

Synthesis, Spectroscopic Characterization & Biological Screening of Co(II), Cr(III), Ag(I) Complexes with Amoxicillin



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For the award of degree of

BS
IN
CHEMISTRY

BY
ANUM SHARIF

ID

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SESSION: 2012-2016

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

In the name of

Allah,

The most Compassionate,

The most merciful

DECLARATION

I ANUM SHARIFD/OSHARIF-U-DIN

ID: 12001067003, Session 2012-2016 hereby declare that the matter printed in the thesis titled "Synthesis, Spectroscopic Characterization & Biological Screening of Co(II), Cr(III), Ag(I) Complexes with Amoxicillin" is my own work and has not been printed, published and submitted as research work, thesis or publication in any form in any University, Research institution etc. in Pakistan or Abroad.

Dated: _____

(Anum Sharif)



RESEARCH COMPLETION CERTIFICATE

Certified that the research work contained in this thesis titled, “Synthesis, Spectroscopic Characterization & Biological Screening of Co(II), Cr(III), Ag(I) Complexes with Amoxicillin” has been carried out and completed by ANUM SHARIF, ID: 12001067003.

The quantum and the quality of the work contained in this thesis is adequate for the award of Degree of BS in Chemistry.

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Dedication

I dedicate my dissertation work to my family and all my Teachers. This thesis work is dedicated to my father, SHARIF-U-DIN, who has been a constant source of support and encouragement during the challenges of graduate School and life. I am truly thankful for having you in my life. I also dedicate this work to my sister ASIYA SHARIF. A special feeling of gratitude to my loving parents SHARIF-U-DIN and SAEEDA SHARIF whose words of encouragement and push for tenacity ring in my ears who have always loved me unconditionally and whose good examples have taught me to work hard for the things that I aspire to achieve.

I also dedicate this dissertation to my all teachers whose efforts make me able to get such wonderful experiences of learning from my childhood. I always appreciate all they have done for helping me in development my technical skills and for helping me to master the leader dots.

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ABSTRACT

The bacteria and fungi are getting resistant against antibiotic drugs. There is need to search for new compounds and coordination complexes of biologically significant molecules that are resistant against pathogens. Amoxicillin is very famous and harmless antibiotic and it is good absorber as compared to other beta-lactam antibiotics. It is used to treat many different types of infections caused by susceptible microorganisms. It works against Gram-negative bacteria more effectively as compare to Gram positive bacteria. In many areas of research amoxicillin and its derivatives are frequently used especially in pharmaceutical and biological studies. Amoxicillin is bio functional active due to the presence of lactam ring this ring protects from bacterial growth by the mechanism of petrolysis. Amoxicillin is unstable in acidic medium it needs to be stabilized for better anti-microbial effect. Amoxicillin can be stabilized by making complexes with different metals. Metal complexes have great biological importance. It works in biological catalytic reactions, antimicrobial agents, in industries and herbicides. Chelating ligands that contains heteroatoms such as S, O and N show great resistance against disease causing microorganisms and are important due to their different ways of coordination with metal ions. It is found that when metal is attached with biologically active specie its action against pathogens increases. Three different complexes of amoxicillin were prepared with metal (II) chromium, cobalt and silver. The sample were analyzed by IR. The antibacterial activity was also performed by agar diffusion assay to check the antibacterial effect of these complexes. The infrared spectroscopy showed that metal complex is formed by hydroxyl group. All the complexes showed resistance against Gram negative *Pseudomonas*, Gram positive *Staphylococcus aureus* and *Streptococcus mutans* bacteria. The zone of inhibition for silver amoxicillin against *Streptococcus mutans*, *Pseudomonas* and *Staphylococcus aureus* was 19mm, 18mm and 18mm respectively. Zone of inhibition measured for chromium amoxicillin dehydrate against *Pseudomonas* was 14 mm which is minimum as compared with other complexes. silver amoxicillin showed maximum antibacterial activity against all strain *Staphylococcus aureus* and *Pseudomonas* and *Streptococcus mutans*. Therefore it is concluded that chromium amoxicillin dehydrate, silver amoxicillin and cobalt amoxicillin complexes could be served as antibacterial agents.

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INTRODUCTION

1. INTRODUCTION

1.1 The penicillin family:

Penicillin belongs to the class of beta lactam. It was the first antibiotic which was discovered from *Penicilliumnotatum* in 1928 by Alexander Fleming. The structure of penicillin consist of cyclic amide which is four membered ring and a side chain, the ring is known as beta lactam ring and it is very necessary for the antibacterial activity. The side chain of the ring is important for pharmacologic properties. Different penicillin are differ from each other by showing different antimicrobial spectrum, some have different ability to penetrate in the gram negative bacteria and they have different behavior within the body (Anacona et al., 2006)