MRIGANKA VATIKA: EVALUATION OF ITS ANTIBACTERIAL PROPERTIES (AN EXPERIMENTAL STUDY)

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ABSTRACT

Antibacterial an agents that destroys or stops the growth of bacteria.*Mriganka vatika* an Ayrveduic medicine its antibacterial study was done by using glucose Brothliquid medium and Muller Hinton Agar solid medium by bacterial Broth dilution method against strain of Staphylococcus aureus, Pseudomonas aeruginosa, Klebsiella pneumonae and Escherichia coli. The use of drug was done in the concentration of 100 mg/ml, 50 mg/ml and 25 mg/ml on the strains. After experimental study, results show that for Pseudomonas aeruginosa, the concentration of 100 mg/dl was found good effective on three strains out of four strains; for Klebsiella pneumonae and Escherichia coli, the drug was effective in the concentration of 100 mg/ml, 50 mg/ml on the strains; for staphylococcus aureus, drug was effective in all concentration of 100 mg/ml, 50 mg/ml and 25 mg/ml on the strains. It's concluded that *Mriganka vatika* has antibacterial activity against strains of gram positive(staphylococcus aureus) as well as gram negative (pseudomonas aeruginosa, Klebsiella pneumonae, Escherichia coli) bacteria and its drug more effective on strains of gram positive than gram negative bacteria.

Key words: antibacterial*, Mriganka vatika*, strains.

INTRODUCTION

Parada has a top range of such medicines in which it used with other mineral and herbal drug. It prolongs the efficacy and durability of such medicine so *Rasa* therapy is fast acting therapy and effective in smaller doses, hence considered highly superior. An *aupsargicrogas* according to *Acharaya Sushuruta*, define as which diseases spreads quickly by the contaminated foods, water and physical contacts etc. like as *Kushtha*(skin diseases). *Mrigankavatika* is a rasa preparation, uses in all types of *Kasa (cough), Swasa (Dyspnoea), Jwar (fever),Premeha (Types of Diabetes),Kandu (itching), Krimi (Worm and bacteria)*etc. mentioned in text of *Bhaisjaya ratanavali* (242-247).

In Ayurveda, there is no any direct reference related to bacteria's but these are mentioned in the form of the word '*Raksasa, Preta, pisacha'* etc. As microbiology is not more branch of modern science while the Mriganka vatika is related to our ancient rasa literature. Ingradients of trial drugs such as *Parada, Gandaka, Vasa and Trikatu* etc. shows antibacterial activity on the basis of previous researches. So it was a better chance to correlate the modern science (antibacterial agents) with *ayurvedic rasa* preparation.

Aim and Objectives:

- To prove antibacterial activities of *Mriganka vatika* against gram positive and gram negative Bacteria's.

- Comparison of effects of trial drug on Gram positive and gram negative Bactria's.

Material and methods:
Preparation of *Mriganka vatika* was carried out by *Kharaliya rasayana* method as per text of *Bhaisjayaratanavali* (242-247). *Kajjali* was made from 20 gm purified *Parada* and equal quantity of purified *Gandaka* triturating together in mortar and paste for 18 hours, resulting gray color powder without shining of *Parada*, on visible when inspection. After it purified *Tankan* (Borax), *Louha bhasma, Abhraka bhasma* each 20 gms were added in mortar and grinding properly.Herbal ingredientswere such as *Sunthi*(Zingiber officinalis), *Marich*(Piper nigrum), *Haritaki*(Termanellia

chebula),*Vibitaki*(Termanellia bellarica), *Amalaki* (Emblica officinalis), *Chavya* (Piper rectrofectum),*Tallish patra*(Abies webbiana), *Raktotpala*(Nelumbium nucifera) and *Laksha*(resinous extracts of Ficus religiosa) in20 gms each andPippli (Piper longum) in 40 grams. All have a fine powder before adding mixture and finally three *Bhavanas*(grinding and activating with herbal medicine *Swarasa etc.*) of *Vasapatra Swarasa*(Juice) (Adhatoda vasika) were performing into whole mixture till it converted in a very dark black and smooth paste than Vatika(pill) formation was done.After drying, Mriganka vatika (each 100 mg) were prepared.

Media: Media of **Himedion pvt. Ltd**. Was used.

s.no.	Bacteria name	Type of media which used
1.	Staphylococcus aureus	Blood agar, Nutrient agar, Muller Hinton agar
2.	Escherichia coli	Mac conckey agar, Muller Hinton agar
3.	Klebsiella pneumonae	Mac conckey agar, Muller Hinton agar
4.	Pseudomonas aeruginosa	Mac conckey agar, Muller Hinton agar

Strains of bacterial species were selected by their various antibiograms prevalent in local population.

Antibacterial study: Maintenance of culture: Study was performed by using Broth liquid medium and Agar solid medium by bacterial Broth dilution method at Centre of NPIL Amolak Laboratories & Diagnostic Private Ltd.; Udaipur, Rajasthan under supervision of Dr. Arvinder Singh M.D. Pathology. Solution of medicinal preparation (Mriganka vatika) was prepared in distilled water in concentration of 100 mg/ml, 50 mg/ml, 25 mg/ml. 1 ml solution incubated overnight with

1 ml of bacterial Broth solution in concentration of 1×100000/ml equivalent to 0.5 McFarland Bacl2 solutions. To prepare 100 mg/ml concentration solution was directly prepared in 1ml of glucose Broth solution. Plating of these Broths had done according its standard procedure, after 24 hours incubation colony count as per standard procedure.

Observation: In this study, four strains prevalent in population(selected by antibiograms) of all four bacteria'swere used, plated and observed by standard methods. Reading which observed:

For Pseudomonas aeruginosa:			
	Conc. in mg/dl	Growth observed into four strains.	Inhibition of growth in %.
1.	100	1	75
2.	50	4	0
3.	25	4	0
For Escherichia coli:			

1.	100	0	100
2.	50	3	25
3.	25	4	0
For Klebsiella pneumonae:			
1.	100	1	75
2.	50	3	25
3.	25	4	0
For Staphylococcus aureus:			
1.	100	0	100
2.	50	2	50
3.	25	3	25

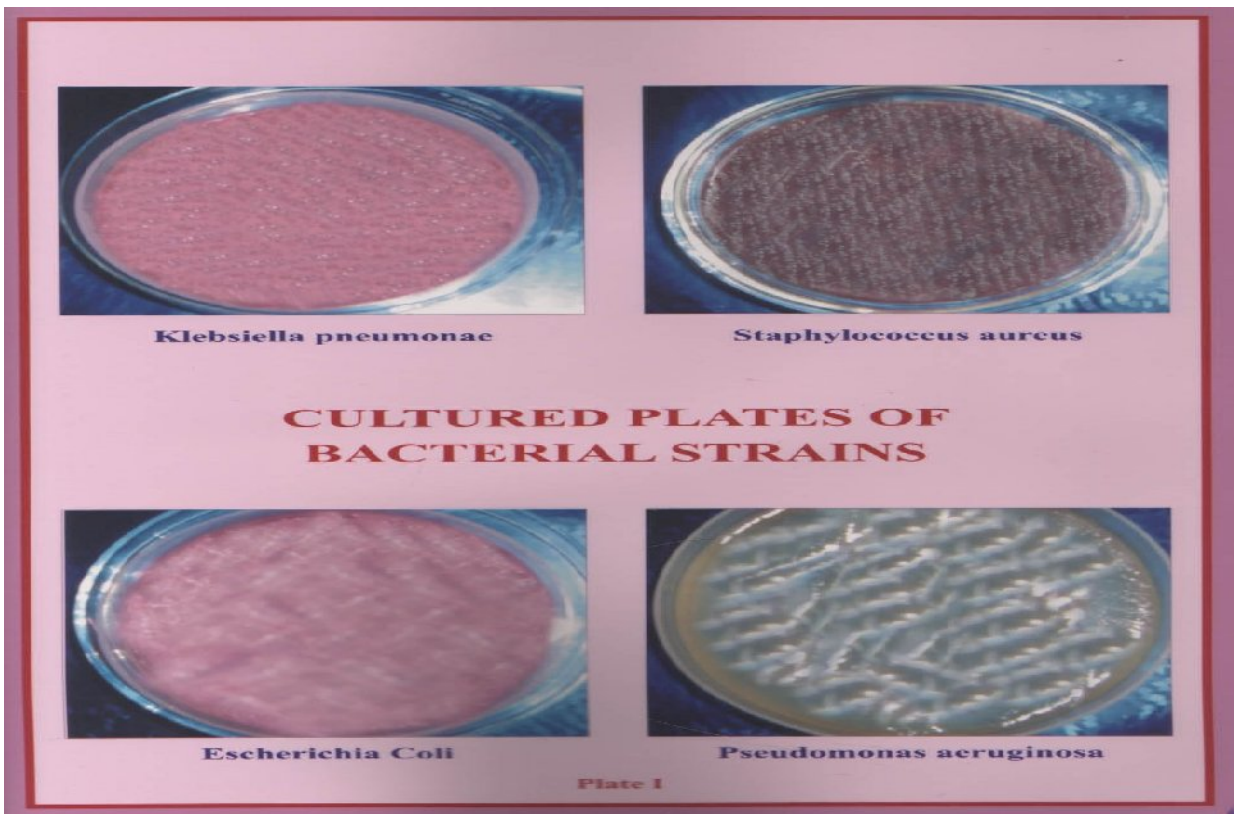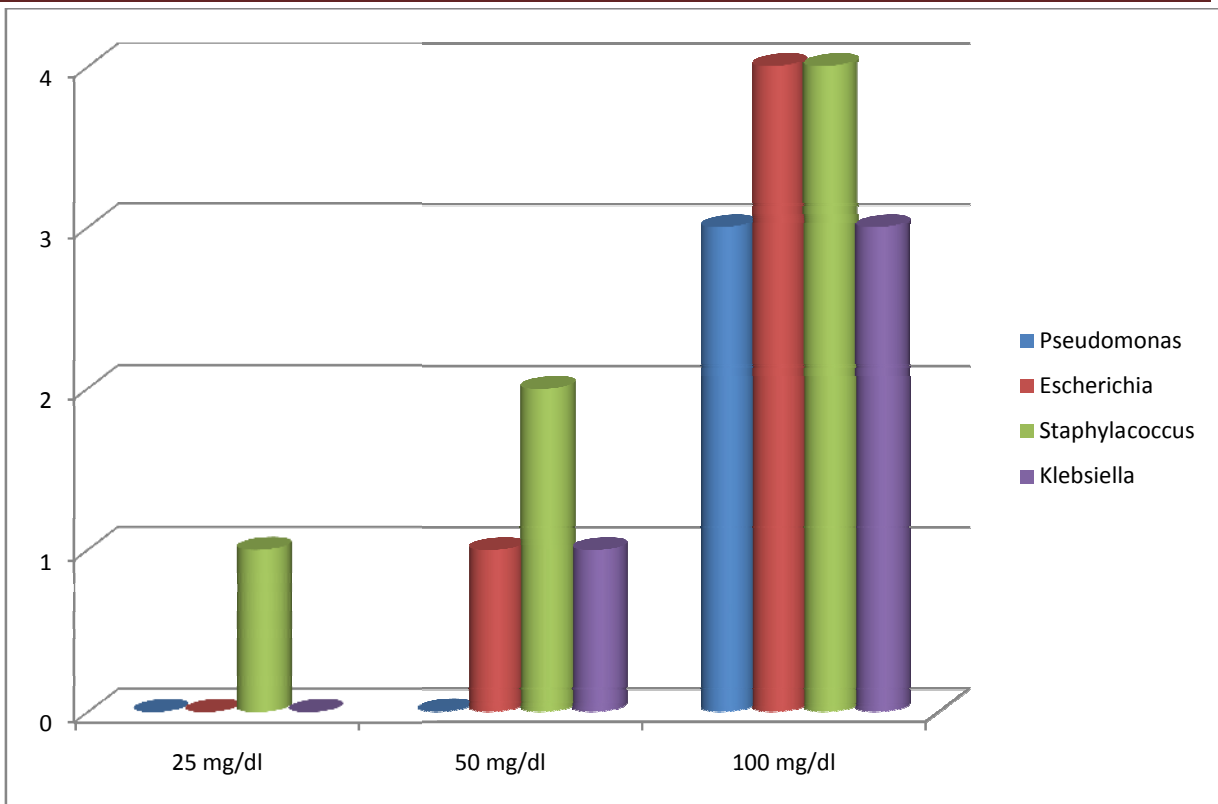Colony counts of less than 50 were considered effectiveness of drug.

Reading method: 0.005 ml/delivery calilerated loop was used to inoculate the media plates were incubated further 24 hours and colonies were counted and multiplied by 200 to get :

number of CFU/ml of broth. As mentioned in theoretical section upto 1000 CFU/ml were considered as inhibitory effect of drug(colony forming unit).

Observation of CFU/ml in respective drug concentration

Strains	**100 mg/ml**	**50 mg/ml**	**25mg/ml**
For Pseudomonas aeruginosa:			
1.	<1000/ml	>1000/ml	>1000/ml
2.	<1000/ml	>1000/ml	>1000/ml
3.	<1000/ml	>1000/ml	>1000/ml
4.	>1000/ml	>1000/ml	>1000/ml
For Escherichia coli:			
1.	No growth	>1000/ml	>1000/ml
2.	No growth	<1000/ml	>1000/ml
3.	<1000/ml	>1000/ml	>1000/ml
4.	<1000/ml	>1000/ml	>1000/ml
For Klebsiella pneumonae:			
1.	<1000/ml	<1000/ml	>1000/ml
2.	<1000/ml	>1000/ml	>1000/ml
3.	<1000/ml	>1000/ml	>1000/ml
4.	>1000/ml	>1000/ml	>1000/ml
For Staphylococcus aureus:			
1.	<1000/ml	>1000/ml	>1000/ml
2.	<1000/ml	>1000/ml	>1000/ml
3.	No growth	<1000/ml	<1000/ml
4.	<1000/ml	<1000/ml	>1000/ml

Graphical presentation of inhibition of strains (out of four strains) in different concentration of drug:

CULTURED PLATES OF
BACTERIAL STRAINS

Klebsiella pneumonae

Staphylococcus aureus

Escherichia Coli

Pseudomonas aeruginosa

Plate I

Plate II

DISCUSSION

Antibacterial activity of *Mriganka vatika* was seen against strains of Staphylococcus aureus, Pseudomonas aeruginosa, Klebsiella pneumonae and Escherichia coli. The use of drug was done in the concentration of 100 mg/ml, 50 mg/ml and 25 mg/ml on the strains. After experimental study, results show that *Mriganka vatika* has antibacterial activity against strains of gram positive(staphylococcus aureus) as well as gram negative (pseudomonas aeruginosa, Klebsiella pneumonae, Escherichia coli) bacteria and its drug more effective on strains of gram positive than gram negative bacteria.In *Ayurveda,* the action of drugs is determined on Pharmacodynamic factors as *Rasa, Guna, Veerya* and *Vipaka*along with

certain specific properties called *Prabhava (Karma)*, which cannot be explained on these principles inherited by the drugs. Ingredients of *Mriganka vatika* like as *Parada, Gandhaka, Trikatu, Triphala, Vasa, Talis patra* etc. having maximum of *Katu, Tikta Rasa; Tikasana,Usana guna* and *Usana Veerya*. All properties in Ayurvedic texts show *Krimighana* (antibacterial) effects.

CONCLUSION

It is concluded that *Mriganka Vatika* has good antibacterial activity against strains of gram positive (staphylococcus) while the drug was less effective against gram negative bacteria's. Gram negative bacteria's are less resistant in natural preparation while gram negative bacteria is as type of more harmful and resistant bacteria in nature same was

proved in this study. The best effect of *Mriganka vatika* was seen on gram positive (staphylococcus).

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