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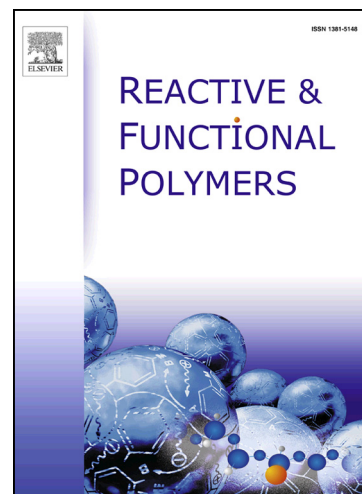
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# Synthesis and antimicrobial activities of acrylamide polymers containing quaternary ammonium salts on bacteria and phytopathogenic fungi

Anqiang Zhang<sup>a</sup>, Qiongqiong Liu<sup>a</sup>, Yufeng Lei<sup>a</sup>, Shuanghao Hong<sup>b</sup>, Yaling Lin<sup>b,\*</sup>

*a. Department of Polymer Material Science and Engineering, College of Material Science and Engineering, South China University of Technology, 381 Wushan Rd., Guangzhou 510641, Guangdong, China.*

*b. Department of Pharmaceutical Engineering, College of Natural Resource and Environment, South China Agriculture University, 483 Wushan Rd., Guangzhou 510642, Guangdong, China;*

\* Correspondence to: Yaling Lin ([linyaling@scau.edu.cn](mailto:linyaling@scau.edu.cn))

## ABSTRACT

Three series of acrylamide monomers / polymers containing quaternary ammonium salts (QASs), i.e., acrylamide QAS monomers (QDs), homopolymers of QDs (PQDs) and copolymers of QDs with acrylate monomer (PQDCs), were synthesized and employed in antimicrobial tests against both bacteria (*Escherichia coli* (*E. coli*) and *Staphylococcus albus* (*S. albus*)) and phytopathogenic fungi (*Rhizoctonia solani* (*R. solani*) and *Fusarium oxysporum* f. sp. *ubense* race 4 (*Foc4*)). The antibacterial activity of the QASs was evaluated by determining the minimum inhibitory concentration (MIC) against *E. coli* and *S. albus* by the TTC coloration method, and the antifungal activity was measured by mycelia growth inhibition as well as MIC and the minimum fungicidal concentration (MFC) values. The results indicated that PQD homopolymers and PQDC copolymers showed far better antimicrobial activities than QD monomers. PQDC copolymers by incorporating hydrophobic acrylate units into the main chain of polyacrylamide backbone displayed even better antimicrobial activities, depending on QAS structure and hydrophobic content. Moreover, polymers with benzyl group attached to nitrogen atom showed better inhibitory effect on bacteria and phytopathogenic fungi. The results could assist understanding and development of future design of antimicrobial polymers as potential fungicide agents to control plant disease.

**KEYWORDS:** antibacterial activity; polyacrylamide containing quaternary ammonium salts; minimum inhibitory concentration; phytopathogenic fungi; hydrophobicity

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