



ABSTRACT

Achyranthes aspera is a well-known traditional plant, belonging from Amaranthaceae family. The purpose of this study was to determine the biological attributes such as antibacterial, antifungal and antidiabetic properties present inside the plant and the phytochemicals responsible for their inhibition. Extraction of *Achyranthes aspera* plant's different parts including stem, root, seed and leaf was carried out by varying different parameters such as temperature, solid-liquid ratio, extraction time and concentration of the solvent and was analyzed by RSM to check the highest amount of extract yield and DPPH activity. The antimicrobial activities were done by taking 2g of powder of plant different parts and dissolving them in 10ml of five different solvents such as methanol, ethyl acetate, n-hexane, petroleum ether and chloroform. Antidiabetic activity was checked by the α -glucosidase enzyme inhibition assay. Metabolite profiling was done for the pharmacological identification of phytochemicals involved. The results revealed that the plant *Achyranthes aspera* has an efficient inhibition against *Bacillus subtilis* and *Pseudomonas aeruginosa* but it didn't show any activity against *Escherichia coli* and *Staphylococcus aureus*. While the plant has good inhibition against the fungus *Aspergillus niger*. Root of *Achyranthes aspera* has best resistance towards the virus H9N2 after testing through the hemagglutination assay. The yellowish appearance of the chick embryo showed the cytotoxic activity of the plant as well. RSM method also showed the best extract yield and DPPH activity at temperature 35°C at extraction time 30 hours with solid- liquid ratio 1:15 and ethanol concentration 60. No antidiabetic activity was as such seen by *Achyranthes aspera*. FTIR (fourier transform infrared spectroscopy) analysis has the absorption spectrum at 3394.72, 2927.94, 2870.08, 1647.21, 1438.90, 1253.73, 1037.70, 597.93 and 547.78 c/m indicating the presence of alcohols, alkenes and alkane groups of aromatic compounds. These observations will be helpful in finding the pharmacognostic and pharmacological identification and standardization of the drug in its crude form and also to monitor the drug from its adulteration.