

Research Methodology in Chemistry

Edited by
Fiona N.-F. How, Ph.D



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RESEARCH METHODOLOGY IN CHEMISTRY

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Table of content

Preface

Contributor

Reviewers

Chapter – 1: Research Methodology: An Introduction (6467/19269)	X
Chapter – 2: Good Chemistry Research (6467/19275)	6

Part One: Chemical Synthesis Based Research

Chapter – 1: Chemical Synthesis in General (5980/19279)	11
Chapter – 2: Design and Methodology (5980/19283)	17
Chapter – 3: Instrumentations for Chemical Analysis (5980/19290)	24
Chapter – 4: Separation and Purification Methods (5980/19293)	29

Part Two: Natural Products Based Research

Chapter – 1: Introduction (5641/19299)	37
Chapter – 2: Research in Natural Products (5641/19305)	40
Chapter – 3: Methods in Natural Products Research (5641/19308)	46
Chapter – 4: Bioactive Principle from Plants (5641/19311)	55
Chapter – 5: Biological Activity of Natural Products (5641/19489)	62
Chapter – 6: Standardization Process and Plant Metabolomics in Natural Products Research (5641/19490)	67

Part Three: Polymer Based Research

Chapter – 1: Natural Polymers (6312/19492)	73
Chapter – 2: Synthetic Polymers (6312/19494)	77
Chapter – 3: Polymer Analysis and Characterization (6312/19497)	86

Part Four: Analytical Based Research

Chapter – 1: Introduction (5678/19500)	92
Chapter – 2: Selecting a Research Topic and Writing a research proposal (5678/19502)	97

Chapter - 3: Sampling, measurement and result analyses (5678/19505) 105

Part Five: Laboratory Safety Practices

Chapter - 1: General Laboratory Safety Practices (5777/19507) ~~111~~

Chapter - 2: Personal Safety Equipment (5777/19511) ~~117~~

Chapter - 3: Laboratory Safety Equipment (5777/19515) 122

Chapter - 4: Laboratory Equipment Safety (5777/19516) 129

CHAPTER – 3

POLYMER ANALYSIS AND CHARACTERIZATION

Rosliza Binti Mohd. Salim

The characterization of polymeric materials naturally divides into consideration of the isolated polymer molecule and the structures that are created once these species are allowed to aggregate. The physical and chemical properties of polymeric materials influence their processing and use, so their polymerization and processing have to be carefully controlled.

High Performance Liquid Chromatography (HPLC)

High performance liquid chromatography (HPLC) is a powerful tool to characterize synthetic and natural polymers by separating individual fractions accordance to molecular weight, chemical composition, functional groups, etc. It is also used for isolation and purification of biopolymers and analysis of additives in complex polymer formulations. As in any chromatographic technique, separation occurs due to thermodynamic partitioning between the sample components in the mobile and stationary phases. In HPLC, this process takes place in solution inside a chromatographic columns packed with inorganic (usually silica based) or organic porous particles, capable of resisting the high pressure created by a moving liquid (mobile phase) mechanically pumped through the column. Depending on the application, isocratic (constant mobile phase composition) or gradient (variable composition) modes of separation can be employed, which significantly extends the capabilities of the techniques (Wiley, 2008; Pethrick and Viney, 2003).