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Occupationally Related Eye Problem–A Report and Antibacterial Effect of Jasminium Officinale on Eye Pathogen

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Abstract

The purpose of this new study was to determine the types and levels of major impact on eyes due to occupational environment. Cooking, driving and welding occupations were studied. Welding proved to be more problem oriented on eyes. Traditional method of curing the eye odema, redness using Jasmine flowers (*Jasminium officinale)* is found to be effective on survey report. Water and Methanol extracts were found to have antibacterial effect on common eye pathogen *Streptococcus aureus,* Methanol extract wit 50µl, 75 µl and 100 µl concentrations showed increasing rate of activity with high zone of inhibition than water extract.

Keywords: Occupation, welding, eye odema, *Jasminium officinale*, eye pathogen, zone of inhibition.

Contents

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1. Introduction

The human eye is the most complex organ in our body. In a number of ways, it works like a digital camera. The eyes are made up of very delicate tissue, when exposed to various environment are more prone to various forms of injury followed by disease. One of the common sensations that a person experiences in the eye is a burning feeling, heat, soreness and aching feeling. Burning is the feeling of excessive heat radiating into it. The common cause of burning in the eyes is eye strain. Some of the cause of eye strain includes: occupational hazards, watching television, looking at a computer, exposure to bright lights etc. Driving requires full attention and focus. Sight, in addition to hearing, is one of the most important senses required to drive safely. A variety of changes in the eye can contribute to

discomfort from glare to haloes. Cooking brings heat and dust to eyes and causes damage to tender parts of the eye. Welding torch may bring flash burn after exposed to UV light. Welders should learn basic first aid for eye injuries. Despite the damage radiation can cause, molten metal particles striking the eye are common sources of eye injuries. The primary damage and injury on eyes permit the entry of secondary infection to eyes by microbes. Traditionally welders and people suffering from eye odema are found to get relief by using Jasmine flowers tied over the eyes overnight. Plant and plant products have been used extensively throughout history to treat medical problems. Numerous studies have been carried out to extract various natural products for screening antimicrobial activity (Nila *et al.,* (2001), Velickovic *et al*., (2003), Cowan (1999), Savagami *et al.,* (2001), Ates and Erdogroul (2003). In recent years, all the medicine used were from natural resources (Singh, 2011). Plants contain hundreds or thousands of metabolites. Plant derived products have been used for medicinal purpose for centuries (Hema *et al*., 2001).The secret behind the Jasmine flowers is to be revealed in this experimental work.

Survey-Report

Daily eye injuries to workman are enormous, undetected and untreated eye diseases are major public health problems that can lead to vision loss. The survey information on eyes is based on three types of occupations such as cooking, driving and welding. The data on age, experience, problems faced, disease pattern was available from 15 persons each.

Table 1: Shows the details Regarding Occupational Related Eye Problems

S. No	Category	Cooking	Driving	Welding
1	Age group	40-50(9)	40-50(7)	30-40(7)
2	Experience	10 yrs(11)	10yrs(11)	10yrs(14)
3	Problem	Heat, pain	Heat (5), dust (6), swelling in eyes (10)	Irritation, redness, temporary blindness 8 hours (7)
4	Working hours	8 hrs (9)	8 hrs (6)	8 hrs (7)
5	Miscellaneous	Fuel-wood (8), gas (7)	Shift system	Rods used (20)
6	Treatment	Water bath, flowers	wetness	Eye drops (7), flowers, water

2. Materials and Methods

Antibiotic Sensitivity Test

Antibiotic Sensitivity is the susceptibility of bacteria to antibiotics. Antibiotic susceptibility test (AST) is usually carried out to determine which antibody will be most successful in treating a bacterial infection in vivo. Testing for antibiotic sensitivity is often done by the Kirby-Bauer method, Muller-Hinton agar is used in this antibiotic sensitivity test.

Kirby - Bauer Testing

The bacterium is swabbed on the agar and the antibiotic discs are placed on top. The antibiotic diffuses from the disc into the agar in decreasing amounts, the further it is away from the disc. If the organism is killed or inhibited by the concentration of antibiotic, there will be NO GROWTH in the immediate area around the disc. This is called the "Zone of inhibition".

Sample collection and preparation

To find out the effect of jasmine flowers on eye pathogen, jasmine flowers were collected from the market. Flower stalk is removed to get pure petals and weighed 25gm each.

Preparation of Extracts

Two types of extract were prepared. Water extract and methanol extract. To 25 gm petals added 50 ml pure water and grind well to paste condition, in a motor and pestle. It is then filtered and stored at 4c for future study. In the same way methanol extract of floral petals is prepared and stored.

Test Microorganism

The extract prepared is tested against Staphylococcus aureus-a common eye pathogen. The bacterial strain was obtained from the Rani Anna College Microbiological lab. The bacteria were cultured in a nutrient for 24hours. Then it is ready for Antibacterial screening.

Antibacterial screening

Antibacterial activity was determined by well diffusion method according to the NCCLS(6). Petri plates containing 20ml of Mueller Hinton agar medium were seeded with a 24hrs culture of the bacterial strains. Wells (6mm diameter) were cut into the agar and plant extracts were tested in a concentration of 50mg/ml, 75mg/ml and

100mg/ml. Incubation was performed at 37*C for 24hrs. The assessment of antibacterial activity was based on measurement of the diameter of the inhibition zone formed around the well.

3. Results and Discussion

Survey indicates the essence of antibiotics present in nature. Nature has provided us abundant antibiotic agents in fruits, leaves, flowers etc. In this study the natural antibiotic effect is proved well in experimental work, which is given below. The results are put forth as two categories.

(1) Antibiotic sensitivity test.

(2) Antibacterial effect of Jasminium officinale.

Antibiotic sensitivity test

The effectiveness of individual antibiotics varies with the location of the infection, the ability of the antibiotics to reach the site of infection and the ability of the bacteria to resist or inactivate the antibiotics. Some antibiotics actually kill the bacteria (bactericidal) whereas others merely prevent the bacteria from multiplying (bacteriostatic). So that the host's immune system can overcome them. In the present study, the effectiveness of six types of antibiotics against *Staphylococcus aureus* is tested. Ciprofloxin is found to inhibit bacterial growth to the maximum of 22mm diameter and Amphicillin is least effective with 10mm zone of inhibition. Table-2 shows the details of Antibiotic sensitivity test.

Table 2: Antibiotic sensitivity of *Staphylococcus aureus* against various antibiotics

Test antibiotics	Zone of inhibition (diameter)
Amphicillin (10)	10mm
Gentamycin (G 10)	11mm
Tetracycline (T 30)	15mm
Ciprofloxin (Cf 5)	22mm
Halexin (Cp 30)	13mm
Cobramycin (oc 20)	16mm

Antibacterial activity of Jasminium officinale:

The antibacterial activities of the extract obtained from the flower petals of *Jasminium officinale* under study by the diffusion method shown in Table-3. The water extracts showed low inhibitory effects against *Staphylococcus aureus.* The largest zone of inhibition was observed from methanol extracts against *Staphylococcus aureus.*

Table 3: Inhibitory properties (zone of inhibition mm in diameter) of flower extract

Flower Extracts	Extracts concentration		
	50µg/ml	75µg/ml	100µg/ml
Water Extract	10mm	12mm	14mm
Methanol Extract	12mm	14mm	15mm

The results indicated that the crude extracts of jasmine flowers studied showed antibacterial activity towards the gram + bacteria. The methanol extract showed more activity than water extract. This shows that the polar solvent methanol is capable of separating bioactive compounds from the floral part. These bioactive compounds such as phenols, flavonoids and terpenes act against the bacteria by inhibition of growth.

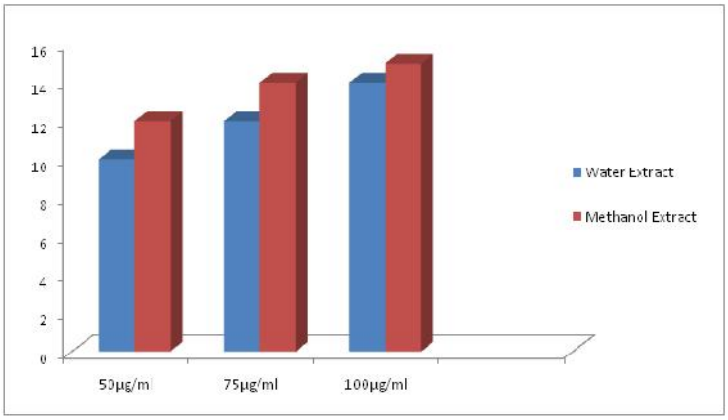
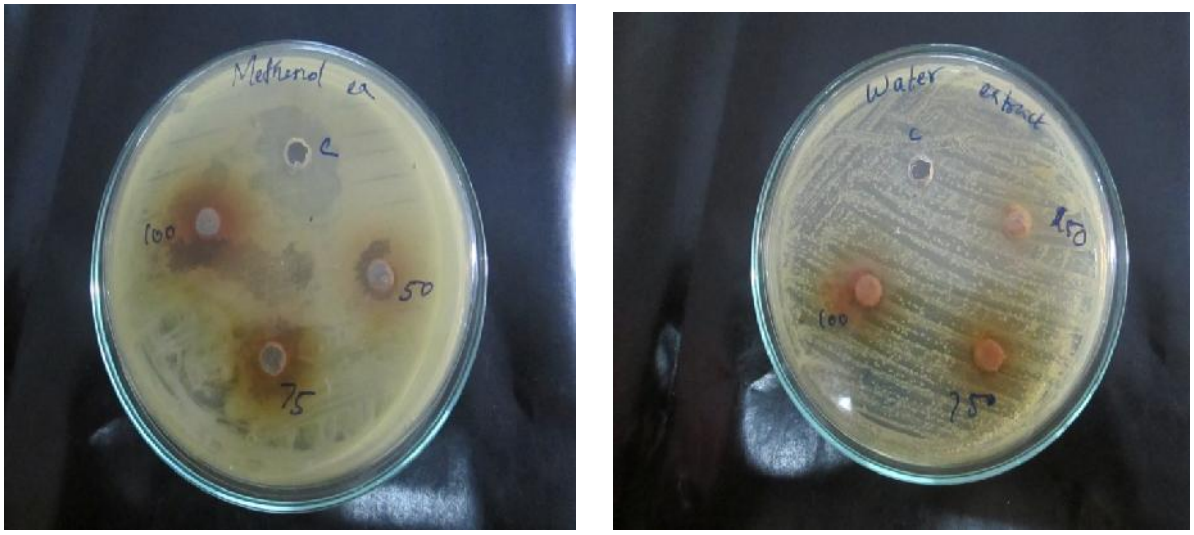


Figure 1: Inhibitory effects of Jasminium officinale extracts on *Staphylococcus aureus*



The antibacterial compound extracted from *Jasminium officinale* may inhibit bacteria by a mechanism that of currently used antibiotics and may have therapeutic value as an antibacterial agent against multi-drug resistant bacterial strains. The floral part may thus be a source that could be useful in the treatment of infections caused by this organism. It appears that over all the microorganism were not as sensitive to the water extract compared to the methanol extract. The reasons for this could be that all of the identified components from plants are active organic compounds. The outcome of our experimental work coincides with the research paper "Antibacterial activities of some plant extracts utilized in popular medicine in Palestine". Abu-Shanab (2004).

4. Conclusion

The main conclusion drawn from our data is that the antibacterial effect of *Jasminium officinale* with *Staphylococcus aureus* as detected in this study may partly explain the use of traditional plant medicine in use against a number of factors for generations. Results of this kind herald an interesting promise of designing a potentially active antibacterial synergized agent of plant origin.

5. Acknowledgements

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