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Research Article

ANTI MICROBIAL EFFECT OF *SWARNA MAKSHIKA BHASMA*

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Abstract

Shodhana of *swarna makshika bhasma* was done by boiling it in *eranda taila and matulunga swarasa* for two hours and *marana* was done by adding *gandhaka* to *shodhita makshika* and *bhavana* was given by *matulunga swarasa*. After the preparation of bhasma,it was tested for *bhasma pareekshas* to ensure the quality and safety. *Bhasma pareekshas* like *rekha poorna, varitara, dadhi pareeksha* and *niruttha* play a vital role. The present study was aimed at testing the antimicrobial activity of *swarnamakshika bhasma* on the most common hospital acquired infections caused due to staphylococcus aureus and E-coli. *Swarnamakshika bhasma* inhibited the growth of staphylococcus at the concentration of 8mg after half an hour and inhibited the growth of E-coli at a concentration of 4mg after half an hour with maximum inhibition concentration being 1mg-8mg.

Key words – *Dhatuvada, dehavada, varitara, rekhapurna, niruttha*.

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INTRODUCTION

Swarnamakshika is one of the important *maharasas* and it has its own importance in both *Dhatuvada and Deha vada*. For *dehavada* it is Said that it destroys all the diseases, it is one among the best *vrishya dravyas* and it is considered as *Rasanagriya*. It is called as *praana of parada* and be used in *swarna abhava*. It has the capacity of uniting two metals. It yields metals like copper, iron and sulphur. By having *madhura rasa,laghu guna and sheeta veerya*, it undergoes *madhura vipaka*. It is *tridosha hara* and *visheshsataha kaphapitta hara. Swarna makshika* is indicated in various diseases like *kushta, krimi, netra rogas, prameha, pandu, hridroga, arshas, kandu, visha, jeerna jwara, anidra, apasmara, mandagni.*

MATERIALS AND METHODS

After the preparation of *swarna makshika bhasma* , it was tested for all the *bhasma pareekshas* like *rekhapoorna, varitara, unnama*, also by giving lot of importance for *dadhi pareeksha and niruttha*.

Its antimicrobial property was tested against gram positive and gram negative organisms like staphylococci and ischerio coli, which are common nosocomial pathogens causing variety of hospital acquired infections. Here the aim was to detect the minimum inhibition concentration (MIC) with minimum bacterial dose of *swarna makshika bhasma*.

Method adopted : For this standard broth dilution method was employed for detecting anti microbial action and MIC detection of *swarna makshika bhasma*.

Two different procedures were employed to test the action of test compound.

Preparation of stock solution : 1 gram of the test compound was mixed with 10ml of sterile distilled water. The mixture was thoroughly mixed to get a uniform suspension and this suspension was used for further testing.

Preparation of test compound paste : 10mg of the *Swarnamakshika bhasma* was taken in a china dish, sterile distilled water was added drop by drop with constant mixing till smooth paste was formed. This paste was further tested for antimicrobial action.

To make the sample suitable for the study, sample of stock solution, semisolid paste, suspension of 1gm of compound (*bhasma*) 10ml of distilled water were made ready.

Gentamycin solution was used as a control antibiotic.

Suspension was prepared out of standard strains of ATCC staphylococcus aureus and ATCC E-coli.

Control groups:

Positive control : In which the bacterial suspension was maintained to check the viability of the organism. Negative control – was only distilled water was used.

Broth dilution method

1ml of suspension of the *bhasma* containing 1mg of *Swarnamakshika bhasma* concentration was taken in a sterile test tube.

0.1ml of bacterial suspension was added.

The same procedure was employed using 2mg,4mg,8mg concentrations of bhasma.

These tubes was incubated for 24hrs at 37 degree C

Next day tubes were observed for turbidity

Results : Turbidity was observed only in the positive control groups, where as no turbidity was seen in any other series of test tubes. This shows all the samples had effectively inhibited the growth of the bacteria.

Mueller Hinton Agar plates was divided into 4 sections & labelled with the help of sterilised loop. The content from each test tube was taken out and applied over the agar plates at 1\2 an hour, 1hr, 2hr,4th hr and 8th hour. Similar procedure was done with all the test tubes and incubated for 2hrs.suspension was sub cultured first followed by the sub-culturing of the solution after mixing.

Results : No growth observed. Which says that there is absorption of the active principal present in the sample.

Paste was prepared by adding 1ml of distilled water to 10mg of *bhasma* and to this 0.1ml of bacterial suspension was added and stirred in the solution sub-cultures were made as earlier. Test tubes were inoculated with gram positive and gram negative bacteria and incubated for 24hours.

Observations

Mueller Hinton agar plates	E coli	staphylococcus
Positive control group	Growth present	Growth present
Negative control group	Growth absent	Growth absent
Gentamycin	Growth absent	Growth absent
Swarnamakshika bhasma	Growth absent in 4mg after 1\2an hour	Growth absent in 8mg after 1\2an hour

Results

The minimum inhibition concentration of the *swarnamakshika bhasma* against the test micro organisms was as follows;

1. *Swarnamakshika bhasma* inhibited the growth of staphylococcus aureus at a concentration of 8mg after 1\2 an hour. The minimum inhibition concentration was 1mg-8mg
2. *Swarnamakshika bhasma* inhibited the growth of E-Coli at a concentration of 4mg after half an hour. The minimum inhibition concentration range was 1mg-8mg.

DISCUSSION

The solubility of *swarnamakshika bhasma* plays an important role to test the sample against gram positive and gram negative microorganisms.

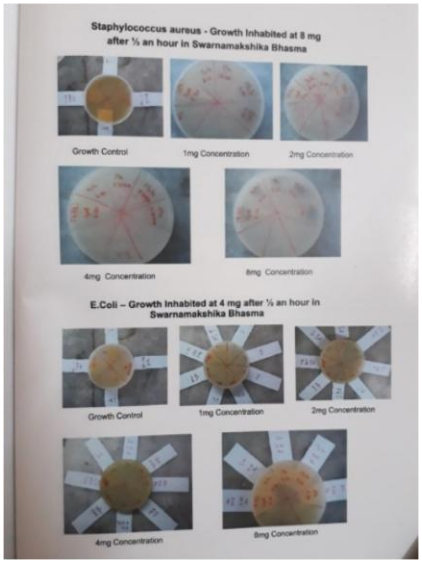
As water is an universal solvent, distilled water was considered as an ideal solvent. It is neither acidic nor alkaline in nature. Therefore *bhasmas* were checked for solubility in distilled water in acidic ph of 1.2 and in alkaline ph of 7.8. *Swarnamakshika bhasma* was sparingly soluble in all these medias. As the obtained result was not satisfactory the suspension was taken for the study.

In serial dilution method the supernatant fluid as well as the mixed portion containing nutrient broth showed antibacterial effect against both gram positive staphylococcus aureus and gram negative bacilli which explains that the active principles present in the *bhasma* was absorbed by the distilled water. So hypothetically it may be assumed that the same occurs in the body, that is *bhasma* is absorbed by the fluids of our body and unabsorbed portion is excreted out.

Swarna makshika bhasma showed no growth of staphylococcus at a concentration of 8mg after half an hour and also showed no growth of E-coli at a concentration of 4mg after half an hour.

This shows that the *Swarna makshika bhasma* has effectively inhibited the growth of micro organisms which is taken as minimum inhibition concentration of *Swarna makshika bhasma* with a range of 1mg-8mg.

Based on the ancient literature which speaks about the effect of *Swarna makshika bhasma* in vrana ropaka, kushtaghna, krimighna properties and its specific use in twak vikaras, it was also observed that it can be effectively used in non healing chronic ulcers, venous ulcers and other wound infections. And by the results obtained here,it showed that the prepared *Swarna makshika bhasma* has antimicrobial action against both staphylococcus and E-Coli, it can be said that *Swarna makshika bhasma* can be used externally on fresh and open wounds to prevent further infections, on infected wounds as it has wound healing property.



CONCLUSION

The prepared *Swarna makshika bhasma* when tested against gram positive and gram negative organisms like staphylococcus aureus and E-Coli showed significant results. The prepared *Swarna makshika bhasma* inhibited the growth of staphylococcus aureus at 8mg after half an hour and E-Coli at a concentration of 4mg after half an hour where the minimum inhibition range was 1mg-8mg.

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