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Topic of Research: Synthesis of choline based ionic liquids and their interaction with antimicrobial drugs

Findings

Choline based ionic liquids (Cho.Br-ILs) are proving to be the promising class of new solvents with exceptional properties. We explored Cho.Br-ILs in our PhD work for their application in pharmaceuticals.

The Cho.Br-ILs series with varied cationic chain length and bromide as anion was synthesized and characterized. The tensiometry results suggest that the ILs show chain length dependent surface activity, critical micellar concentration and micellar shape. The ILs were stable to higher temperatures (260-280 °C) and can be used as potential antioxidant enhancers.

The comparative dynamic surface tension studies of surface-active compounds revealed the adsorption kinetics at the air-water interface was mixed diffusion-controlled mechanism. We believe new suitable and reliable method (dynamic surface tension) to determine the solubility of drugs (example: ciprofloxacin) in surface active systems.

We synthesized new Cho-API-ILs using levofloxacin/cephalexin as anions with increased drug solubility. The antimicrobial and *in-vitro* cytotoxicity activities result suggest these compounds act as good antibacterials and potential anticancer agents. The surface activity enhanced in presence of APIs. Spherical/lamellar shaped micelle were confirmed by TEM studies.

The spectroscopic studies between levofloxacin and choline-levofloxacin-ILs with model transport protein-(HSA) suggest static quenching mechanism was observed and a stronger binding of Cho-LVF-ILs in comparison to levofloxacin.

Overall, the bioactive drug development (API-ILs) is interesting for further medicinal investigations that is a quickly developing and appealing field of research which might play a substantial role in the future of healthcare.