

Green Synthesis of Triglyceride Quaternary Ammonium Salts and their Silver Complex as Potential Antimicrobial Agents †

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Abstract: Due to accelerating cost, hazardous effects, and rapid depletion of non-renewable resources, the interest in developing advanced functional material has grown, and sustainability of renewable resources is globally required. Glycine max oil (GMO) is biodegradable, non-toxic, cost-effective, and abundantly available renewable resource. The present work reports the green synthesis of a quaternary ammonium salt of GMO triglyceride and its silver complex as a potential antibacterial agent. The quaternary compound has been synthesized by the amidation reaction of GMO in the presence of a base, followed by a neutralization reaction. The solution was then treated with silver acetate to obtain a greyish black color silver complex solution which showed antibacterial activities. The reaction has been confirmed by solubility test, Fourier Transform Infrared Spectroscopy (FT-IR), ¹H, and ¹³C Nuclear Magnetic Resonance Spectroscopy (NMR). The antibacterial activity has been checked by the agar diffusion method against different gram-positive and gram-negative bacteria. The results indicated that antibacterial activity had been improved by modification of GMO. This material can be used in various fields with the primary concern of killing pathogens or preventing surface colonization.

Keywords: renewable; triglyceride; antibacterial; amidation; green synthesis; neutralization; spectroscopy.

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Conflicts of Interest

The authors declare no conflict of interest.