

**DEGRADATION AND ORIENTATION OF COLLAGEN**

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**Final Year Project Report Submitted in  
Partial Fulfillment of the Requirements for the  
Degree of Bachelor of Sciences (Hons.) Polymer Technology  
in The Faculty of Applied Sciences  
Universiti Teknologi MARA**

**MAY 2008**

This Final Year Project Report entitled “**Degradation and Orientation of Collagen**” was submitted by Saiful Bahri bin Mohd Yasin, in partial fulfillment of the requirement for Degree of Bachelor of Science (Hons.) Polymer Technology, in the Faculty of Applied Sciences and was approved by



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## **ABSTRACT**

### **DEGRADATION OF COLLAGEN**

The degradation of collagen properties such as UV light exposure, solvent effect and pH affect was investigated. At initially, Difference Scanning Calorimetric (DSC) was used to investigate the temperature profile of raw collagen. Then, collagen was diluted in water, a mild acetic acid and hydrochloric acid to form collagen film by bulk film into petri dish and thin film on glass slide as well as Polytetrafluorethylene (PTFE) coated glass slide. The film was exposed to Ultraviolet light to investigate the degradation of the molecular structure by using Fourier Transform Infrared Spectrometer (FTIR) spectrum. The Polarized Microscope (PLM) was utilized to observe the orientation of the collagen on glass and Polytetrafluorethylene (PTFE) coated glass slide. The finding for these studies was employed for application of thin film used for medical purposes.

# CHAPTER 1

## INTRODUCTION

### 1.1 Background and Problem Statement

Collagen is a type of protein. Protein can be degraded in certain time and due to that, it is important to understand degradation of the collagen especially applied to bulk collagen film and thin collagen film.

The degradation of collagen was studied by exposure of Ultraviolet (UV) light, effect of solvents and pH value. The effect the molecular bond and orientation of the collagen molecules were investigated. Collagen is protein molecule with a triple helix of three polypeptide chains, procollagen and these three individual  $\alpha$  – chains are crosslinked biosynthetically and fold to form a triple helix with a molecular weight of approximately 300 g/mol [1]. The type I collagen will be used to investigate the molecular bond and orientation change and it is the most abundant in the collagen types.

The characteristics and degradation of the collagen will help in understanding the properties and then application in medical and electrical purposes.