Synthesis and biocidal activity of some naphthalene basedv cationic surfactants

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In this study steps were taken towards the development of bactericidal synthetic cationic surfactants based on naphthalene, by reacting dodecyl bromide with compounds containing tertiary nitrogen atom based on naphthalene to produce a series of quaternary ammonium salts which converted to stannous and cobalt cationic complexes via complexing them with stannous chloride and cobalt chloride.The chemical structures of the synthesized metallocationic surfactants were confirmed using several analytical tools including: Micro elemental analysis, FTIR spectroscopic analysis and 1H-NMR spectroscopic analysis.The synthesized metallocationic surfactants were evaluated as surface active agents throughout measuring their surface properties including: surface tension at different temperatures (25, 35 and 45 °C), interfacial tension at 25 °C and emulsification power at 25 °C, and all the complexes have good surface properties.The surface parameters including: critical micelle concentration (CMC), effectiveness (πCMC), efficiency (PC20), maximum surface excess (Γmax) and minimum surface area (Amin) were studied.The thermodynamic parameters including: free energy of micellization (ΔGomic) and adsorption (ΔGoads) were calculated based on the surface parameters.The synthesized metallocationic surfactants were evaluated as biocides for different microorganisms including: three different types of Gram-positive bacteria, one type of Gram- negative bacteria, one type of yeast and one type of fungi and all the complexes are good biocides.The antimicrobial activity of some of the prepared metallocationic surfactants against sulfate reducing bacteria (SRB) was determined and they have good biological activity towards SRB.