

Removal of copper ions from polluted
Water by activated carbon



By: Fakhra Ashraf

ID: 12002067006

SUPERVISOR:

Shah Muhammad Haroon

DEPARTMENT OF CHEMISTRY
SCHOOL OF SCIENCE
UNIVERSITY OF MANAGEMENT AND TECHNOLOGY,
LAHORE, PAKISTAN
2016

Removal of copper ions from polluted
Water by activated carbon

Submitted to University of Management and Technology Lahore

In partial fulfillment of the requirements

For the award of degree of

**BS
IN
CHEMISTRY**

BY: Fakhra Ashraf

ID

1	2	0	0	2	0	6	7	0	0	6
---	---	---	---	---	---	---	---	---	---	---

SESSION: 2012-2016

DEPARTMENT OF CHEMISTRY
SCHOOL OF SCIENCE
UNIVERSITY OF MANAGEMENT AND TECHNOLOGY,
LAHORE, PAKISTAN

الله أكبر



Thesis Similarity Report

DECLARATION

I FAKHRA ASHRAF D/O MUHAMMAD ASHRAF

ID: 12002067006

Session 2012-2016 hereby declare that the matter printed in the thesis titled

**“REMOVAL OF COPPER IONS FROM POLLUTED WATER BY
ACTIVATED CARBON”**

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: _____

()

RESEARCH COMPLETION CERTIFICATE

Certified that the research work contained in this thesis titled,

“REMOVAL OF COPPER IONS FROM POLLUTED WATER BY ACTIVATED CARBON”

has been carried out and completed by FAKHRA ASHRAF,
ID: 12002067006. The quantum and the quality of the work contained
in this thesis is adequate for the award of Degree of BS in Chemistry.

Supervisor,
Shah Muhammad Haroon
Department of chemistry
UMT, Lahore.

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

Dedication

I dedicate my thesis work to my family and all my Teachers. This work is dedicated to my father, Muhammad ASHRAF, who has been a source of support and help during the tasks of graduate School and life. I am truly thankful for having you in my life. I also dedicate this work to my mother. A special feeling of thankfulness to my loving parents whose affection, love, acknowledgment and pray makes me able to get such success and honor. I also dedicate this thesis to my all teachers whose hard work make me able to get such wonderful experiences of learning. I always appreciate all they have done for helping me in development my practical skills and for helping me.

Finally, this thesis is dedicated to all those who have faith in the learning.

ACKNOWLEDGEMENT

Initially I want to thanks to ALLAH almighty for his uncountable blessings. After that I wish to thank my supervisor who was more than generous with their skill and precious time. A special thanks to Dr. Sammia Shahid for her help to complete my BS and educating my knowledge. Shah Muhammad Haroon my supervisor for his countless hours of brilliant, reading, inspiring, and most of all tolerance throughout the whole process. Special Thanks to my other chemistry teachers Dr. Ayesha Mohy-Ud-Din, Hamid Raza, Dr. Khurram Shahzad Munawar, Dr. Nouman Rasool, Dr. Sohail Nadeem, Dr. sohail Afzal. I would like to acknowledge and thank my school split for allowing me to conduct my research and providing any assistance requested. Special thanks go to the members of Chemistry department of UMT for their continued support.

Finally I would like to thank the beginning teachers, guide-teachers and superintendents in our school division that helped me with this project. Their pleasure and willingness to provide advice made the completion of this research an enjoyable experience.

ABSTRACT

There are many sources of water pollution. Most of them are city sewage and industrial waste which are removed in rivers, sea and canals etc. Heavy metals released in the environment that create global problem. Water pollution is damage of streams, lakes, underground water, sounds, or seas by substances unsafe to living things. Removal of copper ion is done by activated carbon. The process is use for their removal of copper. Metal are removed by using activated carbon. By using oxidizer as adsorbent metals are removed from aqueous solution. The major advantage of activated carbon is inexpensive and cheap.

The main point of this work was to achievement low cost and effective adsorbents for the removal of Cu using tamarind stone carbon. It was detected from the experimental results that almost 90percent copper can be separate from the solution. Adsorption have been examined as a purpose of initial Cu (II) ion concentration, Particle size, pH and temperature. Data were studied using spectrophotometer. On the basis of experimental results it can be concluded that the carbonaceous tamarind is effective for the elimination of Cu (II) from solution.

CONTENTS

	Pages
Dedication.....	<i>iv</i>
ACKNOWLEDGEMENT.....	<i>v</i>
Abstract.....	<i>vi</i>
Contents.....	<i>vii-viii</i>
Chapter no: 1	
Introduction.....	<i>ix-xiii</i>
Properties	<i>xiv</i>
Uses.....	<i>xiv</i>
Copper in environment	<i>xv</i>
Health effect.....	<i>xv</i>
Chapter no: 2	
LITERATURE REVIEW.....	<i>xvi-xxii</i>
Chapter no: 3	
Materials & Methods.....	<i>xxiii-xxiv</i>
Absorbance measurement of Copper (II).....	<i>xxiii-xxiv</i>
Effect of Concentration on Cu (II) Absorbance.....	<i>xxiii-xxiv</i>
Effect of Particle size on Cu (II) Absorbance.....	<i>xxv-</i>
Effect of pH on Cu (II) Absorbance	<i>xxv</i>
Effect of Temperature on Cu (II) Absorbance.....	<i>xxvi</i>

Chapter no: 4

Results and discussionxxviii

Results

Effect of Concentration on Adsorption of Cu (II).....xxix-xxx

Effect of Particle Size on Adsorption of Cu (II).....xxxi

Effect of pH on Adsorption of Cu (II).....xxxii

Effect of temperature on Adsorption of Cu (II)xxxiii

Discussionxxxiv

pH of Activated Carbonsxxv

Effect of concentration on Adsorption of Cu (II)xxv

Effect of Particle Size on Adsorption of Cu (II)xxv

4.4.4. Effect of Temperature on Adsorption of Cu (II)..... xxvi

Conclusion xxxvii

References.....xxviii-xlii

CHAPTER NO:1

INTRODUCTION

There are many sources of water pollution. Most of them are city sewage and industrial waste which are removed in rivers, sea and canals etc. Waste is defined as the given

material which found from the industrial waste chemicals. Many types of wastes like oil, chemicals, wood, tree, trash etc. Industrial wastes may be solids, liquids and gases which are divided by on the basis of their toxicity.