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ANTIMICROBIAL STUDIES OF *SHUDDHA GANDHAK* OF *AYURVED PRAKASH* AND *RASAYANSAR* METHOD

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ABSTRACT

Gandhak is an important drug in Rasashastra used since ancient times. It is known for its best antimicrobial action and choice of drug for skin diseases. Raw *gandhak* causes some diseases in impure form as it contains impurities, so *shuddha gandhak* should be used. Commonly used method for *gandhak shodhan* is *dhalan* using *Goghruta* (Cow Ghee) and *Godugdha* (Cow Milk). For *gandhak shodhan, Ayurved Prakash* has mentioned equal *goghruta* quantity and *Rasayansar* has mentioned one fourth goghruta quantity to gandhak. It may possible that as *goghruta* quantity for *gandhak shodhan* changes then antimicrobial activity of *shuddha gandhak* will change. Present study was carried out to know whether the antimicrobial activity of *shuddha gandhak* of above methods, changes or remains same to each other. For antimicrobial study, three samples of *gandhak* i.e. Sample1 (Raw *gandhak*) Sample2 (*Shuddha gandhak* of *Ayurved Prakash*) and Sample3 (*Shuddha gandhak* of *Rasayansar*) were taken. These samples were examined against two bacteria *Staphylococcus aureus, Micrococcus leuteus* and one fungi *Candida albican*. Modified Agar Cup method was used by taking CS2 (Carbon disulphide) as a solvent. It was observed that Experimental group of three *gandhak* samples shown, zone of growth inhibition for *Staph. aureus, Micro. leuteus* and *Candida albican* of Sample1 was 10mm, 12.5mm, 12.5mm; of Sample2 was 11mm, 12mm, 13mm; of Sample3 was 13mm, 14mm, 14mm respectively. These results indicate that Sample3 was shown increase in zone of growth inhibition for three microbes. So *shuddha gandhak* of *Rasayansar* method is having more antimicrobial action than *shuddha gandhak* of *Ayurved Prakash* method.

Keywords: *Gandhak, goghruta, godugdha, dhalan, shodhan*

INTRODUCTION

Gandhak is most important drug and widely used for many diseases[1]. It is an ingredient in many formulations prescribed in skin disorders such as *Gandhak Rasayan*[2], *Gandhak druti*[3], *Gandhak taila*[4], *Gandhak malahar* etc. Rasashastra classical texts have mentioned about gandhak is as *keetnashak, keetaghna, krumighna, pamari, kushtari, dadrughna*[5]. It denotes its action on skin diseases. *Shuddha gandhak* has properties of reducing toxicity with enhancing potency of Parad (Mercury) [6], important role for *bhasma* preparation[7] and highly appetiser, digestive[8] in nature. Raw *gandhak* causes some diseases in body as it contains impurities i. e. *Shilachurna and Visha*[9]. So it is subjected to *shodhan* process to get benefits of more potential *Shuddha gandhak*. A *Shodhan* process potentiates properties of drug and removes impurities. Rasashastra classical texts have been mentioned many methods and different materials for *gandhak shodhan*. Widely used method is *dhalan* by using *Goghruta*

and *Godugdha*. *Ayurved Prakash*[10] has described equal quantity of *Goghruta* for *gandhak shodhan* by *dhalan* process. Earlier *Rasayansar*[11] has mentioned one fourth quantity of *Goghruta* for *gandhak shodhan* by same *dhalan* process. Here the *Goghruta* quantity is reduced to three times. Hence the production cost of above *shuddha gandhak* has a large difference. As medicine should affordable to large population particularly poor people, this study was carried out to know the antimicrobial activity of above *shuddha gandhak* for two bacteria and one fungus. A previous study was carried out on "Antimicrobial study of *Ashuddha* and *Shuddha gandhak*" and *gandhak* was found effective against these two bacteria and one fungi. This study was done to know anti-microbial activity of *shuddha gandhak* of different two methods.

MATERIAL AND METHODS

Gandhak Shodhan: Raw *gandhak*, *Goghruta* (Cow Ghee), *Godugdha* (Cow Milk) were collected from local market. Raw *gandhak* was taken 1000 gm. and divided into two batches for *Ayurved Prakash* and *Rasayansar* method. *Goghruta* was used of *Agmark* standard of *Gowardhan Company*. *Godugdha* was taken of *Mahananda Company* having *Agmark* standard and specific gravity of 1.030. All materials were taken as shown in TABLE NO.1.

TABLE NO. 1: MATERIALS TAKEN FOR *GANDHAK SHODHAN*

Sr.No	*Dravya* Taken	1st *Dhalan*		2nd *Dhalan*		3rd *Dhalan*	
		Ayurved Prakash	Rasayansar	Ayurved Prakash	Rasayansar	Ayurved Prakash	Rasayansar
1.	Raw *Gandhak*	500gm	500gm	470gm	480gm	465gm	470gm
2.	*Goghruta*	500gm	125gm	470gm	120gm	465gm	120gm
3.	*Godugdha*	1500ml	1500ml	1500ml	1500ml	1500ml	1500ml

For each method, powdered *gandhak* was taken of 500 gm. At first normal temperature *Godugdha* was taken in a cylindrical pot i.e. *ketley* covered with dry clean cotton cloth tied at neck. Required *goghruta* was taken in a steel pot and heated on slow fire. When *goghruta* completely melted then powdered *gandhak* was added to it. After melting of *gandhak* in *goghruta*, mixture was poured in *ketley* having *godugdha* through cloth. Stones and clay like structure were remained on cloth and *gandhak* filtered in *godugdha*. During pouring mixture continuous stirrer was done to avoid blockage of cloth pores due to *gandhak* cooling. Temperature was maintained between 110^0c- 120^0c during each *dhalan* process. After 15 minutes *dhalit gandhak* was taken out from *godugdha* and appeared as fresh yellow *bundi* like structure. *Shuddha gandhak* was washed out with hot water of 80c temperature till it gets free from *goghruta* and *godugdha*. This process was repeated for twice i.e. three *dhalan* was completed for each method. For one *dhalan* 15 minutes of time was required. For each *dhalan* new and fresh *goghruta* and *godugdha* were used. For *Ayurved Prakash* method total *goghruta* required was 1435 gm and *shuddha gandhak* obtained after first, second, third *dhalan* was 470gm, 465gm,

460gm respectively. For *Rasayansar* method total *goghruta* required was 365gm and obtained *shuddha gandhak* after first, second, third *dhalan* was 480gm, 470gm, 465gm respectively. *Godugdha* was used each time for *Ayurved Prakash* and *Rasayansar* method was 1500ml and 1000ml respectively. [TABLE NO. 1]

Antimicrobial Study: This study was carried out against two bacteria *Staphylococcus aureus*, *Micrococcus leuteus* and one fungus *Candida albican*. Three samples of *gandhak* namely Sample 1 (Raw *Gandhak*) Sample 2 (*Shuddha gandhak* of *Ayurved Prakash* method) Sample 3 (*Shuddha gandhak* of *Rasayansar* method) was taken for antimicrobial study. These samples were sterilised in oven at 100^0c for a half hour. In Control group CS2 and in Experimental group Sample 1, 2, 3 were studied. Nutrient agar was used as a nutrient media for study. Modified Agar cup method was used with Carbon disulphide (CS2) as a solvent. This is shown in TABLE NO. 2.

TABLE NO. 2: MODIFIED AGAR CUP METHOD

Sr. No.	Materials	Antibacterial Study	Antifungal Study
1	Media Agar	25 GM	15 GM
2	Peptone	10 GM	15 GM
3	Dextrose	_------	40 GM
4	Meat Extract	05 GM	-------
5	$Nacl_2$	03 GM	-----
6	Distilled Water	1000 ML	1000 ML
		at 121^0 C	final pH 5.6 at 25^0 C

RESULTS

Antimicrobial studies were carried out for 10% concentration of *gandhak* above samples against mentioned microbes. The results were calculated on the basis of zone of growth inhibition for that microbe. In control group CS2 shown zone of growth inhibition for *Staph. aureus* and *Micro. leuteus* and *Candida albican* was 12.5mm, 15mm and 12mm respectively. In experimental group, three *gandhak* samples were shown results as below. Sample1 was shown zone of growth inhibition for *Staph. aureus*, *Micro. leuteus* and *Candida albican* as10mm, 12.5mm, 12.5mm respectively. Sample2 was shown zone of growth inhibition for *Staph. aureus*, *Micro. leuteus* and *Candida albican* as 11mm, 12mm, 13mm respectively. Sample3 was shown zone of growth inhibition for *Staph. aureus*, *Micro. leuteus* and *Candida albican* as 13mm, 14mm, 14mm respectively. It was observed that increase of zone of growth inhibition was noticed for Sample3 i.e. *Shuddha gandhak* of *Rasayansar* method. (TABLE NO 4 & FIGURE 1,2,3).

TABLE NO. 3: OBERVATIONS IN ANTIMICROBIAL STUDIES

Sr. No.	Samples	Antibacterial Study		Antifungal Study
		Staph. aureus	***Micro. leuteus***	***Candida albican***
1	Control CS2	12.5 mm	15.0 mm	12.0mm
2	Sample 1	10.0 mm	12.5 mm	12.5 mm
3	Sample 2	11.0 mm	12.0 mm	13.0 mm
4	Sample 3	13.0 mm	14.0 mm	14.0 mm

DISCUSSION

Rasashastra is a unique branch in the world which is related to herbo-mineral preparations. *Parad* and *gandhak* are two most important drugs used in many formulations. *Gandhak* is most potential and famous drug for skin diseases in *shuddha* form. *Gandhak* is effective by internal and external use. *Shodhan* is a process due to which raw material is converted to absorbable, edible form by removing impurities and by reducing toxicity. Many procedures has to be done in *shodhan* like *nirvapan, aavap, dhalan* etc. *dhalan* means a solid material is melted and poured in a liquid material. For *gandhak shodhan, goghruta* and *godugdha* are used widely as they have *sheet, sar, pittnashak guna* to subside acidity property of *gandhak*. A study was carried out on "Antimicrobial study of *Ashuddha* and *Shuddha gandhak*" and concluded with antimicrobial activity of *gandhak*. Two different references were found of *gandhak shodhan* mentioning different quantity of *goghruta* with same *dhalan* method. In present study two bacteria i.e. *Staphylococcus aureus, Micrococcus leuteus* and one fungus i.e. *Candida albican* were taken for antimicrobial study. Antimicrobial study of *gandhak* was carried out by Modified Agar Cup method. Carbon disulphide CS2 was used as a solvent. In control group CS2 was shown zone of growth inhibition for *Staph. aureus* and *Micro. leuteus* and *Candida albican* as12.5mm, 15mm, and 12mm respectively. In experimental group, three *gandhak* samples were shown results as below. Sample1 was shown zone of growth inhibition for *Staph. aureus, Micro. leuteus* and *Candida albican* as 10mm, 12.5mm, 12.5mm respectively. Sample2 was shown zone of growth inhibition for *Staph. aureus, Micro. leuteus* and *Candida albican* as 11mm, 12mm, 13mm respectively. Sample3 was shown zone of growth inhibition for *Staph. aureus, Micro. leuteus* and *Candida albican* as 13mm, 14mm, 14mm respectively. This indicates that *gandhak* has antibacterial antifungal action. Also it is mentioned that *gandhak* has synonyms like *pamari, dadrughna* i.e. more antifungal action, it is proved on the basis of above study as *gandhak* was shown more area of growth inhibition for fungus.

CONCLUSION

Antimicrobial studies was shown increase in growth inhibition for Sample3 i.e. *Shuddha Gandhak* of *Rasayansar* method. So it is most economical method as it requires three times less *goghruta* to *gandhak* and lowers the production cost of *shuddha gandhak*. It is more effective against above mentioned microbes in which it was shown increased zone of growth inhibition for *Candida albican*. So it has more antifungal action.

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