sastra attributes the origination of the metal to China, here it was known by the name Tutenague. This, through commerce, came to be known as Tutunagam in Tamil, which turned to Tuttha in Sanskrit and from here went to Iran by the name Tutia. From here it spread to the whole west where it was known by the name Indian Tin or Stannumindicum and was thought to be Bismuth till 16th cent. It was also known as Cadmia in Europe and Tutia or Tutty by the recentalchemical society.

Synonyms and Vernacular names

Synonyms

Yasada , Jasada , Ritihetu, Kharparaja, Rangasadrsa , Bangasadrsa SwetaPatra&KamsasthiGirija

Vernacular Names

1. Arabi – Shibaha
2. Bengali – Dasta
3. Brahmi – Khota
4. Chinese – Tutenague
5. English – Zinc
6. Gujarathi – Jasada
7. Hindi - Jasta, Dasta
8. Irani – Tutia
9. Kanada – Sattu
10. Latin – Zincum
11. Malyalam - Nagam, Tamagaputi
12. Marathi – Jasta
13. Nepali – Dasta
14. Persian - Tutiya Rumi
15. Sanskrt - Jasada,Tuttha,Yasada
16. Tamila – Tutanagam
17. Telugu - Tuttunagam,Kharparam

Chemical Names: Ruhatutiya, Tatiya, Atarada, Tasadira, Shahaja, SangeBastri.

Commerce: Spelter

GrahyaLaksana - Acceptable Yasada:(RT)

On Cutting should be

- ✓ **Samujjwala :** Uniformly glistening
- ✓ **Snigdha:** Unctioned, continuous to touch, without perceptible deformations.
- ✓ **Mrdula:** Seemingly soft, not brittle, malleable on pressure.
- ✓ **Nirmala:** Clean, without visible impurities.
- ✓ **Drtadrava:** Melting on applying ordinary heat.
- ✓ **Mahabhara:** "M*urti-laghutwaapimahabhara*" (AP)i.e. appearing light but then too heavy i.e. w/v > 1.
- ✓ **Bharadhya:** Appearing light but then too heavy (RD)
- ✓ **SwetaVarna:** Clean, without visible impurities. (RD)
- ✓ **Dantura:** Toothed (RD)

AgrahyaLaksana - Not Acceptable Yasada:(RT)

- ✓ **Kathina:** Hard/brittle/breaks by spattering on pressure.
- ✓ **Kathinadrava:** Not easy to melt. Requires extra effort for melting.
- ✓ **Ruksa:** Dry/roughened surface, not allowing easy, clean movement of touch.
- ✓ **Ruksaprabha:** Dull luster.
- ✓ **Laghu:** Light, w/v < 1
- ✓ **Malina:** With visible impurities / dirty appearance.
- ✓ **Khara:** Like Ruksa (RD)
- ✓ **Citra:** With visible impurities / dirty appearance. (RD)

  Neelaprabha: Not blue but bluish (RD)

Properties

Zinc: Metallic Element

Atomic Number : 30 Group : II B
Atomic Weight : 65.38 Valency : 2
Isotopes (stable) : 5 Density : 7.14
Melting point : 419º C Boiling Point : 907º C
Malleable at : 100º C to 150º C Crystal structure : hcp (Fig.2.2a-b)

General Properties

- ✓ Shining white metal with bluish gray luster (called spelter)
- ✓ Strongly Electropositive
- ✓ Ignites in presence of Moisture
- ✓ Insoluble in Water

Occurrence

Ores	Zn %	Hardness	Specific Gravity	Cut Surface	Shape
Calamine (anhydrous Carbonate)	52	5	4.4	-	- Granular/Slab
Zinc Bloom (hydrous Carbonate)	56	2-2 ½	3-7	Shining	Shapeless
Zinc Blende (Sulphide)	66	3 ½-4	4	White/ Reddish	Granular/Slab
Zincite (Oxide)	80	4 – 4 ½	5 – 5	Orange	Yellow/Red

Sources

The common sulfide mineral is sphalerite, found in vein type deposits. The largest sources are Canada (British Columbia, Ontario and Quebec), USA (Utah, Colorado, Idaho, Missouri), Mexico, Peru (Cerro de Pasco Mine), Australia (Broken Hill) and Central Asia, Japan, Belgium and Afghanistan –in the form of zinc sulphate called Zak spread on land due to volcanic eruptions.

- ✓ Australia – very rare, native zinc is found in some parts.
- ✓ The Indian Subcontinent :
- ✓ Nepal Burma - Tavhaya – zinc sulphide, Mergui, Sansanthana, Wadwin.
- ✓ Kashmir Punjab - LahulSigri, Zinc sulphide with surma.
- ✓ Sikkim –
- ✓ Kangra - On Sigrimountain with surma in form of Sulphide.

Gadhwal - In copper mines Simla - Near Sabathu in lead minesBengal - Hazaribaug – Mahabank and Baragunda - ZnS with lead and copper Madras - Kurnula - Kokilsarika (Smithsonite) with lead sulphide.

Gazalpuli and Basavpuram – Lead mines, Madura-Zns with Au – Ag RajPutana - Mewar / Udaipur - Jawar / Zawar – Smith sonite. Marwad – Jodhpur Deharadun - Jonsar – Tona River – Zinc Sulphide in lead mines with lead sulphide and pyrites.

Extraction

Extracted from ores by two distinct methods, both starting with zinc oxide formed by roasting the ores 1) Thepyrometallurgical or distillation process wherein the zinc oxide is reduced with carbon in retorts from which the resultant zinc is distilled and condensed.

2) The hydrometallurgical or electrolytic process wherein the zinc oxide is leached from the roasted or calcined material with sulphuric acid to form zinc sulphate solution which is electrolysed in cells to deposit zinc on cathodes.

Practicalities:

Grade	Lead max	Iron max	Cadmium max	Aluminium max	Copper max	Tin max	Non Zinc max	Zinc min by difference
(SHG)	0.003	0.003	0.003	0.002	0.002	0.001	0.010	99.99
(HG)	0.03	0.02	0.02	0.01	-	-	0.10	99.9
(PW)	0.5 to 1.4	0.05	0.20	0.01	0.20	-	2.0	98.0

SHG - Special high grade; HG - High grade; PW - Prime western

B - Zinc of Commerce - Spelter

C - Grades

Grades	Purity	Grades	Purity
Special high-grade	(99.99%)	High-grade	(99.95%)
Intermediate	(99.5%)	Brass special	(99%)
Prime Western	(98%)		

D - Hazards: Dust : Flammable, dangerous fire and explosion risk ZnO : Fresh fumes produce oxide shakes or zinc chills.

F - Uses: Nutrition – Essential Growth Element Electroplating Auto partsStorage and dry cell batteries Roofing, Gutters, Engravers plates, cable Alloys – Brass Bronze and Die-casting alloys

Sodhana
Classical review
Table-3 Sodhana - Classical Review.

SI.NO	Reference	Sodhana categorization and media	Activity
1	*Rasa Ratnakara (Rasa Khanda)	Samanya for Dhatus: Taila - Takra - Gomutra - Aranala - Kulattha Kwatha	Quenching / Dhalana 7 times each
2	Rasa Ratnakara (RddhiKhanda)	Samanya for Dhatus: Taila - Takra - Gomutra - Kanji - ArkaDugdha - KulatthaKwatha - JambiraSwarasa	Quenching / Dhalana 7 times each
3	Sarangdhara	Samanya for Dhatus: Taila - Takra – Kanji - Gomutra – KulatthaKwatha + ArkaDugdha	Quenching / Dhalana 3 times each
4	**Rasendra Cintamani	Samanya for Dhatus: Taila - Takra - Gomutra - Kanji - KulatthaKwatha	Quenching / Dhalana 7 times or 3 times each
5	Yoga Ratnakara	Samanya for Dhatus: Taila - Takra - Gomutra - Aranala - Kulattha Kwatha	Quenching / Dhalana 7 times each
6	Bhaisajya Ratnavali	Samanya for Dhatus: Taila - Takra - Gomutra - Kanji - KulatthaKwatha Naga - Vanga: ArkaDugdha	Quenching / Dhalana 7 times each Quenching / Dhalana 3 times each
7	Brhat Rasa Raja Sundara	Yasada: Milk	Quenching / Dhalana 21 times
8	Rasa Tarangini	Yasada: Curnodaka OR NirgundiSwarasa OR SudhaDugdha OR Godugdha	Quenching / Dhalana 7 times 7 times 7 times 21 times

Marana
Marana Footnotes
RasendraSampradaya
Colour of YasadaBhasm : Samagni- Pandu / Sweta
Kharagni- Pita
Hathagni- Green
Yoga Ratnakar: Samanya Marana of all Dhatus
B. R. R. Sundar- This Bhasma should be used only for Anjana.

Rasa Tarangini
Colour of YasadaBhasma - KundenduDhawala. Use only for Navana (A type of Nasya) and Anjana.
Rasa Tantra Sara Va siddha PrayogaSamgrahacolour of YasadaBhasma- Redish yellow.

Inferences from marana classical review
- ✓ Some instruct to wash and dry the JaritaYasada before giving Bhavana of herbal juices.
- ✓ Some instruct subjection of the JaritaYasada directly to Bhavana of herbal juices without washing.
- ✓ The materials sought at by any of the above three methods, is given Bhavana or is levigated using herbal juices.
- ✓ During the process of Sodhana, due to the melting of Yasada, some part of the surface metal undergoes compounding with available elements, either directly from the atmosphere or accompanying the metal through prior quenching. This has been advised to be separated out, derive the metal from it and put it to further Sodhana process or to keep on separating it from many such quenchings and subject to Marana, along with the original parent metal.

Marana concept
Provision for using the body building elements in an administrative formcan be termed as Marana.Before these can be transformed into Bhasma form, it is mandatory that they are in such a form as can be worked with. For this, we find that the Puti-Lohas are conveniently subjected to two altogether different and varying in themselves intermediate steps. The first one, very popularly known and accepted is the 'Jarana' and the other is 'Pisti' preparation with Parada i.e. amalgamation. The Marana of Puti-Lohas at many places seems to be half done. But in case of Yasada the therapeutic indication of a particular form of Yasada has a specific domain of action. If the bhasma prepared consuming less time and energy according to the texts was found to serve the purpose, the pharmaceutical process was then halted at the so-called 'Jarana' Stage of the metal. But wherever this was found to be unsafe or without application, the further usual process of Bhavana

(levigation) and Marana (calcinations / incineration) were continued. If we look at the word Jarana, it is to be found nowhere in the authentic textualreferences, but we can preserve it for convenience.

I First Intermediate Step – Jarana
II Second Intermediate Step – Pisti Preparation
Marana Highlights Through First Intermediate Step – Jarana

1. It is simply incineration or roasting and at times calcination.
2. The molten metal is stirred either with iron ladle or some herbal / vegetable drug branch or root.
3. Some matter, generally herbal is added to the molten metal and stirred to incineration.
4. Sometimes inorganic matter, salts, ksara of herbal drugs etc. are also added to facilitate the conversion of the metal to a fine powder.
5. The material reduced to ash form is heated to red hot and at times covered and again heated over prolonged period of 12 to 24 hrs.
6. The ash so formed is used as it is. All the classical texts do not contraindicateits internal use.
7. Some indicate that the ash so formed be washed with water and then subjectedto Puta (repeated cycles)

Marana Highlights Through Second Intermediate Step – PistiPreparation

According to the said principles of Rasa Sastra the Bhasma prepared by using Mercury as the medium, is supposed to be the best. In accordance with this, a second intermediate step prior to subjection of the metal like Yasada to Marana is mixing it with Parada / Mercury. The Parada subjected to Sodhana is mixed with molten

Yasada and triturated vigorously. For that matter any metal amalgam is prepared by trituration method for Rasa preparations, the metal being melted in case of PutiLohas. The various types of alloys and the methods of their preparation are dealt under the section of Sodhana. The amalgams are also alloys but with one constituent as mercury. It is practically demonstrated that mercury facilitates embrittlments of a metal, by penetrating along the grain boundaries of brass. Using this capacity of mercury of destroying the solid structure of any metal, it is used as a powdering medium. This amalgam i.e. Pisti is then instructed to be washed with some amla (acidic) drava specifically NimbuSwarasa which may be clearing the Pisti of any acid soluble contents. These may otherwise interfere in the later stages. Ideally this Pisti is in a very favorable pharmaceutical form for exposure to further Marana process but at very few places in the texts is it alone subjected to Marana. All indicate it to be triturated with Gandhaka (Sulphur) and then proceed further. Till this stage, the provision of making the Yasada into powder form in successfully achieved. But this is not the only objective of choosing this particular method. Its far fetching therapeutic and substantiating effect on body constituents seems to be the prime aim, as after elaborate pharmaceutical process, mostly all the texts speak of the proper use of these compounds with the prerequisite of 'Ksetrikarana' of the body. Without Ksetrikarana no Rasa preparation is indicated. Coming to the combination of this Pisti with Gandhaka before it is actually subjected to Marana, Gandhaka, is the best binder of Parada. Parada, as otherwise is very heat unstable, presence of sulphur allows the holding back of Parada till a desired form of compounding is achieved. It is for sure that the Parada does not stay or stays in very minute, optimum quantities in the final bhasma. The presence of Gandhaka facilitates formation of such compounds as sulphides or sulphates, which are readily accepted on the pharmacological fronts.

Bhavana

Bhavana, the levigation, i.e. rubbing of solid matter with a liquid or Bhavana has various definitions throughout the texts, varying on the amount of liquid used and the time required to be allocated for the same. They are as follows:

On the Amount of Liquid

- ✓ Volumetrically or gravimetrically equal to the amount of solid to be levigated.
- ✓ Volumetrically so much so that the solid material can be immersed,completely.
- ✓ Volumetrically so much so that the solid material can be knidedloose enough to the consistency of dough. In case where the liquid is supposed to be the decoction of some herb, the amount of that dry herb is equal to the amount of material to be levigated, eight parts water added to it and reduced to one eighth by boiling. The whole of this liquid is then to be digested in the material by levigation.
- ✓ Till the whole of the liquid is digested, and the dough can be turned into Cakrika

On the Subjective Signs

- ✓ Till the whole of the liquid is digested and the material gains back its powdered state.

On the Period Consumed

- ✓ Adding the liquid to the solid material and allowing it to stay the whole day and the whole night this being continued for whole seven days and seven nights. During the period if the liquid evaporates, it is indicated that it be added in the same way as earlier.

Cakrika

Cakrika preparation has been welcomed in the discipline of Rasa Sastra as Pelletization, which has been defined by modern pharmaceutics as an agglomeration process that converts fine powders or granules of bulk drugs and excipient into small free flowing spherical units ranging in size from 0.5 to 1.5 mm. (Indian Drugs 36 (1) pp 44 to 49) It is an integral procedure of Marana process, though at times the texts even speak of subjecting the powder obtained after levigation, as it is in to the Marana

process. If we look into the exact necessity for the preparation of Cakrika its making will be found to be mandatory: 1) The first and the foremost reason in its preparation, which is a natural inbuilt reason is that the Cakrika is a parameter for testing the amount of heat supplied to the material. If in places of Cakrika, the powder is subjected to Marana as it is, it will not serve to judge the amount of heat supplied. 2) Preparation of Cakrika also facilitates transfer of the material from the mortar to the apparatus in which Marana has to be carried out. 3) If in case of the traditional Puta, where after the burning of the fuel, the ash settles down, the Marana apparatus or the Samputa may have just toppled over and the Mrtkarpat if not done properly, broken away, then there would be a strong possibility that the material inside is dropped into the outer waste of burnt fuel. In case, the material is not in a Cakrika form it may be a total loss. To facilitate such easy shifting of the material, Cakrika is a very handy procedure.

Some Intricacies and Specificities

- ✓ Moulding and drying of Cakrika is totally dependent on the nature of material. The dough should be loose enough so that a Cakrika with continuous, uncracked margins / border is prepared. As far as possible this being a manual peration, the Cakrika should be of uniform shape and thickness. The shape of a Cakrika is again the subject of convenience but as far as the name suggests, it is to be round in shape, like a convexo-convex lens.

- ✓ Ideally the drying of Cakrika is done in shade as it avoids a very fast loss of moisture and hence cracking. But YasadaCakrika have been advised to be dried in sunshine (AtapaSosita) As a matter of convenience and greater gravity of advantages, the Cakrika preparation in this study has been replaced by caking, where any contamination or loss of material has been efficiently avoided.

Puta

Rasa Vagbhata through his Rasa RatnaSamuccaya Chapter tenth, very beautifully gives the meaning of Puta and all the things which it achieves. RasadiDravyaPakanamPramanaJnapanamPutam|

NestoNyunadhikahPakahSupakamHitamausadham || (RRS 10/47). That which provides with knowledge of the measure of the extent of cooking of various substances like Parada is Puta. And this knowledge is necessary as neither less nor more cooking is expected if an effective drug has to be prepared. This can be further classified as: Puta is a visible, measurable parameter to understand as to what a drug undergoes when exposed to conditions favourable for areaction. Nowhere in the definition a direct mention of the word 'Agni' is made. Hence we can say that this referred 'Paka' can be anything that brings about a change.

Achievements from Puta(RRS 10/48-50)

1.Apunarbhava - Inability to attain original form
2. Gunadhikya – Potentiation
3. Agrata - Followed by many other qualities
4. AnapsuMajjanam - Unsinkable in water
5.Rekhaparnata - Occupying the inter ridge spaces of the finger pad skin
6. Laghuta – Lighteness
7. Sighravyapti - Spreading and occupying very rapidly
8. Dipanam - Increasing the appetite
9. Loha exposed to Puta is even more potent than JaritaParada.
10. Curnatva - by penetration of external heat into the metal and breaking the metal to a powdered state.

The definition of Puta and its achievement are placed consecutively, thus indicating that if the 'Paka' is proper, the drug will bear the above mentioned qualities.(The 'achievement' mention of these qualities is an evidence that our seers were well aware of the metallurgical aspect of metals). As if giving the reason for the attainment of proper transformation, the above points are projected further in the text. Earlier in the same chapter, the NirutthaBhasmaLaksana have been defined :-

Varitara- That substance which is Mrta, when floats on water is called varitara.

Rekhapurnata- That substance which is mrta, when occupies the inter ridge space on the skin of finger pad is Rekhapurna.

Apunarbhava- On exposure to heat (equivalent to heat of preparation) Guda, Gunja, Sukhasparsa, Madhu and Ajya, that which does not attain its Prakrti or original form is Apunarbhava.

Uttama- When spread on water and placed on that layer is a comparativelyheavier object, and the object floats like Hamsa, the Mrta substance is Uttama.

Niruttha- When exposed to heat (equivalent to heat of preparation) along with silver, it does not 'stick' to silver, meaning does not increase the weight of silver, the Mrta substance is then Niruttha. The earlier specified qualities are only by the virtue of attainment of the above, mentioned characteristics.

Analytical Findings of Yasad

Particle size of *bhasma*, which got considerably reduced after every *puta*, indicates that the *marana* helps in the reduction of the particle size. The size of nano particle plays an important role in changing the entire properties of material.[1] The least particle size of YPM samples may be rendering it, more available for the manifestation of the moderate cyto protective activity.The absence of free Zinc in the samples subjected to *putas*can be interpreted as total conversion of Zinc into its compound form and its presence in *Jaritha*sample indicates incomplete conversion. The use of *Gandhaka*in the *paradamaritayashadabhasma* samples might have resulted in a few sulfide phase formations.[2] When

compared with *shoditha* (purified) samples the *sulphate*percentage increased and the phosphate percentage got reduced in *Yashada bhasma*.*[3]* The presence of Fe304 detected in *Yashadapushpa*may be, due to frying in iron pan.[4]Variety of major and trace elements detected in Spectroscopy may be due to the natural and manipulated blemishes associated with it, the media and vessels used for its processing etc.[5]

PHARMACOLOGICAL FINDINGS

With increasing knowledge of risk of nanomaterials, it becomes imperative to assess the safety of Nano particulate Ayurvedic medicines using toxicity models. Drug yashada*pushpa*which showed significant size reduction in cotton pellet granuloma model, indicates its anti-inflammatory and anti proliferative effect.[6] In the pharmaco clinical study on *Madhumeha*, *Yashada*compound was observed to have a marginally better effect than *Shilajatu*compound in experimental animals and viceversa clinically.[7] In toxicity study, serum urea level was elevated in all the three YJM and YPM treated groups of albino rats. At the same time the drug showed reversal of elevated serum urea in diabetic albino rats. Since the changes are of moderate intensity they are likely to be reversible. However caution should be exercised while administering these preparations in persons with renal insufficiency**.** It is better to avoid their long term administration. On the basis of analysis of ponderal and bio-chemical parameters it can be suggested that YPM seems to have moderate cytoprotective activity, YJM weak cytoprotective activity and YJ moderate anti-diabetic, antihyperglycemic and weak cytoprotective activity.

CLINICAL FINDINGS

Therapeutic efficacy of *Yashadabhasma*has been proved in diseases like *Swethapradara*, *Vicharchika* and *Prameha*. In these studies, the *bhasmas*were administered by mixing with suitable herbal powders and adjuvants. The therapeutic dose was ranging in between 300 mg – 1 gm. Different preparations of *Yashadabhasma,* used internally and externally, had shown remarkable relief in *swethapradara.* Antibacterial, antifungal and immunomodulatory activity of *yashada*might have prevented the recurrence of such immunosuppressive diseases. Similar properties of *Yashadamritamalahara*might have contributed in reducing the symptoms of *Vicharchika*on external application. *Shilajatu*showed significant result than *Yashada in Madumeha*clinically. This may be because of the better action of *Shilajatu*at *rakthadathu*and *medodhatu*level than *Yashada*. In D.M, oxidative stress contribute to insulin resistance and many complications. Later studies have proved Immunomodulatory and free radial scavenging activity of *Yashadabhasma*, may help to prevent the systemic level damage, by reducing the oxidative stress. Though some studies suggest that the antidiabetic activity of *yashadabhasma*is due to its insulin sensitizing effect, further studies to identify it's target of action have to be carried out.

CONCLUSION

With increasing knowledge of risk of nanomaterials, it becomes imperative to assess the safety of Nano particulate Ayurvedic medicines using toxicity models. Drug yashada*pushpa*which showed significant size reduction in cotton pellet granuloma model, indicates its anti-inflammatory and anti proliferative effect[6]. In the pharmaco clinical study on *Madhumeha*, *Yashada*compound was observed to have a marginally better effect than *Shilajatu.*We are using zinc as aimmunomodulator in current scenario Covid-19. Yasadbhasma is the form of a zinc so yasadbhasm can use as a immunomodulatory. Many researches have proved as aImmunomodulatory. Yasadbhasm also can use in Diabetes mellitus, Vicharchika&SwetapradaraThe therapeutic dose was ranging in between 300 mg – 1 gm. Different preparations of *Yashadabhasma. Yashadamritamalahara*might have contributed in reducing the symptoms of *Vicharchika*on external application.

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