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Supremacy of metal based drug suvarna bhasma and comparative study of commercial samples of suvarna bhasma

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Abstract

Suvarna bhasma is an ancient traditional ayurvedic drug introduced by ayurvedic pharmacy which is used all over India since antiquity. This drug is claimed to be the supreme ayurvedic drug for all sorts of heart complaints, high blood pressure, tuberculosis etc. It is also claimed to be a strong anti-poisoning agent who, can function as excellent remedy against different kinds of body poisoning. In spite of these and such other extra ordinary medicinal properties it has still remained as traditional drug only. However during recent years attempts are being made to rejuvenate the art and science of ayurvedic bhasma with the help of modern science and technology. For this purpose an essential and important prerequisite is to know the current status of suvarna bhasma samples which are commercially sold and used by ayurvedic physicians for the therapy. In present communication we would like to present results and conclusions of our recent work in gold based drug Suvarna Bhasma with the help of comparative study of various commercial samples of metal based drug Suvarna bhasma is done.

Keywords: Suvarna Bhasma, ayurvedic drugs, comparative study of commercial samples

1. Introduction

During recent years, scientists are taking keen interest in rejuvenation of the art and science of traditional drugs of vital importance. Metal based bhasmas is the extremely interesting and important class of drugs of mineral origin. Our interdisciplinary research group is working intensively in this area. Among these gold based drugs Suvarna Bhasma is one of the drugs which are used in India since antiquity (Zahoor *et al* 2005) [7].

At the time of Charak, Shushruta and prior to this period pharmaceuticals of mineral origin were not in common use. The art of adopting metals and metallic compounds for medicinal purpose was established in latter period. Chemists tried to conquer the art and knowledge of transmutation of metal by chemical methods. Ayurvedic process which converts the micro or semi micro metallic/nonmetallic state into nano state induced miraculous medicinal properties in the resulting product. Some of these extra ordinary properties include rapid absorption, high potency, long durability, permanent results; they can be preserved for years since they have no expiry period, minute quantities are being quite effective, and large scale production is not necessary. Suvarna Bhasma has anti anxiety, anti-depressant, analgesic and free radical scavenging activity. (Singh Neetu *et al* 2012) [5] Bhasmikarana is a concept of making the gold medicinally reactive. (Mahaptra *et al* 2010) [4] Bhasmas are considered to be biologically produced nanoparticles. (Willi Paul *et al* 2011) [1] since bhasma contains nanoparticles, they are easy to inject and target towards specific portion in the body (Kulkarni S. *et al* 2013) [6]

2. Materials and methods

Sample coding: Suvarna bhasma samples from five reputed ayurvedic pharmacies were collected and coded.

Table 1: Sample coding

Sr. No.	Sample	Code
1	Sample 1	BA SB
2	Sample 2	UN SB
3	Sample 3	DP SB
4	Sample 4	AR SB
5	Sample 5	AU SS SB

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Infra-Red Spectroscopy

FTIR Perkin Elmer infrared spectrophotometer is used to study solid state IR spectra.

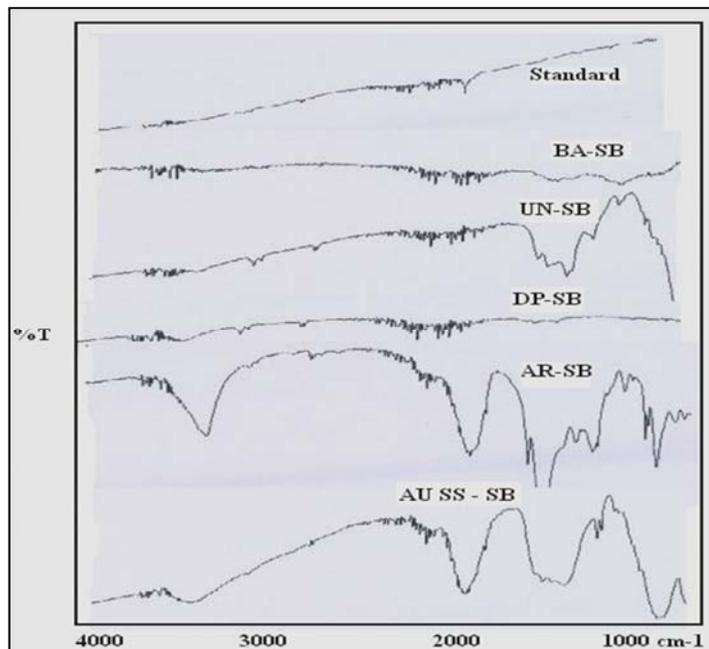


Fig 1: Comparison of IR spectra

Table 2: Comparison of IR frequencies

Commercial Sample	1 O-H	2 Org. matter	3 Org. matter	4 C=O	5 -	6 Fe-O
BA SB	-	-	1457			
UN SB	3619	1474	1458	1139	1022	495
DP SB	3750	-	1458	1120	-	-
AR SB	3318	1473	1458	1139	1022	499
AU SS SB	3466	1474	1458	1139	1022	595

Underlined peaks are unresolved peaks.

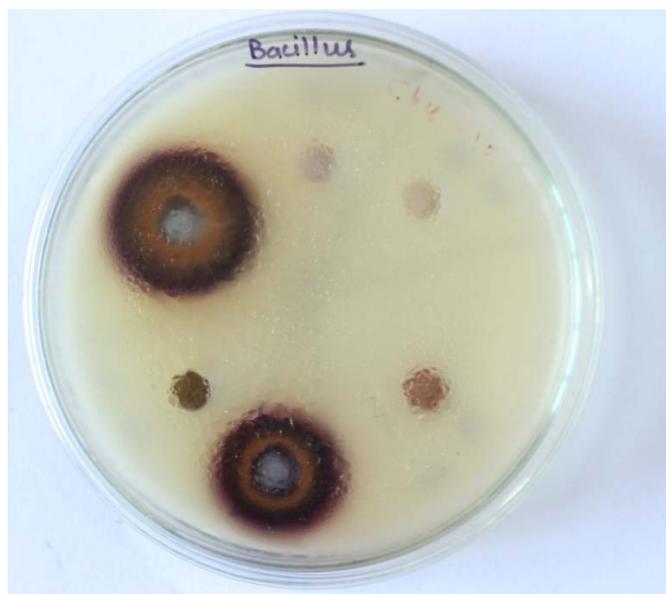
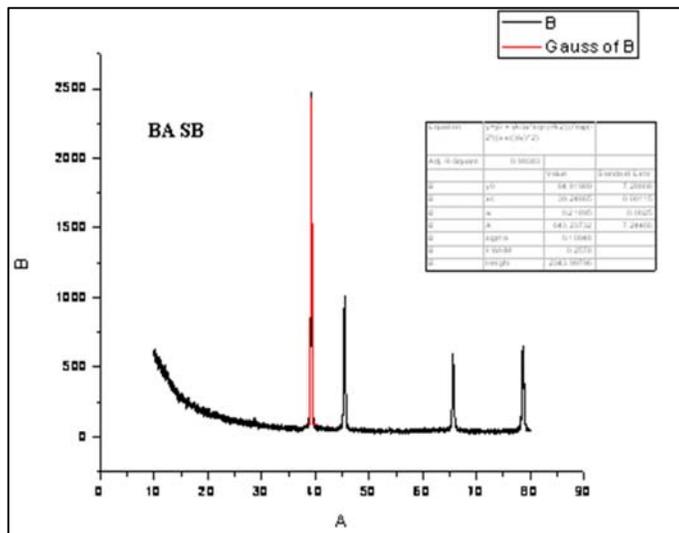


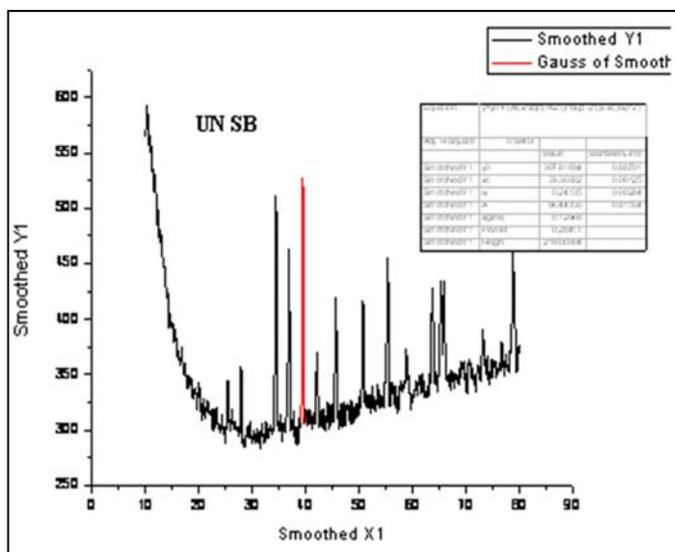
Fig 2: Antimicrobial activity of SB samples

X-Ray diffraction analysis of *Suvarna Bhasma* samples:

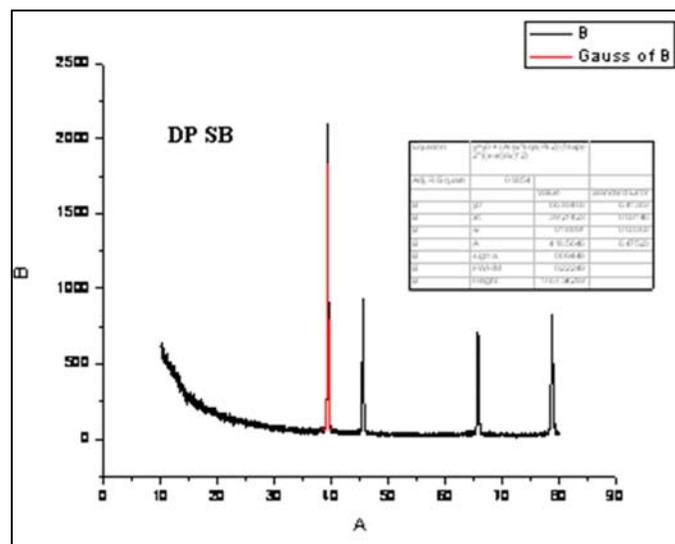
X ray diffraction patterns are recorded on Bruker D-8 Advanced.



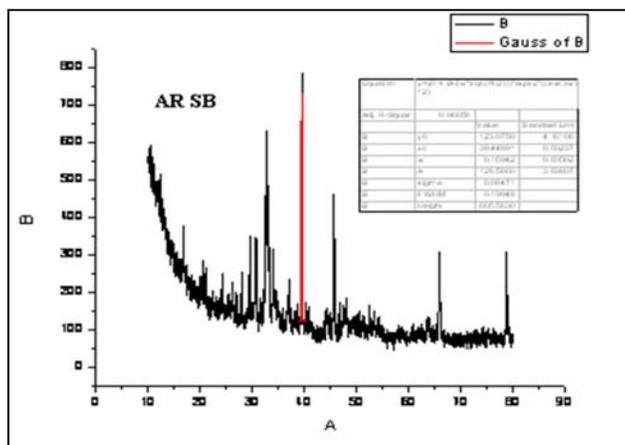
Graph 1: XRD Patterns of BA-SB



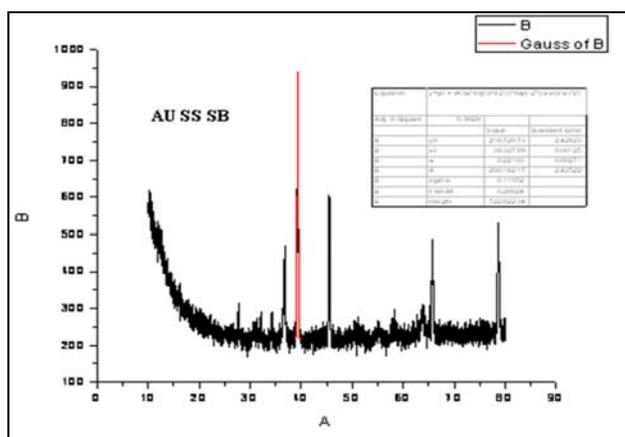
Graph 2: XRD Patterns of UN-SB



Graph 3: XRD Patterns of DP-SB



Graph 4: XRD Patterns of AR-SB



Graph 5: XRD Patterns of AU SS -SB

Table 3: Particle size of *Suvarna Bhasma* samples

Sr. No.	Name of the compound	FWHM	Angle 2θ	Particle size (nm)
1	BA SB	0.2578	39.24865	32.73065
2	UN SB	0.28417	39.36982	29.70458
3	DP SB	0.22249	39.27423	37.92815
4	AR SB	0.19948	39.44891	42.32526
5	AU SS SB	0.26024	39.32789	32.43178

Table 4: Results of XRD analysis

Sr. No.	Sample Code No.	Constituent identified
1.	BA SB	Au + Fe ₂ O ₃ + (Ca, Na, Al, Si) ₄ O ₈
2.	UN SB	Au + Fe ₂ O ₃ +Fe ₃ O ₄ +MgFe ₂ O ₄
3.	DP SB	Au + Fe ₂ O ₃ + Fe ₃ O ₄ +FeS+(Na, K, Ca, Al, Si)
4.	AR SB	Au + Fe ₂ O ₃
5.	AU SS SB	Au + Fe ₂ O ₃ +Fe ₃ O ₄ +MgFe ₂ O ₄

3. Comments

IR spectra of BA-SB sample and DP-SB sample are nearly straight line. IR spectra of samples Au SS SB and AR SB shows broad intense IR peaks which can be assigned to organic matter or inorganic constituents like metal sulphides, carbonates, silicates, or sulphates. Presence of such constituents is supported by XRD. Absence of any distinct peak in the region 4000-2000 cm⁻¹for UN-SB indicates the absence of organic matter in UN- SB.

Suvarna Bhasma samples are expected to exhibit antimicrobial activity against microorganisms. There is major limitation of solubility of SB samples for the antimicrobial investigations of samples of *Suvarna Bhasma*.

Recently attempt has been made by Wadekar and co-workers (Wadekar *et al* 2005)^[2] to find a practical solution which was used and recommended by Malik and co-workers and this attempt is found to be fruitful to some extent. In this attempt, *Bhasma* samples are transferred into colloidal solution state in liquid media.

All the samples are screened for antimicrobial activity. Sample DP-SB showed an antimicrobial activity against E. Coli. Formation of light pink coloured gold nano particles is seen in case of DP SB sample.

Other samples showed anti-microbial activity against *Bacillus subtilis*.

XRD pattern reveals that most of samples are

microcrystalline as indicated by predominance of sharp lines. Apart from these sharp lines, there are also several broad bands in the XRD pattern of many of these samples indicating that some amorphous compounds are also associated. The formation of such amorphous components is likely to be due to number by calcination cycles applied to the triturated intermediate products in presence plant juices. These *Bhasmas* therefore exist in nanocrystalline form whose amount depends on the number and nature of calcination cycles.

4. Conclusions

All the samples of *Suvarna bhasma* under the investigation contain gold in its micro fined metallic form. At every stage of this *bhasmikarana* the particle size reduces, tending to nano level. Since particle size of gold in all *Suvarna bhasma* samples ranges from 29 to 37 nm, it can be absorbed and assimilated in the body as ionic gold. There are significant variations in chemical compositions of selected commercial samples for the present work. Most probably this is due to variations in the synthetic method adopted by the particular *Ayurvedic* pharmacy. There is remarkable variation in exhibition of antimicrobial activities of five different samples of *Suvarna Bhasma* obtained from five reputed pharmacies. Out of five samples only one sample DP-SB showed significant antimicrobial activity against *E. Coli*. The reasons behind this variation are yet to be exploring which need more detail investigation and modifications.

5. Acknowledgment

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6. References

1. Paul W, Sharma P. Blood compatibility studies of Swarna bhasma (gold bhasma), an Ayurvedic drug. *International Journal of Ayurveda Research*. 2011; 2(1):14-23.
2. Wadekar MP, Rode CV, Bendale YN, Patil KR, Prabhune AA. Preparation and characterization of a copper based Indian traditional drug: tamra bhasma. *Journal of Pharmaceutical and Biomedical Analysis*. 2005; 39(5):951-955.
3. Yadav V, Makwana M, Kamble S, Qureshi S, Sarmalkar B, Salve D. Different Au-content in Swarna Bhasma Preparations: Evidence of lot-to-lot Variations from Different Manufacturers *Advances in Applied Science Research*. 2012; 3(6):3581-3586.
4. Mahapatra S, Jha CB. Physicochemical characterization of ayurvedic bhasma (suvarnamakshika bhasma): An approach to standardization *International Journal of ayurved research*. 2010; 1(2):82-86.
5. Singh N, Chaudhari, A. Suvarna bhasma and gold compounds: An innovation of pharmaceuticals for illumination of therapeutics 2012; 3(1):5-9.
6. Kulkarni Bhasma SS, nanomedicine. *International research journal of pharmacy*. 2013; 4 (4):10-16.
7. Zahoor Ahmad Shah ZA, Gilani RA, Sharma P, Vohora SB. Attenuation of Stress-Elicited Brain Catecholamines, Serotonin and Plasma Corticosterone Levels by Calcined Gold Preparations Used in Indian System of Medicine *Basic & Clinical Pharmacology & Toxicology*. 2005; 96:469-474.