

Analysis and treatment of paint industry wastewater



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UNIVERSITY OF MANAGEMENT AND TECHNOLOGY,
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For the award of degree of

MS
in
CHEMISTRY

BY
MAQSOOD ANWAR

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SESSION: 2014-2016

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

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

*IN THE NAME OF ALLAH, THE BENEFICENT, THE
MERCIFUL."*

Praise is to Allah the cherisher and sustainer of the worlds...

Most gracious, most Merciful...

Master of the Day of Judgment...

Thee do we worship, and thine aid we seek...

Show us the straightway...

The way of those on whom thou has bestowed thy grace, those

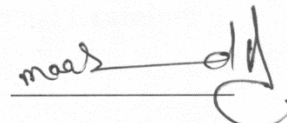
Whose (portion) is not wrath. And who go not astray...



Declaration

I **Maqsood Anwar** S/O **Muhammad Anwar** ID: **14003140027** Session **2014-2016** hereby declare that the matter printed in thesis titled "**Analysis and treatment of paint industry wastewater**" 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 institute *etc.* in Pakistan or Abroad.

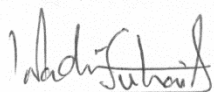
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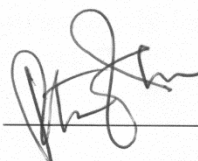


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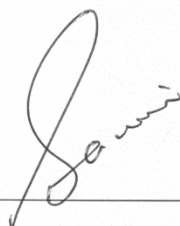
Certified that the research work contained in this thesis titled, "Analysis and treatment of paint industry wastewater" has been carried out and completed by **Maqsood Anwar, ID: 14003140027**. The quantum and the quality of the work contained in this thesis are adequate for the award of Degree of MS/M.Phil.



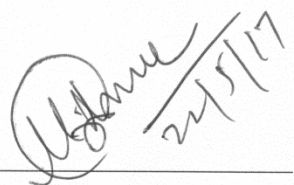
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REFERENCES

DEDICATION

“I dedicate this thesis to my Parents, Brothers and sisters who have supported me, friends, and my advisor and who taught me to be creative, attentive, and courageously lead me and make me done this work.”

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*All praises are for **ALLAH ALMIGHTY** who guides us in darkness and helps in difficulties. Infinite thanks to him who enabled me to complete this task. All the tributes to **HOLLY PROPHET MUHAMMAD (P.B.U.H)**, the city of knowledge, torch of guidance who has guided his ummah to the knowledge from cradle to grave. I would pay bundle of Darood-o-salam to the Holly PropHet (salla-laho-alaihy-wa-alyhe-wasallum). This was possible only due to grace of Almighty **ALLAH**, Whose blessings are cherished fruit of our modest efforts to overcome the problems and difficulties.*

*I cannot find proper words to pay infallible gratitude to my praise worthy and venerate supervisor **Dr. SOHAIL NADEEM**, Assistant Professor, Department of Chemistry, University of Management and Technology Lahore, whose untiring guidance, masterly advice, patronage, positive criticism and inspiring stance throughout this study helped me to bring this task to completion. I acknowledged with deep reverence and sincerity and feel much pleasure in expressing my gratitude to him.*

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*I would like to pay my especial thanks to my all **Friends (Waqar Aslam, Aamir Shehzad, Nadeem Abas and Muhammad Umair)**. They always*



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*May **ALLAH** give them His blessings along happy life.*

MAQSOOD ANWAR

ABSTRACT

The samples of paint industry effluent were collected from outlet pipe of the paint industry located at 9 Km Raiwind road Lahore. Different techniques have been employed for the reduction and removal of heavy metal and other harmful parameters. For this purpose wheat straw, rice husk and animal charcoal were used. The samples were characterized by UV-Visible Spectroscopy. The industrial effluents included the different amount of various parameter such as pH 8.90, TDS 1860mg/lit, electrical conductivity 428 $\mu\text{s}/\text{cm}$, TSS 540mg/lit, COD 370mg/lit and BOD 120mg/lit and heavy metals such as Pb 9.4 mg/L, Zn 4.8 mg/L and Fe 0.13 mg/L. The results of untreated wastewater of paint industry effluents were quite different from treated wastewater. By using rice husk treatment the pH changed to 8.87, EC 251 $\mu\text{s}/\text{cm}$, TDS 910mg/lit, TSS 343mg/lit, COD value of 140 mg/lit and BOD value of 68mg/lit and heavy metals such as Pb 4.0 mg/L, Zn 2.1 mg/L and Fe 0.06 mg/L. By the use of wheat straw for the treatment of wastewater, pH variation of 7.33, EC 290 $\mu\text{s}/\text{cm}$, TDS 890 mg/lit and TSS 245mg/lit, COD 146 mg/lit, BOD 90 mg/lit and heavy metals such as Pb 3.90 mg/L, Zn 1.99 mg/L and Fe 0.05 mg/L. By using animal charcoal treatment the pH changed of 7.10, EC 215 $\mu\text{s}/\text{cm}$, TDS 780 mg/lit and TSS 165mg/lit, COD 150 mg/lit, BOD 55mg/lit and heavy metals such as Pb 1.40 mg/L, Zn 0.98 mg/L and Fe 0.03 mg/L. These experiment for heavy metals analysis were done by using spectrophotometer at 510 nm. Animal charcoal reduced the concentrations of these heavy metals almost 60-75%.



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CHAPTER-1

Introduction

1.01: Introduction

Paints are defined as layer of liquid inserted on the solid surface for its protection, furnishing and decoration purposes. The state of solid can be changed by the process of chemical reaction and by the evaporation of solid. The paint products of all manufacturing industries depends upon the product coating, architectural coatings and special coating. All paint products have basic raw materials such as binder's solvent to sustain maintain viscosity pigments to provide color important characteristics are involved by the assortment of additives. In many cases fabrication facilities blend the raw material to formulate the product rather than to react.

A number of paint product can be manufactured by paint industries such as enamels, paints, varnishes, water based paint, synthetic resins, lacquers, etc. An integrated paint industries can be termed as industry that not only involved for the manufacturing of paints but also formulates its ingredients such as lacquers, varnishes and resin etc.