

Synthesis of Carbon Nanoparticles by using Seed Oils and Evaluation of Their Biological Applications



By:

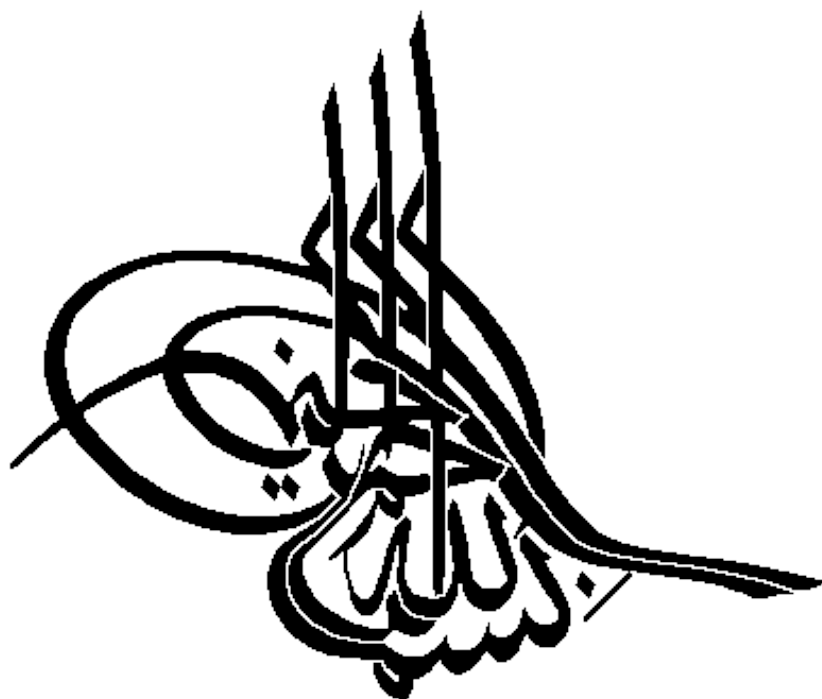
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LAHORE, PAKISTAN 2015**



In the name of

Allah,

The most Compassionate,

The most merciful



DECLARATION

I **MUHAMMAD SLAMAN MUHSAN** S/O **MUHAMMAD SADDIQUE** ID: **13001140014**, Session **2013-2015** hereby declare that the matter printed in the thesis titled **“SYNTHESIS OF CARBON NANOPARTICLES BY USING SEED OILS AND EVALUATION OF THEIR BIOLOGICAL APPLICATIONS”** 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.

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(***MUHAMMAD SALMAN MUHSAN***)



RESEARCH COMPLETION CERTIFICATE

Certified that the research work contained in this thesis titled, **“SYNTHESIS OF CARBON NANOPARTICLES BY USING SEED OILS AND EVALUATION OF THEIR BIOLOGICAL APPLICATIONS”** has been carried out and completed by **MUHAMMAD SALMAN MUHSAN, ID: 13001140014**. The quantum and the quality of the work contained in this thesis is adequate for the award of Degree of MS/M.Phil.

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Dedication

This research work is
Dedicated to

MY HOMELAND “PAKISTAN”

My real paradise

MY SACRIFICIAL PARENTS AND SISTERS

Who always pray for my success and sacrifice for
me

MY SINCERE FRIENDS

SANAULLAH SAQI

AND

IMRAN LATIF

Who always stands with me in any situation

&

MY TIMELESS INSTITUTION

“UMT LAHORE”

That provided me chances to explore new ideas



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ABSTRACT

Synthesis of carbon nanoparticles was carried out by using different seed oils (mustard, olive, linseed, castor, almond, eucalyptus and cardamom oils). Simple combustion technique was applied and it was as efficient as other methods such as laser ablation, chemical vapor deposition, arc discharge. Nano particles of Carbon having nano range were synthesized by using the above stated oils by the help of this simplistic and inexpensive technique. The characterization was done by powder Thermo Gravimetric analysis (TGA), X-Ray Diffraction (XRD), Differential Scanning Calorimetry (DSC), Scanning Electron Microscope (SEM) and Fourier Transform Infra-Red spectroscopy (FTIR). The average size of carbon nanoparticles by using mustard oil, olive oil, linseed oil, almond oil, eucalyptus oil, lemon oil and cardamom oil was observed that was 18 nm, 24nm, 57nm, 3.46nm, 3.042nm, 4.69nm and 4.70nm respectively.as explored by using powder X-Ray Diffraction technique. Surface morphology of these synthesized carbon nanostructures was predicted by the help of scanning electron microscopy technique. The screening of these produced carbon nanoparticles was done for antibacterial activities against different species (*e.g.* Staphylococcus aureus, Streptococcus haemolyticus, Pseudomonas aeruginosa and Proteus refrigere) and productive results were obtained.

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LIST OF ABBREVIATIONS

SEM	Scanning Electron Microscopy
TGA	Thermo gravimetric Analysis
FTIR	Fourier Transform Infrared Spectroscopy
TEM	Transmission Electron Microscopy
BET	Brunauer, Emmett and Teller
SWCNT	Single Walled Carbon Nanotubes
MWCNT	Multi Walled Carbon Nanotubes
CVD	Chemical Vapour Deposition
EDS	Energy Dispersive X-ray Spectroscopy
Nm	Nano meters DC Direct Current
TPa	Terapascal
DSC	Differential Scanning Calorimetry
BET	Brunauer, Emmett and Teller
XRD	X-Ray Diffraction
GPa	Giga Pascal
CNT	Carbon Nanotube
VLS	Vapour Liquid Solid
PUFA	Poly Unsaturated Fatty Acid
PVC	Poly Vinyl Chloride
TBA	Thio Barbituric acid
CASP	Center for Advanced Studies In Physics
TPR	Temperature Programmed Reduction
DLS	Dynamic Light Scattering
MEMS	Micro Electro Mechanical System
CNFS	Carbon Nanofibers

CHAPTER# 1

INTRODUCTION

Any particle that has at least one of its magnitudes in nano range i.e.1 to 100 nm (Kelsall, Hamley et al. 2005). Due to exceptional properties such as excellent pharmaceutical and electronic capabilities, resistant to corrosion (Shenderova, Zhirnov et al. 2002; Wang, Serrano et al. 2002; Lu, Yang et al. 2009) and increased bio/chemical compatibility for different uses such as carcinogenic, respiration, antimicrobial, hydrogen storage, Nano composites, filtration, catalysis and biotechnology (Ajayan and Zhou 2001; Baughman, Zakhidov et al. 2002). Carbon nanoparticles because of their extraordinary uses are very much progressive particles of modern ages that have high demand in many fields largely based on the progress of excellent, simple and cheaper method for its synthesis.