ABSTRACT

This dissertation is about the synthesis of amino acids i.e. L-alanine, D-phenylalanine, D-homoalanine, D-ornithine and D-lysine using Strecker synthesis. For this purpose, different aldehydes were treated with ammonia to synthesize imino derivatives which are treated with aqueous solution of cyanides. The resultant α-aminonitriles are subjected to acidic hydrolysis to form α-amino acids. Furthermore, the synthesis of nickelocene amino acids was then carried out using click chemistry. Moreover, nickelocene is first treated with acetic anhydride in the presence of phosphoric acid then acetyl nickelocene was obtained. After acetylation of nickelocene the compound acetyl nickelocene was reacted with phosphorous oxychloride in the presence of inert atmosphere at 0 °C then an organometallic novel compound of ethynyl nickelocene was synthesized as a precursor for variety of new compounds. To follow the click chemistry methodology this above titled compound ethynyl nickelocene was further reacted with different azides of amino acids like 3-Azido-L-Alanine, 4-Azido-D-phenylalanine, 4-Azido-D-Homoalanine, 5-Azido-D-Ornithine and 6-Azido-D-Lysine in the presence of CuI as a catalyst to obtained nickelocene amino acids. Click chemistry is a synthetic approach in which small building blocks are used or joining two or more than two reagents to make practical and best reliable chemical transformations. In this synthetic approach chemists synthesize the novel compounds and the precursors for further synthesis with greater yield. The applications of click chemistry are numerous especially in drug discovery, combinatorial chemistry, bioconjugation, and research in DNA and proteomics. The use of click chemistry also extended to find structure activity relationship between different chemicals to produce analogue of chemical libraries. There are different types of click reactions performed by the researchers. Here copper catalyzed cyclo-addition reaction was performed to synthesize the novel organometallic compounds. The coupling reactions in which terminal alkynes and azides are taking part and follow the "Copper catalyzed

cycloaddition reactions" methodology in click chemistry. The synthesized nickelocene amino acids (organometallic compounds) were characterized by FT-IR, ^{1}HNMR and ^{13}CNMR respectively. Antimicrobial activity of synthesized bioconjugates was also evaluated against various bacterial and fungal strains such as *Staphylococcus aureus*, *Escherichia coli*, *Bacillus subtilis*, *Streptococcus pneumonia*, *Alternaria alternate*, *Aspergillus flavus* and *Aspergillus niger*.