

EVALUATION OF ANTIBACTERIAL ACTIVITY OF DIFFERENT SOLVENT EXTRACTS OF MEDICINAL PLANT *IPOMOEA AQUATICA* FORSK

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ABSTRACT

Natural products, such as plant extract, either as pure compounds or as standardized extracts, provide unlimited opportunities for new drug discoveries because of the unmatched availability of chemical diversity. *Ipomoea aquatica* Forsk (IAF), commonly called water spinach, belongs to the family Convolvulaceae. The present study reveals the antibacterial and phytochemical analysis of various organic extracts (acetone and petroleum ether) of leaves of plant of *Ipomoea aquatica* forsk. Acetone and Petroleum ether extracts of *Ipomoea aquatica* Forsk were tested against four common bacteria of medical importance using Disc Diffusion (DD) and Well Diffusion (WD) assay. Acetone extract showed the maximum zone of inhibition when compared with petroleum ether extract in both disc diffusion and well diffusion method. Phytochemical analysis of both the extracts showed the presence of carbohydrates, phenols, tannins, proteins and terpenoids. The results obtained in the present study indicate that *Ipomoea aquatica* could be a good source of anti-bacterial drug, relatively safe for consumption.

Keywords: Zone of inhibition, phytochemical analysis, acetone extract, petroleum ether extract.

INTRODUCTION

Plant and its products have a long history that began with folk medicine and through the years has been incorporated into traditional and allopathic medicine. With the advancement in Science and Technology, there is a remarkable progress has been made in the field of medicine with the discoveries of many natural and synthetic drugs. Antibiotics are undeniably one of the most important therapeutic discoveries of the current century that had effectiveness against serious bacterial infections (Sen and Batra, 2012).

Ipomoea aquatica Forsk (Water Spinach) belongs to the family Convolvulaceae, it grows in wild region. It is cultivated throughout Southeast Asia and is a widely consumed vegetable in the region (Sivaraman, 2010). *Ipomoea aquatica* Forsk is also supposed to possess an insulin-like activity according to indigenous medicine in Sri Lanka (Huang, 2005). Phytochemicals are biologically active compounds that occur naturally in plants. They are the molecules responsible for the color and organoleptic properties (Ramaswamy and Kanmani, 2012). Phytomedicines or botanical medicines refer to the use of bark, seeds, root, berries, leaves or flowers of any plant for therapeutic purposes by large number of people. It has now been recognized that the plants which naturally accumulate and synthesis some secondary metabolites like glycosides, alkaloids, tannins, volatiles oils and contain vitamins and minerals, possess medicinal properties (Hafiz, 2014). Present study deals with the investigation of Antibacterial and Phytochemical analysis of various organic extracts (acetone and petroleum ether) of leaves of plant of *Ipomoea aquatica* forsk.

MATERIALS AND METHODS

All chemicals and reagents were of analytical grade and purchased from Hi-media Laboratories Pvt. Ltd., Mumbai, India and Sd-fine Chemicals Ltd., Mumbai, India.

Plant Collection and Extraction: The leaves of water spinach (*Ipomoea aquatica* Forsk) were obtained from Potheri Lake in Kancheepuram District, Tamil Nadu. After harvesting, the leaves were washed under tap water. Leaves were dried in the dark room for 5 days. Ten grams of dried and ground leaves were placed in a Soxhlet apparatus. Extraction was performed with 100 ml of organic solvents such as acetone and petroleum ether for 6 hours. After extraction, it was poured in petriplate and kept at Room Temperature (28°C) in order to remove solvent (Bimakr, 2011).

Phytochemical analysis: Qualitative Phytochemical analysis was carried out for acetone and petroleum ether extracts according to the Yadav and Agarwala, (2011).

Antibacterial Assay:

Disc Diffusion Method: In disc diffusion method, dried and sterilized filter paper discs (5mm diameter) containing the test samples (0.1g/ml of stock) of acetone and petroleum ether extracts are placed on Muller Hinton (MH) agar medium, uniformly seeded with the test microorganisms such as *Bacillus cereus*, *Escherichia coli*, *Staphylococcus*

aureus and *Salmonella typhi* respectively. The plates were then inverted and incubated at 37°C for 24 hours for optimum growth of the organisms. Standard antibiotic (tetracycline t30) discs and blank (sterile water) discs were used as positive and negative control respectively. The antimicrobial activity of the test agent was then determined by measuring the diameter of zone of inhibition expressed in millimeter (Benkeblia, 2004).

Well Diffusion Method: Petri plates containing 20 ml of Muller Hinton (MH) agar medium were seeded with the bacterial strains by using spread plate method. Wells were punctured and stock was prepared 0.1g/ml of both acetone and petroleum ether extracts. From the stock, dilutions were made to obtain 250µg/100µl, 500µg/100µl, 750µg/100µl and 1000µg/100µl of plant extracts and poured into wells respectively. The plates were then incubated at 37°C for 24 hours. Erythromycin (0.05%) was used as positive control (Kaur and Mondal, 2014).

RESULTS AND DISCUSSION

Phytochemical analysis: Preliminary phytochemical analysis (Table-1) revealed that presence of medically active compounds in the *Ipomoea aquatica* forsk such as proteins, carbohydrates, phenols, tannins and terpenoids in both the extracts (Acetone and Petroleum ether). Alkaloids, saponins and steroids were absent in both the extracts of the plant. Glycosides and Flavanoids were present only in the acetone extracts. These compounds have significant therapeutic application against human pathogens including bacteria, fungi or virus. In recent years these bioactive components are used in different forms such as infusions, syrups, concoctions, decoctions, essential oils, ointments and creams (Sahu, 2014).

Antibacterial Activity: In disc diffusion assay, Figure-1 showed that acetone extract have maximum antibacterial activity when compared with petroleum ether extract. In acetone extract, the microorganism *Escherichia coli* and *Bacillus cereus* showed 12mm diameter of zone of inhibition respectively. In Well diffusion assay, Figure-2.1 & Figure- 2.2 showed that *Escherichia coli* and *Staphylococcus aureus* microorganisms have maximum zone of inhibition in acetone extract and petroleum ether extract respectively. Both the extracts were showed maximum antibacterial activity in the Gram Negative Bacteria. These results supports the potential for developing antimicrobials from higher plants and it will lead to the development of a phytomedicine to act against microbes (Parekh and Chanda, 2006).

Table.1.Phytochemical constituents of different extracts of *Ipomoea aquatica* Forsk (Leaves)

Phytochemical compound	Acetone extract	Petroleum ether extract
Carbohydrates	++	++
Phenols and Tannins	++	++
Steroids	--	--
Proteins	++	++
Alkaloids	--	--
Terpenoids	++	++
Flavanoids	++	--
Saponins	--	--
Glycosides	++	--

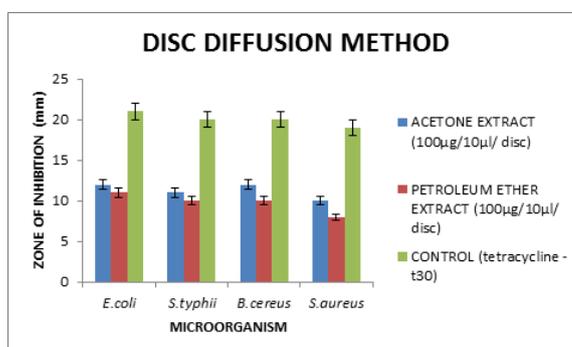
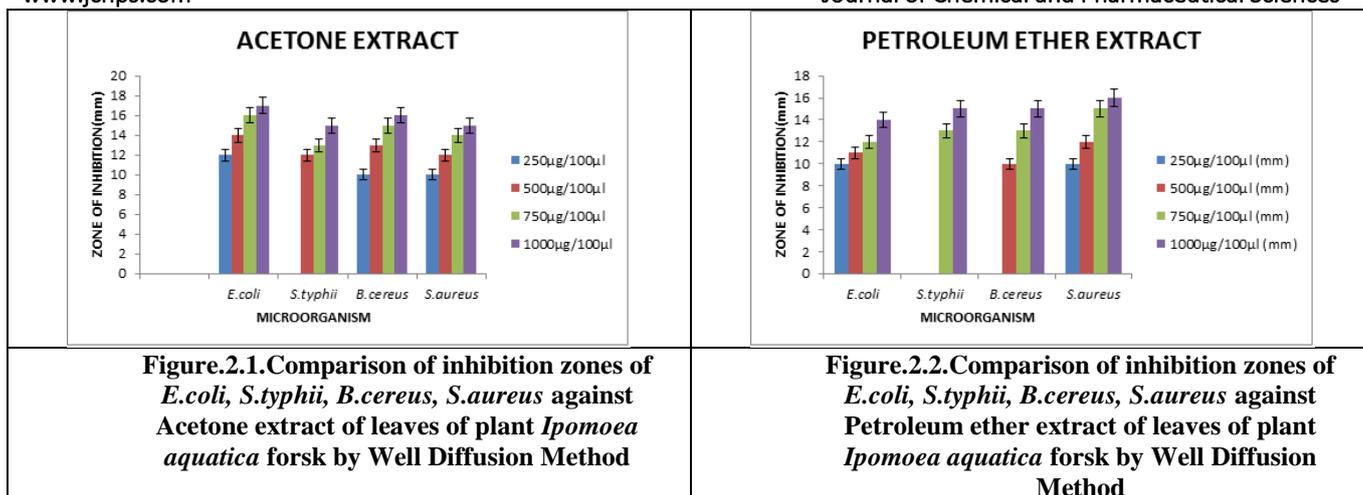


Figure.1.Comparison of inhibition zones of *E.coli*, *S.typhi*, *B.cereus* and *S.aureus* against various extracts of leaves of plant *Ipomoea aquatica* forsk by Disc Diffusion Method



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