

Research Methodology in Chemistry

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



IIUM PRESS

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

RESEARCH METHODOLOGY IN CHEMISTRY

Edited by

Fiona N.-F. How, Ph.D



IIUM Press

2011

Published by:
IIUM Press
International Islamic University Malaysia

First Edition, 2011
©IIUM Press, IIUM

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without any prior written permission of the publisher.

Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

Fiona N.-F. How
Research Methodology in Chemistry
Fiona N.-F. How

ISBN 978-967-418-202-1

ISBN: 978-967-418-202-1

Member of Majlis Pencerbitan Ilmiah Malaysia – MAPIM
(Malaysian Scholarly Publishing Council)

Printed by :
IIUM PRINTING SDN. BHD.
No. 1, Jalan Industri Batu Caves 1/3
Taman Perindustrian Batu Caves
Batu Caves Centre Point
68100 Batu Caves
Selangor Darul Ehsan

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 – 2

SELECTING A RESEARCH TOPIC AND WRITING A RESEARCH PROPOSAL

Jamaluddin Bin Mohd Daud

There are three ways for any researcher to get a topic to research:

1. A research topic is provided by the supervisor.

In this case, a researcher doesn't have to worry about selecting a topic; just start listing key words.

2. The supervisor gives some guidelines to researcher for all provided research topics.

The supervisor will direct the researcher to the related sources of literature and information.

3. The supervisor gives complete freedom to the researcher to choose whatever topic he/she wants.

This can be a challenge to researcher. Pick some interesting topic to work with and learn more about it.

It is important first to select the finest research topics before creating the outline or plan for the research proposal. Technically, the topic interest is the core starting point in any research proposal writing. So let's take some steps in realizing how to properly select a topic that will make research project more interesting.

First of all, a researcher must have a definite goal to carry out research and write a research proposal in the field of analytical chemistry. There are many types of intentions in writing. Once the goal has been signified, researcher may start making a list of research topics. Researcher must assume the significance of the subject. Is this subject really important? Will it contribute greatly to oneself as a person and to the society as a whole? The importance and significant of the topic is measured by how many people will benefit from it.