ABSTRACT

Synthetic antibiotics are prone to antimicrobial resistance (AMR) and adverse effects, making them problematic for treating various conditions. Antibiotic resistance among microorganisms can be attributed to abuse and inadequate treatment strategies. The decreasing efficacy of synthetic antibiotics has made it more difficult to treat many ailments. AMR puts persons' health at risk. Synthetic medications are ineffective against AMR infections, leading to increased treatment costs. To address AMR, new pharmaceutical substances can be developed that are resistant to bacterial defenses.

Oxidative stress in biological systems is leading to the spread of major diseases, including Diabetes Mellitus. Oxidative stress disrupts physiological systems, resulting in metabolic disorders. Synthetic antioxidants are commonly employed to scavenge free radicals, including reactive oxygen species. However, synthetic antioxidants have risks and can harm one's health. According to WHO, 80% of people in underdeveloped nations use various herbs to treat ailments. Researchers are analyzing plants that contain medicinal compounds including antimicrobials and antioxidants.

Previous research found that plant secondary metabolites contain effective antioxidants and antibacterial substances. However, comprehensive investigation of these metabolites is currently underway. Plant natural compounds are a better alternative to manufactured treatments for treating antibacterial and antioxidant disorders. The current study assessed the antioxidant, antibacterial, and antifungal properties of Ficus *macrophylla* leaves. To prepare the leaf extract, newly picked leaves were quenched with liquid nitrogen after cleaning. The solvent composition was created by mixing ethanol and water in various proportions: aqueous, 20%, 40%, 60%, 80%, and 100% ethanol. Quenched leaf powder was extracted with these solvents using ultrasonication for 30 minutes, followed by rotary evaporation and lyophilization to remove all water content. After calculating extract yield percentage, antioxidant potential was assessed using ABTS, DPPH, TFC, and TPC assays.

Extracts were tested for antibacterial activity against E. Coli and Streptococcus bacteria using the well-diffusion method. The antifungal activity was carried out using the fungus

strain Aspergillus Niger. Ficus *macrophylla* leaf extract was analyzed for several chemicals using GCMS. Ficus *macrophylla* leaf extracts produced yields of 7.18%, 12.50%, 12.58%, 12.64%, 13.76%, and 24.08% in water, 20% ethanol, 40% ethanol, 60% ethanol, 80% ethanol, and pure ethanol.

The DPPH radical scavenging percentages were 12.64%, 17.94%, 18.32%, 19.82%, and 23.18% for aqueous, 20%, 40%, 60%, 80%, and pure ethanol, respectively. The ABTS scavenging percentages were 12.90%, 17.93%, 18.29%, 18.31%, 19.80%, and 23.79% for water, 20% ethanol, 40% ethanol, 60% ethanol, 80% ethanol, and pure ethanol, respectively. The absorbance values obtained with TFC were 0.1995, 0.18.0.154, 0.202, 0.41, and 0.132 for water, 20% ethanol, 40% ethanol, 60% ethanol, 80% ethanol, and pure ethanol. respectively. TPC absorbance values were 0.437, 0.556,0.623, 0.71, 0.918, and 0.745 for water, 20% ethanol, 40% ethanol, 60% ethanol, 80% ethanol, and pure ethanol, respectively.

In terms of antibacterial activity, the results demonstrated that against E. Coli, all of the samples showed action except for the methanol, which was nil. The biggest diameter of the inhibitory zone was exhibited by composition No. 1 containing solely methanol, which was 8.4 cm, while the control was 2 cm. Composition No. 6, which contained only water, demonstrated no antibacterial activity. However, in the case of the streptococcus bacterium, only composition 5 with 10% methanol demonstrated antibacterial action, whereas no such activity was observed in the remaining compositions. Composition 5 had an inhibitory zone diameter of 0.6 cm. Aspergillus Niger was employed as a fungus strain to demonstrate antifungal activity. It was discovered that all of the compositions exhibited antifungal activity except for the composition containing only water. Composition 2, which contained methanol 40, had the largest inhibition zone diameter of 2.6cm, while composition 5, which contained 10% methanol, had the smallest inhibition zone diameter of 0.5cm. The GC-MS study of *Ficus macrophylla* leaves extract revealed the presence of a variety of bioactive chemicals.