

Original Research Article

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Inhibitory Potential of Rose Petals Extracts: An Attempt to Annihilate *Staphylococcus aureus*

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ABSTRACT

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Rose has influenced cultures artistically, economically, clinically, scientifically, psychologically and religiously because of its fragrance. The floral petals of higher plants are known to possess antibacterial activity. In the present study antimicrobial activity of rose petals extracts were evaluated against five strains of skin infection causing *S. aureus*. Antibiotic susceptibility test showed that 100% *S. aureus* strains were found to be sensitive to Erythromycin and Linezolid each, followed by 80% to Clindamycin and 60% to Gatifloxacin. However, all the strains of *S. aureus* were resistant to Oxacillin. It was found that both the types of extracts prepared in methanol and distilled water were found to be effective against it.

Introduction

From ancient times, humans have utilized plants for the treatment or prevention of diseases, leading to the dawn of traditional medicine. While plant leaf, stem and root extracts have been widely evaluated for bioactive compounds, screening for plant flower has not been extensive. The flower petals which provide physical protection to the reproductive compounds can be expected to synthesize potent bioactive compounds. The floral petals of higher plants are known to possess antibacterial activity (Darokar *et al.*, 1998). Roses have influenced cultures aesthetically, economically, medically,

religiously and spiritually since humankind could smell and appreciate its fragrance. Rose is a perennial plant of the genus *Rosa*, within the family Rosaceae. Rose has influenced cultures artistically, economically, clinically, scientifically, psychologically and religiously because of its fragrance. There are approximately 10,000 species of rose; *R. damascene*, *R. gallica*, *R. centifolia*, *R. indica*, *R. rubiginosa* to name a few (Ozkan *et al.*, 2004).

Rose is the most celebrated of all the fragrances reason being the presence of anthocyanins in the petals. Rose petals and leaves work as a diuretic and flush toxins from

the body. They are known to relieve bronchial and chest congestion and also provide relief from sore throat. However, *Staphylococcus aureus* is a gram positive bacterium that usually appears under the microscope as spherical (coccus) organisms appearing in pairs, short chains, or bunched, grape-like clusters. *Staphylococcus aureus* has been implicated as a causative agent in acute food poisoning episodes, toxic shock syndrome, impetigo, scalded skin syndrome, cellulitis, folliculitis and furuncles. It is also a common cause of systemic infections such as infective endocarditis, osteomyelitis, epiglottitis, and sinus infections amongst others. *S. aureus* is also responsible for many infective and systemic infections in the health care setting (nosocomial infections). Rose water because of its antiseptic property has been used as eyewash, and is also used to moisturize the skin. Various studies have been conducted to establish the anti-fungal, anti-bacterial and anti-oxidant activities of rose. These activities were attributed to the presence of flavonoid and phenolic compounds, also known as bioactive agents (Kiruthika *et al.*, 2011; Sahoo *et al.*, 2011; Khan and Tewari, 2011; Saeed *et al.*, 2014). Therefore the present study was conducted to evaluate the antibacterial property of Roses extract against *Staphylococcus aureus*.

Materials and Methods

Sample collection

The flowers were picked in morning and stored in at low temperature for further use. The petals were surface sterilized with 0.1% Mercuric Chloride for 10 seconds and washed with sterile distilled water for three successive times (Laxmi *et al.*, 2017).

Preparation of extract of rose petals

From rose, the petals were removed and subjected to air drying under shade for one

week. After drying completely it was grinded to make powder of it. A 5 gm of each samples were dissolved in 50 ml of solvents i.e. in Methanol and Distilled water and allowed to stand for one week with frequent shaking. After one week the solvents were filtered through Whatman Filter Paper No. 1 and kept it in incubator at 37⁰C till all solvents had completely evaporated from mixtures. Now all mixtures were dissolved in Tris HCL (Cantore *et al.*, 2009).

Test organisms

Skin infection causing *Staphylococcus aureus* were collected from pathology laboratory in Nagpur and were identified on the basis of morphological, cultural and biochemical characteristics (Collee and Marr, 1996).

Antibiotic sensitivity test

Antibiotic sensitivity test was performed by Kirby Bauer Disc Diffusion method (Bauer *et al.*, 1966). Five different types of antibiotics were used in the study (Table 1). *S. aureus* strains were grown on nutrient agar at 37⁰C for 24 hours and the colonies were suspended in sterile saline water equivalent to a 0.5McFarland standard (1.5X10⁸CFU/ml). Hi-sensitivity agar plate was uniformly seeded by adding 100µl inoculated broth and was spread by means of spreader. The discs were placed on each inoculated Hi-sensitivity agar plate. The plates were incubated at 37⁰C for 18 hours. The diameter of the zone of inhibition was observed in mm and the isolates were classified as “resistant” or “sensitive” based on the standard interpretative chart according to Clinical and Laboratory Standards Institute (CLSI) guidelines (CLSI, 2007).

Antibacterial activity of rose petals extracts against *S. aureus*

Antibacterial activity of Rose petals extracts was performed by well diffusion technique.

S.aureus strains were grown overnight on nutrient agar at 37⁰C, and the colonies were suspended in sterile saline water equivalent to a 0.5 McFarland standard (1.5×10⁸ CFU/ml). The suspension (100 µL) was spread over the Hi-Sensitivity agar. The wells of 6 mm diameter were cut into the agar medium with a sterilized cork borer. Then 20µl each of the extracts were added separately into the separate wells. The plates were incubated at 37⁰C for 18 hours. The diameter of the zone of inhibition around each well was measured and recorded (Bauer *et al.*, 1966).

Results and Discussion

The present study was conducted to evaluate the effect of extracts of Rose petals on *Staphylococcus aureus*. It showed the comparative study of an extracts and antibiotic Ampicillin as a positive control and negative control (Methanol and Distilled water) against strains of *S. aureus*. Antibiotic susceptibility test showed that 100% *S. aureus* strains were found to be sensitive to

Erythromycin and Linezolid each, followed by 80% to Clindamycin and 60% to Gatifloxacin. However, all the strains of *S. aureus* were resistant to Oxacillin (Table 2). Antibacterial activity of Rose petals extracts showed that all *S.aureus* (100%) were sensitive to both Methanol as well as Distilled Water extracts (Table 3).

Plant and plant materials have been widely used to cover health care needs, and this form of medicine is termed as herbal medicine, herbalism or herbology. Plant materials have been widely used for the treatment of infectious diseases and have gained popularity as they decrease the side effects seen with the use of systemic antimicrobials. Prior to using these plant and plant materials, a through screening of the plants should be done, which would help to isolate and characterize the active compounds. Rose and parts of the rose plant have been in use in medicine, the evidence for which dates back to the “Arkprakash” one of the vedas of Ayurveda (Bahl *et al.*, 2016).

Table.1 Antibiotics discs used in the study

Sr. No.	Antibiotics	Abbreviation	Concentration
1	Clindamycin	(CD)	2 mcg
2	Erythromycin	(E)	15 mcg
3	Gatifloxacin	(GF)	10 mcg
4	Linezolid	(LZ)	10 mcg
5	Oxacillin	(OX)	5 mcg

Table.2 Antibiotics susceptibility test of *S. aureus*

Antibiotics	R		S	
	No	%	No	%
Clindamycin	1	20%	4	80%
Erythromycin	0	0%	5	100%
Gatifloxacin	2	40%	3	60%
Linezolid	0	0%	5	100%
Oxacillin	5	100%	0	0%

Table.3 Antibacterial activity of rose petals extracts against *S. aureus*

Extracts	Solvents	R		S	
		No.	%	No.	%
Rose petals I	Methanol	0	0%	5	100%
	D.W	0	0%	5	100%
Rose petals II	Methanol	0	0%	5	100%
	D.W	0	0%	5	100%
Negative control	Methanol	5	100%	0	0%
	D.W	5	100%	0	0%
Positive control (Ampicillin)	Methanol	0	0%	5	100%
	D.W	1	20%	4	80%

Rose petals I and II extracts were evaluated against five strains of skin infection causing *S. aureus*. Antibacterial activity of Rose petals extracts showed that all *S. aureus* (100%) were sensitive to both Methanol as well as Distilled Water extracts Rose petals extracts possess moderate broad spectrum antimicrobial activity against gram positive, gram negative, acid fast bacteria and fungi. According to Aqueous extracts showed highly significant antibacterial activity while methanol extracts showed moderate activity (Vasanthakumar *et al.*, 2015). In the study of Darokar *et al.*, (1998), Rose petals extract were more effective against Gram positive bacteria than that of Gram negative bacteria. Owing to its fragrance, rose has been seen to influence culture artistically, economically, clinically and scientifically. This fragrance of rose is essentially due to oil secreted in the papillae, especially geraniol, citronellol, ethanol, rose oxide, linalool, nerol, eugenol (Sharma, 2003). Various parts of the rose plant, including the stem leaves and the petals have been observed to possess antibacterial and antifungal properties. These properties are noticed in the active compounds that are extracted from the plant, and the extraction of the same depends on the solvent that is used for the extraction process. The most commonly used solvents are methanol and ethanol. Alcohols are used as, they extract both polar and non-polar constituents from

plants (Bisignio *et al.*, 1999; Lourens *et al.*, 2004).

In conclusion, the present study demonstrates antibacterial activity of Rose petals extracts against skin infection causing *S.aureus*. This study shows that rose petals may possess some chemical constituents which are responsible for antimicrobial activity that can partially minimize the use of antibiotics to some extent. However, further studies are required for screening of the volatile and non-volatile active antimicrobial constituents of rose petals to utilize them in pharmaceutical industries.

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