

**SYNTHESIS AND CHARACTERIZATION OF
GELATIN GRAFTED BIODEGRADABLE
COPOLYMER USING ACRYLIC ACID 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

CHEMISTRY

BY

MUHAMMAD AMJAD

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SESSION: 2013-2015

DEPARTMENT OF CHEMISTRY

SCHOOL OF SCIENCE

**UNIVERSITY OF MANAGEMENT AND TECHNOLOGY,
LAHORE, PAKISTAN**

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

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 Muhammad Amjad S/O Muhammad Umar ID: **13001140044**

*Session 2013-2015 hereby declare that the matter printed in the thesis titled **“Synthesis and Characterization Of Gelatin Grafted Biodegradable copolymer Using Acrylic acid 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**

(Muhammad Amjad)

RESEARCH COMPLETION CERTIFICATE

Certified that the research work contained in this thesis titled, "*Synthesis and Characterization Of Gelatin Grafted Biodegradable copolymer Using Acrylic acid and Vinyl Acetate*" has been carried out and completed by **Muhammad Amjad** ID: **13001140044** 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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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

MUHAMMAD AMJAD

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1.1. History of polymers and their development:

From the beginning of life polymers are with us and are used as a building block of life. All living things in the world such as plants, animals, microorganisms and even though human being

have the polymer as a basic constituent. In past, we have been familiar with only natural polymers. These polymers are mostly used in the form of textile fibers. But at the end of 19th century the natural polymers were modified into synthetic polymers. In modern era (1968), John Wesley Hyatt synthesized the first synthetic polymer cellulose nitrate from the natural raw material. After the synthesis of first synthetic polymer, change the ideas of scientists for the development of society. They use the synthetic polymers directly or indirectly to synthesis the different products. In previous few decades, with the development of science and technology, the amount of synthetic polymers increased all over the world each yearⁱ. But due to these synthetic polymers in USA and other countries 20 to 25% volume of total solid municipalwasteincreasedⁱⁱ.Today, we can say that all comforts and luxury in this world is possible due to the synthetic polymers.

ⁱShimao M. (2001) Biodegradation of plastics. *CurrOpinBiotechnol.*12, 242.

ⁱⁱJayasekara R., Harding I., Bowater I., Lonergan G. (2005) Biodegradability of Selected Range of Polymers and Polymer Blends and Standard Methods for Assessment of Biodegradation. *J Polymer Environ.* 13,231.