



Antimicrobial activity of *Mukia maderasapatna* stem extract of jujube seeds activated carbon against gram-positive/gram-negative bacteria and fungi strains: Application in heavy metal removal

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ABSTRACT

Bacterial and fungal infections are the major threat to the human and other living organism. In the present research, the modified jujube seeds have been synthesized and checked its antimicrobial behavior for different types of bacteria and fungi strains. The antimicrobial activities of *Mukia maderasapatna* stem extract from three forms of jujube seeds such as raw jujube seeds (RJS), sulphuric acid assisted jujube seeds (SAJS) and ultrasonic assisted jujube seeds (UAJS) have been investigated. The preliminary phytochemical screening of the stem extracts from *Mukia maderasapatna* was performed by the standard phytochemical methods. The conduction band and functional groups of modified jujube seeds were evaluated by using UV-vis spectrophotometer and Fourier Transform Infrared Spectrometer, respectively. The activated jujube seeds were explored for their antimicrobial activity against multidrug-resistant of two gram-positive (*Staphylococcus aureus*, *Proteus mirabilis*), three gram negative bacteria (*Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*) and two fungal strains (*Aspergillus niger*, *Candida albicans*). The different zone of inhibition was captured for different forms of jujube seeds which indicates that UAJS has higher zone of inhibition for all clinical pathogens when compared to RJS and SAJS. Additionally, the prepared UAJS has been effectively utilized for the removal of heavy metal ions from aqueous solution. Freundlich model provided the best results for the removal of heavy metal ions by UAJS. Finally, it can be concluded that *Mukia maderasapatna* stem extract of modified jujube seeds has an excellent antimicrobial activities against bacterial and fungal strains.

Keywords: Activated carbon; Adsorption; *Mukia maderasapatna*; Antimicrobial activity; Fungi; Microbes

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