



ANTIMICROBIAL ACTIVITY OF AMINO ACID AND DIPEPTIDE BASED AMPHIPHILES

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Cationic surfactants bear anti-bacterial activity. Surfactants are usually organic compounds, which are amphiphilic in nature; they contain both hydrophobic groups (their “tails”) and hydrophilic groups (their “heads”). Thus they are soluble in both organic solvents and water. Quaternary ammonium compounds are found to be quite effective against both Gram’s positive and Gram’s negative bacteria, but they are also toxic. Their toxicity is related primarily to the various biological effects of the quaternary ammonium head and its metabolism (such as oxidative dealkylation), but it is also believed that the surfactant characteristics of the molecules, particularly in liver, causes additional alterations in a number of chemical, biological and transport phenomena. The mechanism of action of cationic surfactants on bacteria is understood to be purely electrostatic interaction and physical disruption. The cationic site of the agent is able to bind to the anionic sites of the cell wall surface. With a significant lipophilic component present, it is then able to diffuse through the cell wall and bind to membrane. As a surfactant it is able to disrupt the membrane and permit the release of electrolytes and nucleic materials, leading to cell death. Amino acid (Tryptophan) based cationic surfactants having carbon lengths C14 and C16 were tested with *Klebsiella aerogens* (Gram -ve) and *Bacillus subtilis* (Gram +ve) and also give rise to semi-solid materials i.e. **Gels**, which can in turn have antimicrobial properties and can have a variety of uses in terms of antibiotics. Mainly peptides and dipeptides have been used which contains a combination of a number of amino acids. It was found that both the surfactants have their MIC (Minimum Inhibitory Concentration) values far below their CMC (Critical Micellar Concentration) and MGC (Minimum Gelation Concentration) values hence thereby showing that they have antimicrobial activity.