

Abstract

Due to the use of *Gomphia squarrosa* Dc leaf extracts in the local medicinal system as potential natural candidates and a great alternative for the treatment of various diseases like cancer, the current study was created to investigate their antioxidant and antibacterial capabilities. Different combinations of ethanol and water (aqueous, 10%, 20%, 30%, 40%, and pure ethanol) were used to maximize or optimize the extraction process. The most effective extracts for the plant species with the most antioxidant capacity was 50% ethanolic extracts. For *Gomphia squarrosa* Dc, the greatest extract yields of 44.34 ± 0.05 were obtained using 30% ethanol. The antibacterial activity of these ethanolic-aqueous extract of the plant against two different bacterial species *Bacillus cereus* (Gram-positive) and *Klebsiella pneumoniae* (Gram-negative) clear indicated the antibacterial potential of the leaves of the respective species. Maximum antibacterial activity has been noticed in the case of A0 the rest had shown antibacterial activity but were lesser than that of the pure aqueous plant extract solution. They can therefore be utilized to treat infectious disorders brought on by virulent bacteria. Antibiotics and plant extracts work together synergistically to fight resistant bacteria, opening up new options for the cure of infectious disorders. Plant leaves with 50% ethanolic extracts showed the highest DPPH activity (2-diphenyl-1-picrylhydrazyl) and with ABTS respectively. The ability of plant leaves to treat cancer naturally has been demonstrated, most likely as a result of the potential synergistic effects of secondary metabolites. As a result, the potential for pharmacological and functional food advancement in the future may be increased. The results showed the therapeutic potential of *Gomphia squarrosa* Dc, which can be used to treat a variety of illnesses and generate functional foods. Future research could build on the current work's conclusions to isolate identified components, quantify them, and use the resulting extract as folk medicine