SYNTHESIS, CHARACTERIZATION AND
PHARMACOLOGICAL STUDIES OF COPPER
COMPLEXES DERIVED FROM FLAVONE DERIVATIVES

A THESIS

Submitted by
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Certified that this THESIS entitled “Synthesis, characterization and pharmacological studies of copper complexes derived from flavone derivatives” submitted for the award of the Degree of Doctor of Philosophy in Chemistry of the Noorul Islam Center for Higher Education is a bonafide research work done by Mr/Mrs/Miss. K.NAGASHRI under my supervision.

Further certified that to the best of my knowledge, the work has not been part of any other thesis or dissertation for which any degree or diploma has been conferred by any University or Institution.

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ABSTRACT

In the design of biologically active metallo-organic molecules, it is of vital importance the choice of appropriate ligands (particularly heterocyclic molecules), which affect the thermodynamic and kinetic stability as well as solubility and lipophilicity of the metal complexes. In the search for potential chemotherapeutic agents, a considerable effort has been made on the design and development of chemotherapeutic agents that contain heterocyclic structures as their main structural motif.

Among the heterocyclic molecules, Flavone and its derivatives have exhibited numerous biological and pharmacological activities. In the past few decades, the research work was focused on the design and development of medicinally important molecules. The structural modifications on heterocyclic scaffold may yield effective therapeutic agents without side effects.

Keeping these facts in mind, in the present study was focused on design, synthesis and structural characterization of hydroxyflavone derivatives and their copper complexes. The chemically charaterised copper complexes were subjected to antimicrobial, DNA studies, antioxidant, SOD, anti-inflammatory and anti tuberculosis activities. The observed structural and biological features were discussed.

The removal of carbonyl group in the flavone nucleus with different substituted aromatic amines improved structural and biological activities. The introduction of electron withdrawing on the phenyl ring was exhibited enhance biological activity. The replacement of “O” by “N” at position 1 with aliphatic amines has increased pharmacological activity of ligands. The incorporation of copper ion, the biological activity was further enchaned.

In summary, the whole work contributes to the search of new molecules (copper complexes of flavone derivatives) with systematic approaches to combat multidrug resistant organisms and may be behaved as chemotherapeutic agents.
DEDICATED TO MY MOTHER

K.LEELAVATHY
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2. activation by 50 mM 2-mercaptoethanol and 50 mM H$_2$O$_2$, simultaneous addition with each copper complex;
3. activation by 50 mM 2-mercaptoethanol and 50 mM H$_2$O$_2$, after each copper complex has been reacted with DNA for 30 min and
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<td>CT-DNA</td>
<td>Calf thymus deoxyribonucleic acid</td>
</tr>
<tr>
<td>EB</td>
<td>Ethidium bromide</td>
</tr>
<tr>
<td>DPPH</td>
<td>1, 1-Diphenyl-2-picryl-hydrazyl</td>
</tr>
<tr>
<td>SOD</td>
<td>Superoxide dismutase</td>
</tr>
<tr>
<td>ROS</td>
<td>Reactive oxygen species</td>
</tr>
<tr>
<td>NBT</td>
<td>Nitrotetrazolium blue</td>
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<tr>
<td>IC&lt;sub&gt;50&lt;/sub&gt;</td>
<td>Half maximal inhibitory concentration</td>
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