Antibacterial activity of cuprous oxide nanoparticles

BS
IN
Chemistry

By: Quratul Ain Liaqat

ID: 13004067014

SUPERVISOR:

Humaira Khan

UNIVERSITY OF MANAGEMENT AND TECHNOLOGY, LAHORE, PAKISTAN
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In the name of

Allah,

The most Compassionate,

The most merciful

DECLARATION

I **QURATUL AIN** D/O **LIAQAT ALI**

ID: **13004067014**, Session **2013-2017** hereby declare that the matter printed in the thesis titled ***"ANTIBACTERIAL ACTIVITY OF CUPROUS OXIDE NANOPARTICLES"*** ismy 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: _____ _____

(QURATUL AIN)

RESEARCH COMPLETION CERTIFICATE

Certified that the research work contained in this thesis titled, "**ANTIBACTERIAL ACTIVITY OF CUPROUS OXIDE NANOPARTICLES** "has been carried out and completed by **Quratul Ain Liaqat,ID: 13004067014.**

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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HUMAIRA KHAN
Supervisor
Department of Chemistry,
UMT, Lahore.

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Dr Sammia Shahid
Chairperson,
Department of Chemistry,
UMT, Lahore.

Dedication

I dedicate my dissertation work to my family and all my Teachers. This thesis work is dedicated to my father, LiaqatAli, 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 mother Razia Liaqat. A special feeling of gratitude to my loving parents Liaqat Ali and Razia Liaqat 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.

Finally, this thesis is dedicated to all those who believe in the richness of learning.

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ABSTRACT

Cuprous oxide nanoparticles were prepared by using copper sulfate pentahydrate and small amount of hydrazine as reducing agent. The antibacterial activity of cuprous oxide nanoparticles was evaluated against different bacteria's such as *Pseudomonas, Streptococcus mutans, Staphylococcus areus, Klebsiella pneumonia* and*Eschericia coli.* For this purpose petri dishes were prepared containing inoculums and bacteria from slant was injected, amoxicillin was used as a standard antibiotic drug along with water as solvent. Amoxicillin is a famous antiseptic drug. Dilutions of cuprous oxide nanoparticles were prepared of 1%, 0.5%, 0.25% and 0.125% respectively. Properties of nanoparticles were studied by using XRD pattern. Cuprous oxide nanoparticles showed antimicrobial efficiency against all of the bacteria byagar well diffusion method. Results showed that cuprous oxide nanoparticles could restrain the growth of *Pseudomonas, E.coli, St.aureus, K.pneumonia* and *St.mutans.* Highest efficiency was achieved against *Klebsiella pneumonia* for 1% concentration and lowest efficiency was achieved against *Streptococcus mutans* and *Pseudomonas* for 0.125% concentration. Therefore, it can be concluded that cuprous oxide nanoparticles show efficient antimicrobial properties and could be replaced in antibiotic drugs as antimicrobial agent.

Contents

INTRODUCTION

1.1Nanoparticles, History and Development

Nanoparticles are those particles which are confined within different dimensions which are measured in nanometers i.e. (nm). Nanoparticles are also known as ultra-small objects which have typically one dimension that ranges from 10 – 100 nanometers in size.