Antibacterial potential of selected medicinal plants against *Escherichia coli* and *Staphylococcus aureus*

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ABSTRACT

Crude, choloroform and methanol extract of leaves and flowers of *Raphanus sativus, Brassica nigrum* and *Foeniculum vulgare* were evaluated against *Escherichia coli* and *Staphylococcus aureus*. Methanol extract of flowers of *F. vulgare* and *B. nigrum* and leaves of methanol extract of *R. sativus* showed significant activity against *E. coli*. None of the extracts showed any activity against *S. aureus*.

Keywords: medicinal plants, *Raphanus sativus*, *Brassica nigrum*, *Foeniculum vulgare*, antibacterial activity.

Plant and plant products have been used extensively as ethnomedicine throughout the world. The use of medicinal plant as a source for relief from illness can be traced back over five millennia to written documents of the early civilization in India [1]. Herbal medicines are gaining growing interest for their cost-effective and eco-friendly attributes [2]. Hence more studies pertaining to the use of plants as therapeutic agents should be emphasized especially those related to the control of antibiotic resistant microbes. Although hundreds of plant species have been tested for antimicrobial properties, the vast majority have not been adequately evaluated. Considering the vast potentiality of plants as sources for antimicrobial drugs, an investigation was undertaken to screen the antibacterial activity from *Raphanus sativus, Foeniculum vulgare* and *Brassica nigrum* against *Escherichia coli* and *Staphylococcus aureus.*

Pure cultures of *Escherichia coli* and *Staphylococcus aureus* were obtained from the Department of Microbiology, IBB College, Kota and cultures were maintained on nutrient agar slants. Healthy leaves of *R. sativus, B. nigrum* and *F. vulgare* were obtained from the local market. After washing and surface sterilization, they were crushed in sterile distilled water/methanol (20g in 100ml). Further dilutions of 1:1, 1:3, 1:5, 1:7 and 1:90 were prepared from the extract. 3-4 isolated colonies were inoculated in 5ml of nutrient broth and incubated at 37°C overnight. For preparation of crude extract fresh plant was directly crushed for the assay. Whatmann Filter Paper No. 1 was taken and the discs were cut in equal diameter (6mm) with the help of punch. After sterilization, discs were dipped in plant extract and they were air dried. 15ml of nutrient agar was prepared and autoclaved. Then the medium was poured into a sterile Petri-plate under aseptic conditions and allowed to solidify. The bacterial culture (1ml) was spread on the agar surface using sterile cotton swab. The prepared plant extract discs were kept in the Petri-plate in which the medium is poured. The plates were incubated at 37°C for 24 hr and after the formation of zone, the inhibition was measured (in cm) using a scale [3].

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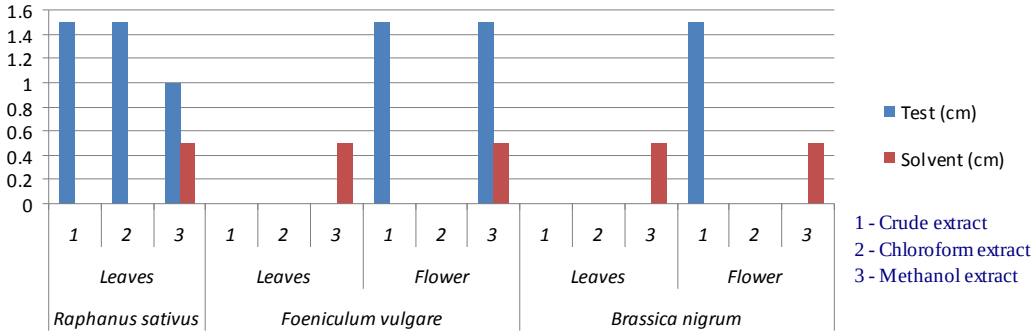

Figure 1. Graph showing zone of inhibition against *E. coli*.

Plants are a valuable natural resource and regarded as potentially safe drugs. The selected plant leaves were employed to study the antimicrobial activity against *E. coli.* The results indicated that the crude activity of leaves of *R. sativus* and flowers of *F. vulgare* and *B. nigrum* showed significant activity against *E. coli.* The methanol extract of all the species showed activity against *E. coli*. None of the species showed activity against *S. aureus*. Our results indicated that extracts prepared in methanol solvent consistently displayed better antibacterial activity than other extracts as in figure 1 and reveals the zone of inhibition of the selected plants against the microorganisms indicated. Further investigations such as phytochemical analysis and spectroscopic methods need to be studied for the isolation of the therapeutic antimicrobial compounds. Abdou et al. studied the antimicrobial activity of crude juices of *R. sativus, Allium cepa* and *A. sativum* and found to be strongly active against *E. coli, Pseudomonas* sp., *Salmonella* and *Bacillus* sp. [4]. Rani et al. found that crude and methanol extracts of *R. sativus* exhibited highest antibacterial activity against *Lactobacillus* sp., *Bacillus thuringensis* and *Enterobacter* sp. [5]. Cantore et al. studied the antibacterial activity of fruits of *Coriandrum sativum* and *F. vulgare* and found significant antibacterial activity [6]. Similar work was done on essential oils of Fennel but revealed no antibacterial activity against *Staphylococcus aureus, Bacillus subtilis, Escherichia coli* and *Pseudomonas aeruginosa* [7]. Results of the present study were supported by the work done by various workers [8-15]. Our results indicated that extracts prepared in methanol solvent consistently displayed better antibacterial activity than other extracts.

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