GRAFTING OF STARCH WITH METHYL METHACRYLATE FOR THE PREPARATION OF BIODEGRADABLE POLYMERS

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GRAFTING OF STARCH WITH METHYL METHACRYLATE FOR THE PREPARATION OF BIODEGRADABLE POLYMERS

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BILAL AHMAD CHHEENA

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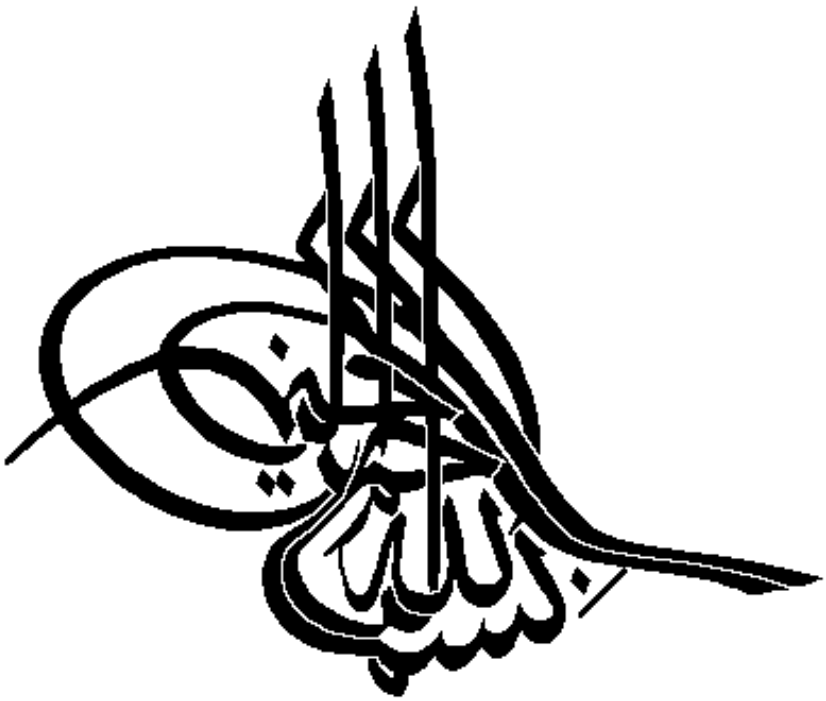

In the name of

Allah,

The most Compassionate,

The most merciful

Thesis Similarity Report

DECLARATION

I **BILAL AHMAD CHHEENA** S/O **MUHAMMAD AKRAM CHHEENA** ID: 13001140022, Session **2013-2015** hereby declare that the matter printed in the thesis titled "**GRAFTING OF STARCH WITH METHYL METHACRYLATE FOR THE PREPARATION OF BIODEGRADABLE POLYMERS**" 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: _____ _____

(Bilal Ahmad Chheena)

RESEARCH COMPLETION CERTIFICATE

Certified that the research work contained in this thesis titled, **"GRAFTING OF STARCH WITH METHYL METHACRYLATE FOR THE PREPARATION OF BIODEGRADABLE POLYMERS** " has been carried out and completed by **BILAL AHMAD CHHEENA ,ID: 13001140022**. 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

TO HAZRAT MOHAMMAD (SAW)

AND

The Sublime Love Of

My Parents

Espacially

Al Haaj Mehar Din Chheena(late)

Whose hands always raised in prayers for

me.

ACKNOWLEDGEMENT

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Bilal Ahmad Chheena

ABSTRACT

Grafting of starch with methyl methacrylate was carried out using free radical mechanism. Free radicals were generated by the thermal disintegration of potassium per sulphate at the temperature of 60 degrees celsius. A variety of experimental methods were investigated to check the effect of different parameters such as (temperature, amount of starch, quantity of monomer) for efficient grafting. The optimum temperature found for good grafting was 60 degrees Celsius. The initial amount of starch was taken as 0.75g. Keeping the amount of starch constant, the quantity of monomer was reduced gradually from 10ml to 2ml in portions of 5ml and 3 ml. The controlled biodegradability of grafted product was obtained by using 3ml monomer in 0.75g starch. This grafted polymer showed 27.29% biodegradability in 60 days. The nanocomposite of starch grafted methyl methacrylate was prepared by incorporating 0.02g Ni nanoparticles in reaction flask 15 minutes prior to the completion of reaction time. The starch grafted polymer and nanocomposite of this were fully characterized by SEM, FTIR, TGA and DSC techniques. Soil burial method was applied to estimate the biodegradability of samples. The polymer containing Ni nanoparticles was less biodegradable than without nanoparticle. Such polymers can be efficiently used as packaging material for food items.

CONTENTS