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Title: **Synthesis, Characterization and Biological Activity of Some Heterocyclic Derivatives**

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### **ABSTRACT**

The title of the thesis revealed the objective of research work which consists of synthesis and characterization of heterocyclic compounds and their biological activity. The main aim of the thesis is to synthesized heterocyclic compounds as potential antimicrobial agent and investigation of their DNA binding interactions.

Heterocyclic chemistry is one of the attractive and challenging fields in current medical science. Due to expanded range of applications, this field has grown actively into the most active research area. Heterocyclic compounds brought a synthetic revolution in organic chemistry which lead to new products of equally novel applications in wide range of areas such as fungicides, paints, pigments, polymers, pharmaceuticals, catalysis, photoconductors most extensively used organic compounds and as a intermediates in many organic reactions. Phthalimide is an important class of heterocyclic compounds among important pharmacophores. Because of their similar structural properties such as hydrophobic aryl ring and an electron-donating group, they possess variety of important biological activities and well explored in the preparation of a variety of drugs. Due to its wide range of applications in medicinal chemistry and pharmaceutics it is an important and tremendous subject of today's research. Phthalimide also serves as herbicides, used in production

of pesticides and dyes. They were also found with industrial applications as bleaching agent, heat resistant polymer and flame-retardants.

Heterocyclic Schiff bases considered as an important part of heterocyclic chemistry due to their constructive and large number of reactions that they undergo and have a wide variety of applications in biological, inorganic and analytical chemistry. Coordination compounds of heterocyclic Schiff base acquire very much attention due to their large number of pharmaceutical applications as anti-microbial, anti-cancer, anti-bacterial and anti-fungal agents. High synthetic flexibility and sensitivity of Schiff base towards metal atoms make it possible for the formation of metal complexes. Due to their thermal stability, biological applications and presence of nitrogen atom in aromatic ring, pyridine and pyrimidine based heterocyclic compounds considered to be better ligands. Since DNA, a genetic material contained all the cellular information hence, considered a very significant molecule. Therefore, study of Drug-DNA interaction is very important aspect in present time. Interactions of small molecules with DNA have been investigated and it attracted more attention for the designing of more effective heterocyclic drugs which target to DNA.