



## Original Article

# Antibacterial, Antidiabetic and Lipid Lowering Effects of Ethanolic Extract of *Ipomoea aquatica*

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Present study was designed to investigate antibacterial, antidiabetic and lipid lowering effects of ethanolic leaf extract of *Ipomoea aquatica* (IA). The antibacterial effect of IA leaf extract was performed using agar-cup-diffusion assay against six pathogenic bacterial strains such as *Klebsiella aerogenes*, *Escherichia coli*, *Staphylococcus aureus* and *Bacillus cereus*, *Vibrio cholerae* and *Salmonella typhi*. This extract has potent antibacterial effect against all six strains compared to commercially available antibiotics of ceftriaxone, ciprofloxacin and ampicillin. Total of 40 Swiss Albino male mice were used for investigation of antidiabetic and lipid lowering effects and made diabetic by alloxan. 20 mice were used for oral glucose tolerance test (OGTT) and 20 mice for a week-long anti-hyperglycemic. Both groups were subdivided into four, each having 5 mice. i) the control receive only 0.5% methyl cellulose as vehicle; ii) Standard received vehicle plus metformin; iii & iv) test samples DIA 250 and DIA 500 received vehicle plus IA extract with 250 and 500 mg/kg b. wt (body weight), respectively. Lipid profile analysis was performed by estimating total cholesterol (TC), triglyceride (TG) and liver glycogen concentration on 20 mice after week-long anti-hyperglycemic tested mice. The glucose tolerance results showed significant ( $p<0.05$ ) and improved 50.03% and 66.09% at the DIA250 and DIA500, respectively. However, IA significantly reduced ( $p<0.05$ ) blood glucose level 57.88% and 69.12% at the DIA250 and DIA500, respectively due to a weeklong anti-hyperglycemic activity. Both glucose tolerance and hypoglycemic effect is comparable to diabetic control group and the effect is dose dependent. In addition to anti-hyperglycemic effect, alloxan induced diabetic mice showed increase in plasma TC and TG level. After the administration of IA extract, TC and TG level were restored to near normal level which showed significant ( $p<0.05$ ) results. The results of IA extract also showed significant ( $p<0.05$ ) and improved liver glycogen content compared to diabetic control mice group. These results indicate that IA has antibacterial, antidiabetic and lipid lowering effects.

**Key words:** *Ipomoea aquatica* (IA), antibiotic, Oral Glucose Tolerance Test (OGTT), Total Cholesterol (TC), Triglyceride (TG), Liver glycogen.

## Introduction

Peoples of rural areas use different plant parts for various ailments. In recent years, there has been a resurgence of scientific interest in the use of medicinal plants for the development of new pharmacotherapeutic agents against different diseases. *Ipomoea aquatica* Forsk. (IA) belonging to the family Convolvulaceae, commonly known as kalmi sag or water spinach. It is cultivated throughout Southeast Asia and is widely consumed vegetable in the region. IA contains several vitamins including A, B, C and E, used to treat gastric and intestinal disorders<sup>1</sup>. The species also contains aliphatic pyrrolidine amides, carotenoids, hentriacontane, 8-sitosterol and glycosides, prostaglandin, leukotriene, N-trans- and N-cis-fenoloyltyramines<sup>2-6</sup>. Only a very few scientific studies have been conducted on its medical aspects. These include the effects on liver diseases<sup>7</sup> and constipation<sup>8</sup>. Water spinach is also supposed to possess insulin like activity according to indigenous

in Sri Lanka<sup>9</sup>. Medicinal properties of this plant has been used in nosebleed and high blood pressure<sup>10,11</sup>. However, there is little information available about the antimicrobial activity of this plant. In the light from the literature, this study has been designed to investigate antibacterial, anti-hyperglycemic and lipid lowering potentials of *Ipomoea aquatica*.

## Materials and Methods

### Preparation of extract

Fresh leaves of IA were collected from Savar, Dhaka in October, 2010 and the plant authenticity was confirmed from the Bangladesh National Herbarium, Mirpur, Dhaka. The collected leaves were washed and sun dried under shadow for one week. Dried leaves were powdered by electric grinder. The powdered plant leaves were extracted with 95% ethanol at room temperature. The bottle were kept at room temperature and allowed to stand for 7-10 days with occasional shaking and

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