Synthesis and biological evaluation of novel carboxylate phosphabetaines derivatives with long alkyl chains

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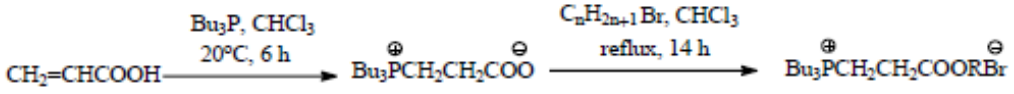
Demand for new antimicrobial agents is high because more microorganisms develop resistance against drugs currently available on the market. Resistance of pathogenic bacteria to antibiotics is rapidly becoming a major problem in the medical community and hospital-based healthcare settings. The search for novel agents to combat resistant bacteria has become one of the most important areas of antibacterial research today. Pharmaceutical and organic chemists are trying to synthesize new drugs with better pharmacokinetic and dynamic properties.

Treatment of acrylic acid with tributylphosphine at room temperature in chloroform during 6 hours yielded (87%) phosphabetaine 1. Alkylation of the starting phosphabetaine 1 – β-tributylphosphonium ethylcarboxylate with alkyl halogenides (reflux for 14 hours in CH3Cl) gave the corresponding phosphonium bromides 4-8 with long alkyl chains. The yield was 52%-72%.



1 **4-8**

R = $C_{10}H_{21}$ (**4**)
R = $C_{12}H_{25}$ (**5**)
R = $C_{14}H_{29}$ (**6**)
R = $C_{16}H_{33}$ (**7**)
R = $C_{18}H_{37}$ (**8**)

The purpose of the present study was to investigate the antibacterial activity of novel nanosized alkyl esters of carboxylate phosphabetaine: β-(carboxyalkyl)ethyltributylphosphonium bromides 4-8. The in vitro microbiological activity of the synthesized phosphonium bromides against gram-positive, gram-negative bacteria and the yeast Candida albicans was determined in comparison to standard agents. Microbiological results indicate the synthesized phosphonium salts possess a broad spectrum of activity against the tested microorganisms. Every newly synthesized compound was characterized by elemental analyses, IR, 1H NMR and 31P NMR spectral studies.

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