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Screening of Bacteriostatic and Bactericidal Properties of Various Flower Extracts

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Abstract: ***Introduction:*** ***Nature has been a wellspring of therapeutic agents for many years and a striking number of present day drugs have been separated from regular source, many dependent on their utilization in conventional meds or phytomedicines. Flower has played a crucial role in the revitalization of inferior condition created by the infection of microorganisms. Moreover, flowers are the important source of potentially useful structures for the development of novel remedial drugs. Historically, flowers have provided a source of the development for useful drugs and plant derived drugs which have made large contributions to human health and well being. Till now very few flowers have been scientifically proved by different researchers for their antibacterial properties as well as medicinal properties but the therapeutic ability of number of plants and flowers are still unknown. The current review explores the role of flowers as strong antimicrobial activities. Several researches have carried out bioassay for antimicrobial activities of different extracts of certain flowers. These works should be brought in the knowledge of every concerned man. Therefore, present study is attempt for review on such flowers with antibacterial properties[1]. Method: Extensive electronic search has been done to explore the relevant studies on flowers and then summarized and analyzed for the benefit of the readers to understand this very vital plant parts that have not just aesthetic value but also medicinal value. Result: There is lesser number of studies on flowers compared to other plant parts. The relevant studies have been cited here.***

Keywords: Antibacterial, Bioassays, Flower extracts, Phytomedicines

1. Introduction

According to World health organization (WHO) more than 80% of the world population relies on traditional medicine for their primary health care needs[2]. The quantities of medications have been created in recent years against the irresistible specialist (microorganisms). But the development in Immune arrangement of microorganisms has no impact on them and gives protection from the anti-toxins. Furthermore, it is the need of time to grow new antimicrobial drugs. Customarily different parts of plants like roots, stem, organic products, leaves, seeds and flowers are utilized as remedial specialists, but flowers have antimicrobial qualities that have been effectively given avoidance and treatment against different pathogens. Flowers with their diverse chemical constituents offer a dependable source of new antimicrobial properties, with general just as explicit antimicrobial movement. Natural products of higher plants as well as lower plants may give a new source of antimicrobial agents with possibly novel mechanisms of action[3].

Recently, multiple drug resistance has developed due to random use of commercial antimicrobial drugs commonly used in the treatment of infectious diseases making it a globally futuristic problem. Isolation of microbial agents less susceptible to regular antibiotics and recovery of increasing resistant isolates during antibacterial therapy is rising throughout the world which highlights the need for new principles. Natural products of higher plants may give a new source of antimicrobial agents with possibly novel mechanisms of action[3]. The current review aims to look for studies done on the medicinal properties of flowers.

A study done by **Ruban *et al.*, (2012)** threw insight into the fact that the typical immune response lacks in plants, since they have in-built system for protection against biotic and abiotic, stress conditions. Since plants have correlation with pathogens, so for the refinement they have also developed the chemical protection pathways against the microorganisms. Therefore, it is reasonable to expect a candor of phytochemicals with specific as well as general antimicrobial activity and antibacterial potential[4]. E.g. (Flowers of various species have shown the antimicrobial activity such as ***Papaver somniferum***, is the source of the narcotic drug **opium** which contains powerful medicinal alkaloids such as **morphine** and has been used since ancient times as an analgesic and narcotic medicinal and recreational drug).

The flower has some protective mechanism against microbial attack in most of the plants. An **antimicrobial** is an agent that kills microorganisms or stops their growth. Antimicrobial activity refers to the process of killing or inhibiting the disease causing microbes. Various antimicrobial agents are used for this purpose. Antimicrobial may be anti-bacterial, anti-fungal or antiviral. They all have different modes of action by which they act to suppress the infection[5]. Considering the great capability of flowers as source of antimicrobial drugs the present study is based on the review of such flowers.

A study done by Chougale *et al.*, (2009) explored the plant *Woodfordia fruticos* in which stems and flowers were extracted with petroleum ether, Chloroform, Diethyl ether and Acetone and their antimicrobial activity was tested against test organisms, *Escherichia coli, Bacillus subtili, Staphylococcus aureus and Pseudomonas aeruginosa.* Method of assay used was disc diffusion method by comparing with the control which is pure solvents free from extracts. It was found out that 80 µg and 120 µg of acetone extract were reported to show proportional antimicrobial activity against all bacterial strains selected for study. Further it was tested with comparison of known antibiotic erythromycin [6].

Another study done by Kumaraswamy *et al.,* (2008) demonstrated the antimicrobial activity of hydroethanolic extract of flowers of *Nelumbo nucifera* plant against *Escherichia coli, Klebsiella pneumonia, Pseudomonas aeruginosa, Bacillus subtilis, Staphylococcus aureus.* Fungal- *Monascus purpureus , Aspergillus niger* with varying result. The white flower extract showed less MIC against both in strain of bacteria than the extract of pink flowers. The antifungal activity was also recorded in dose dependent manner and highest activity was observed with hydroethanolic extract of white flower against *Aspergillus niger* (15mm) and moderate activity was seen in pink flower (11mm). Both the flower extracts were observed to show more or less same activity against Monascus purpureus (13mm & 12mm). These results were then compared with the standard Clotrimazole (30µg/ml)[7].

Ruban *et al.,* (2004) demonstrated the antibacterial activity using disc and agar diffusion methods of the flower extract of ***Hibiscus rosa-sinensis.*** Protein profile was also evaluated using poly acrylmide gel electrophoresis to view their protein profile. The results showed that the cold extraction illustrates a maximum zone of inhibition against *Bacillus subtillis* (*B. subtillis*), *Escherichia coli* (*E. coli*) *viz.,* (17.00 ± 2.91), (14.50 ± 1.71) mm, followed by hot extraction against, *E. coli*, *Salmonella* sp. as (11.66 ± 3.14), (10.60 ± 3.09) mm. In methanol extraction showed a highest zone of inhibition recorded against *B. subtillis*, *E. coli* as (18.86 ± 0.18), (18.00 ± 1.63) mm pursued by ethanol extraction showed utmost zone of inhibition recorded against *Salmonella* sp. at (20.40 ± 1.54) mm. The crude protein from flower showed a maximum inhibitory zone observed against *Salmonella* sp., *E. coli viz.,* (16.55 ± 1.16), (14.30 ± 2.86) mm. The flower material can be taken as an alternative source of antibacterial agent against the human pathogens.

Another important study utilized the flower extractions of *Nymphaea nouchali* to study the antibacterial assay using *Escherichia coli, Klebsiella pneumonia, Proteus vulgaris, Pseudomonas aeruginosa, Salmonella paratyphi A, Salmonella paratyphi B, Shigellaflexineri, Staphylococcus aureus* by Yash *et al.,* (2014). The result showed that **t**he zone of inhibition ranged from 2 cm to 27 cm. The non polar extracts were less active as compared to their polar counterparts. Amongst all the extracts tested the methanolic extract proved to be the most effective. It showed maximum zone of inhibition (27.0) against *Salmonella paratyphi.* Most of the extracts showed activity against both gram-negative and gram-positive bacteria thus indicating a wide spectrum of antibacterial activity [8].

2. Conclusion

From the above study it is evident that the flowers have significant anti bacterial action and can be employed as an antibacterial agent. There are several flowers which have been tested for its antibacterial properties and many other flowers are left for testing. There are several methods that can be used for testing the antibacterial properties of flower, and above studies also suggests that flowers could be one of the reliable sources for the production of new anti bacterial drugs and it should be explored to its full potential.

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