SYNTHESIS AND CHARACTERIZATION OF GELATIN GRAFTED BIODEGRADABLE PLASTIC USING ACRYLONITRILE AND VINYL ACETATE

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SYNTHESIS AND CHARACTERIZATION OF GELATIN GRAFTED BIODEGRADABLE PLASTIC USING ACRYLONITRILE AND VINYL ACETATE

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IN

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BY

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ID

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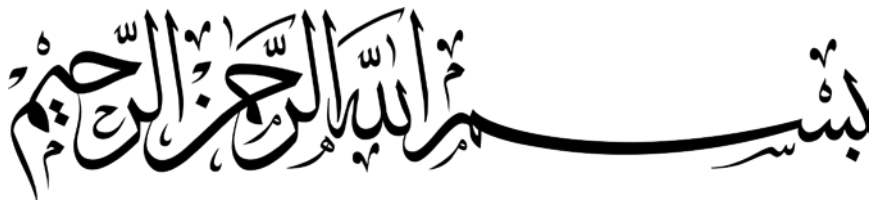

IN THE NAME OF ALLAH, THE MOST GRACIOUS

AND THE MOST MERCIFUL

Then let man look at his food, for that We pour water in abundance; and We split the earth in fragments, and produce therein corn, and grapes and nutritious plants and olives and dates, and enclosed gardens dense, with lefty trees, and fruits and fodder, for us and convenience to you and your cattle.

(Al-Quran)

Lord Muhammad (peace be upon him) said,

"The Calamity of Knowledge is forgetfulness; and to lose knowledge is this, to speak of it to the unworthy.

Who are the learned? Those who practice what they know".

DECLARATION

I **Wajad ulfat** S/O **Khursheed Alam** ID: **13001140040**

Session **2013-2015** hereby declare that the matter printed in the thesis titled **"Synthesis and Characterization Of Gelatin Grafted Biodegradable Plastic Using Acrylonitrile and Vinyl Acetate"** 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: ***11-09-2015***

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(Wajad Ulfat)

RESEARCH COMPLETION CERTIFICATE

Certified that the research work contained in this thesis titled, "*Synthesis and Characterization Of Gelatin Grafted Biodegradable Plastic Using Acrylonitrile and Vinyl Acetate"* has been carried out and completed by **Wajad Ulfat,** **ID: 13001140040**.

The quantum and the quality of the work contained in this thesis is adequate for the award of Degree of M.Phil.

_____ _____

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School of Science,

UMT, Lahore.

DEDICATION

DEDICATE THE FRUIT OF THIS HUMBLE EFFORT TO

HOLY PROPHET (PEACE BE UPON HIM)

THE GREAT SOCIAL REFORMER

MY MOTHER AND FATHER

WHOSE PRAYERS AND AFFECTIONS ARE THE SOURCE OF STRENGTH AND SIGN OF

SUCCESS FOR MY BRIGHT FUTURE

WAJAD ULFAT

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ACKNOWLEDGEMENTS

I have no words to express my deepest and infinite sense of gratitude to **Almighty Allah,** Who knows all the things hidden or evident in this universe, who gave me the courage to complete this work. Countless salutations are upon the **Holy Prophet Muhammad** (peace be upon him) who enabled me to recognize my Creator and declared it to be an obligatory duty of every Muslim to acquire knowledge.

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May ALLAH bless all these people

(Wajad Ulfat)

Abstract

The backbone of gelatin was grafted with the monomers of vinyl acetate and acrylonitrile. This grafted copolymer was obtained by the employing of free radical polymerization technique with potassium per sulfate which acted as initiator in the reaction. The stirring and heating of reaction was constant at 80 ^{o}C. The polymer was characterized by the use of FTIR, TGA and DSC. FTIR proved the grafting of monomers on the backbone of the gelatin. TGA-DSC analyzed the degradation and melting of the copolymer and nanocomposite polymer. The nanocomposite polymer was prepared with the incorporation of suitable quantity of Nickel doped nanoparticles. Soil burial method was used for the study of biodegradation of this polymer and its test range is 60 days. The degradation study of prepared samples W-1 and W-2 was shown to degradation results 29.9 and 11.05 percent respectively. At the beginning of the test was observed that weight of the copolymer (W-1) was increased due to the absorption of moisture from the soil. But after 20 days the weight of polymer was decreased constantly. The W-1 sample showed the high degradation rate. The nanocomposite polymer W-2 sample showed the resistance against the biodegradation. Nanocomposite polymers were also less moisture absorber. Results showed that the grafting was a unique technique which induced the biodegradation that was not present in the synthetic polymers. The nanoparticles imparted the resistance against the microbes; therefore these nanocomposite polymers are best for the packing of food.