

4th African Pharma Congress

June 20-21, 2016 Cape Town, South Africa

Synthesis and antibacterial activity of novel cationic lipids

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The search for new antibacterial molecules is always in demand in the present scenario of slow rate of development of antibiotics. Commonly used pharmaceutical lipids such as oleic acid are known to be having antibacterial properties. This work reports synthesis and evaluation of antibacterial activity of two new classes of cationic lipids. The class I lipids were synthesized by condensing fatty acids with 2-morpholinoethan-1-amine whereas class II lipids by condensing fatty acids with pyridin-4-ylmethanamine by dicyclohexylcarbodiimide coupling chemistry followed by their quaternization using benzyl bromide. The structures of all the lipids were confirmed using modern spectroscopic techniques (FT-IR, ¹H and ¹³C NMR and HRMS). All the synthesized lipids exhibited amphipathic properties. Their critical micelle concentration (CMC) values by step-by-step dilution and extraction method using conductometry. The CMC value ranged from 0.24 to 0.55 mM/L. The antibacterial activity of synthesized lipids was evaluated against *Staphylococcus aureus* and methicillin-resistant *S. aureus* (MRSA) using disc diffusion method. Out of the six tested lipids 4 exhibited activity against *S. aureus* and 3 against MRSA. The zones of inhibitions of active lipids at 5 mM concentration were in the range of 8-17 mm. Interesting observation was the lipids with saturated hydrocarbon chain showed no antibacterial activity. This was in good agreement with previous findings where saturated fatty acids were found to be inactive against bacteria. Further studies on evaluation of bio-safety of the synthesized lipids are under progress in our laboratory.

Biography

Mahantesh Jadhav has obtained his PhD from the University of Pune, India and has more than 3 years research experience in Research and Development (R&D) at Hikal R&D Centre, Pune, India. Presently he is a Postdoctoral Researcher in Professor Thirumala Govender's research group at University of KwaZulu-Natal, Durban, South Africa. He has published more than 6 papers in reputed journals.

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