

Accepted Manuscript

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PII: S1381-5148(14)00216-8

DOI: <http://dx.doi.org/10.1016/j.reactfunctpolym.2014.10.002>

Reference: REACT 3457

To appear in: *Reactive & Functional Polymers*

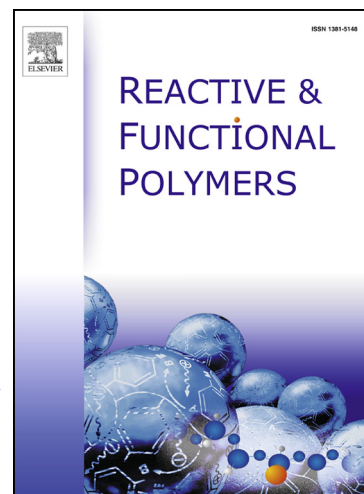
Received Date: 26 July 2014

Revised Date: 30 September 2014

Accepted Date: 6 October 2014

Please cite this article as: Y. Lin, Q. Liu, L. Cheng, Y. Lei, A. Zhang, Synthesis and antimicrobial activities of polysiloxane-containing quaternary ammonium salts on bacteria and phytopathogenic fungi, *Reactive & Functional Polymers* (2014), doi: <http://dx.doi.org/10.1016/j.reactfunctpolym.2014.10.002>

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Synthesis and antimicrobial activities of polysiloxane-containing quaternary ammonium salts on bacteria and phytopathogenic fungi

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Abstract: A series of dimethylaminopropyl benzyl chloride grafted polysiloxanes (PDMS-g-BCs) with tunable molecular weights and cationic content were synthesized, and the effect of polymer structure on the antimicrobial activities against bacteria (*Escherichia coli* (*E. coli*) and *Staphylococcus albus* (*S. albus*)) and phytopathogenic fungi (*Rhizoctonia solani* (*R. solani*) and *Fusarium oxysporum* f. sp. *cubense* race 4 (*Foc4*)) were systematically assessed. The antibacterial activity was evaluated by determining the minimum inhibitory concentration (MIC) against *E. coli* and *S. albus* by the broth dilution method, and the antifungal activity was measured by mycelia growth inhibition as well as by the MIC and minimum fungicidal concentration (MFC) values. The molecular weight and cationic content were major determinants of the activities of PDMS-g-BCs; when the molecular weight was approximately 2500 g/mol and the cationic content was approximately 20 %mol of the total siloxane units, PDMS-g-BCs gained strong antimicrobial activities toward both *E. coli* and *Foc4*, comparable to those of a commonly used broad-spectrum microbicide benzalkonium chloride, making PDMS-g-BCs promising fungicidal agents for plant disease control.

Key words: polysiloxane graft quaternary ammonium salts; antimicrobial activity; phytopathogenic fungi

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