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### FORMULATION AND EVALUATION OF HERBAL WASH FOR NASAL HEALTH

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#### ABSTRACT

Nasal irrigation is an ancient complementary and alternative technique which originated in the Ayurvedic medical tradition in which it is known as "jala neti". Nasal irrigation is used to treat a wide range of chronic sinus and nasal symptoms; for chronic rhino sinusitis it can be an effective adjunctive therapy. Which promote mucociliary clearance by moisturizing the nasal cavity and by removing encrusted material by irrigating or rinsing the nasal passage. Garlic (*Allium sativum* L.) is an ancient crop that originated in Central Asia. But over the years, garlic has been used as a medicine to treat a wide range of diseases and conditions. These conditions include high blood pressure, high cholesterol, coronary heart disease, heart attack, atherosclerosis, fever, coughs, sinus congestion, gout, rheumatism, hemorrhoids, asthma, bronchitis, low blood pressure, low blood sugar, high blood sugar, and snakebites. It is also used for fighting stress and fatigue, and maintaining healthy liver function. Formulations of Garlic wash for Nasal hygiene, which consist of Iodine free salt, Sodium Bicarbonate, Garlic Extract, Distilled water. Herbal wash evaluated for various parameter like pH, tonicity, and Antibacterial activity against *S. aureus*. The herbal wash preparation was found to be safe and effective for nasal health.

#### KEYWORDS

Nasal irrigation, Saline, Rhinitis and Sinusitis.

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#### INTRODUCTION

The nose plays an important role in overall well-being and health. The vital function of the nose is breathing which consist of system is called as Mucociliary Transport System and it is the key to Nasal Health. Air enters your body through nose and it is warmed, humidified and filtered. Particulate materials such as dust or bacteria become trapped in the mucus blanket and the cilia carry these to the back of nose where they are swallowed and killed or digested when they reach your stomach. If the

mucociliary system becomes impaired, then nasal and sinus secretions stagnate. They become infected by the bacteria which are always present within nose and infection develops (Figure No.1).

*Staphylococcus aureus* is a frequent cause of infections in both the community and hospital. Effective measures to prevent *S aureus* infections are therefore urgently needed. The nose is the main ecological niche where *S aureus* resides in human beings. Staph infections (by a strain of bacterium known as *Staphylococcus aureus*.) are minor but when staph infections spread into your blood stream or affect your bones, joints, heart, and lungs. If not treated properly staph infections can become fatal. Staph bacteria can be transmitted from person to person (Figure No.2).

Eradication of *S aureus* from nasal carriers prevents infection in specific patient categories which develop new preventive strategies.

Garlic (*Allium sativum L.*) is an ancient crop that originated in Central Asia. which has been used as a medicine to treat a wide range of diseases and conditions (include high blood pressure, high cholesterol, coronary heart disease, heart attack, atherosclerosis, fever, coughs, sinus congestion, gout, rheumatism, hemorrhoids, asthma, bronchitis, low blood pressure, low blood sugar, high blood sugar, and snakebites).

Nasal irrigation is an ancient complementary and alternative technique which originated in the Ayurvedic medical tradition in which it is known as "jala neti". Nasal irrigation is used to treat a wide range of chronic sinus and nasal symptoms; for chronic rhino sinusitis it can be an effective adjunctive therapy. Which promote mucociliary clearance by moisturizing the nasal cavity and by removing encrusted material by irrigating or rinsing the nasal passage (Figure No.3).

## **MATERIALS AND METHODS**

### **Plant Material and Preparation of Formulation**

The fresh Garlic (*Allium sativum L.*) (Figure No.4) used in this study were purchased from the local vegetable market of Pune. The roots were cut into small pieces. 100 gm of material used for extraction

in 200ml of Distilled Sterile water. The filtrate was heated at 40-50°C using water bath, until thick paste is formed. The thick paste was considered as 100% concentration of extract (Table No.1).

### **Standardization of Single Plant Material**

The standardization of single plant material (raw drug) includes its Botanical Description, Identification and Physico-chemical Parameters.

### **Antibacterial Activity**

#### **Bacterial cultures**

*Staphylococcus aureus* strains were employed for the determination of antibacterial activity. In the present study, Garlic extract was examined for antibacterial activity against above. The agar diffusion method is used for the antibacterial activity. Wells of 8mm diameter were dug on the inoculated nutrient agar medium with sterile cork borer and 50 µl of the extract (at various concentrations) were added in each well. The plates were then incubated at 37°C overnight and examined for zone of inhibition. The diameter of the inhibition zone was measured in mm (Table No.2). The standard antibiotic drug Streptomycin was also screened under similar conditions for comparison. An extract was classified as active when the diameter of the inhibition was equal to or larger than 8mm.

#### **Determination of minimum inhibitory concentration**

The minimum inhibitory concentration (MIC) values were determined by broth dilution assay. The cultures were prepared at 24 hrs. The MIC was defined as the lowest concentration of the compound to inhibit the growth of microorganism. The series of test tube were prepared and labeled as shown in Table No.3.

## **RESULTS AND DISSCUSION**

### **Antibacterial activity**

The results of antibacterial activity of Garlic extract are shown in Table No.2.

#### **nd - non detected inhibition zone**

Concentration of the extract used: 100 mg/ml  
Streptomycin: 10 µg/ml, Mean of triplicate measurements. The extract showed the inhibition of

growth in all the concentration (i.e. 25µl, 50µl, and 100 µl). On the other hand the tested extract even in an amount of 50 µl shows a significant inhibitory activity against *Staphylococcus aureus* (Figure No.5).

### Determination of minimum inhibitory concentration

Experiment was conducted to determine inhibitory concentration of selected root extracts. The MIC values are shown in Table No.3.

### Evaluation of Garlic Wash

The Garlic Wash values are shown in Table No.4.

**Table No.1: Formulation Table of Garlic wash**

S.No	Contents	Quantity(100 gm)
1	Iodine free salt	1.2gm
2	Sodium Bicarbonate	2.5 gm
3	Garlic Extract	10 mg/ml
4	Sterile Distilled water	Upto 250 ml

**Table No.2: Inhibition zones formed by Garlic extract, standard antibiotics**

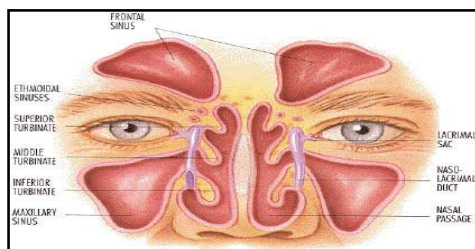
S.No	Group	Tested strains	Garlic Extract Extracts			Zone of inhibition(mm)	
			25 %	50%	100%	Garlic Wash	Standard
						100 µl	Streptomycin (10µg/ml)
1	Gram Positive	<i>Staphylococcus aureus</i>	10	18	20	19.8	35

**Table No.3: Minimum Inhibitory Concentration of medicinal plant extract against *Staphylococcus aureus*, *Bacillus cereus*, *Pseudomonas aeruginosa* and *Escherichia Coli***

S.No	Plant extract	Concentration									
		0	2.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0
1	<i>Staphylococcus aureus</i>	+	+	+	+	-	-	-	-	-	-
The MIC of Garlic extract is 1.0mg/ml at neutral pH											
- : No Turbidity, Absence of growth, and + : Turbidity, Presence of growth											

**Table No.4: Evaluation of gels**

S.No	Formulations	Appearance	pH	Viscosity	Tonicity
1	Wash	Clear Liquid	6.45	0.9 centipoise	Isotonic



**Figure No.1: Anatomy of Nasal Cavity**

Inflammation in the nostrils, yellow or green mucus, nasal discharge, nasal congestion, sore throat, fever, cough, sinus headaches, and pain in the nasal membranes
Pimples, Impetigo, Boils, Abscesses, Carbuncles, And Cellulitis.
Symptoms of staph developing into an invasive disease include pneumonia, scalded skin syndrome, endocarditis, otitis media, meningitis, osteomyelitis, toxic shock syndrome, bacteremia, and sepsis.

Figure No.2: Symptoms of a staph infection in the nose occur locally and throughout the body



Figure No.3: Steps of nasal Irrigation



Figure No.4: Garlic (*Allium sativum* L.)



Figure No.5: Antibacterial Activity of Garlic extracts *Staphylococcus aureus*

## CONCLUSION

From the above result it was concluded that the Garlic extract shows significant antibacterial activity against *Staphylococcus aureus*. Formulation of Garlic wash for Nasal hygiene, which evaluated for various parameter like pH, tonicity, Antibacterial activity against *S. aureus* and was found to be safe and effective for nasal health.

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