

# Mulberry

The Story of Potential Miracle Plant





# Mulberry

The Story of Potential Miracle Plant

*Editors*

Siti Nuurul Huda Mohammad Azmin  
Huck Ywih Ch'ng

PENERBIT UNIVERSITI PENDIDIKAN SULTAN IDRIS  
TANJONG MALIM, PERAK  
2022

First Printing 2022

© Siti Nuurul Huda Mohammad Azmin & Huck Ywih Ch'ng 2022

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical including photocopy, recording, or any information storage and retrieval system, without permission in writing from the writers.

Published in Malaysia by  
Universiti Pendidikan Sultan Idris  
35900 Tanjong Malim, Perak Darul Ridzuan, Malaysia  
Tel: 05-450 6000, Fax: 05-459 5169  
Website: [www.upsi.edu.my](http://www.upsi.edu.my)  
Email: [penerbit@upsi.edu.my](mailto:penerbit@upsi.edu.my)

Typesetting and Graphic by  
Pejabat Karang Mengarang (Penerbit UPSI)  
Universiti Pendidikan Sultan Idris  
35900 Tanjong Malim, Perak Darul Ridzuan, Malaysia

Printed by

Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

Mulberry: The Story of Potential Miracle Plant / Editors Siti Nuurul Huda

Mohammad Azmin, Huck Ywih Ch'ng.

ISBN 978-967-2799-08-5

1. Mulberry.

2. Statistics.

3. Quantitative research.

4. Government publications--Malaysia.

I. Siti Nuurul Huda Mohammad Azmin. II. Huck, Ywih Ch'ng.

583.648



---

# CONTENTS

---

*Preface*

ix

## **1 BACKGROUND OF MULBERRY**

Introduction	1
Origin and History	2
Taxonomy and Varieties of Mulberry	3
Plant Description	3
Climatic Conditions and Soil Preferences	4
Significant Uses of Mulberry	5
Silkworm Production	5
Mulberry as Food	5
Mulberry as Animal Feed	6
Mulberry as Crafts	7
Mulberry in Environment Remediation	7
Mulberry as Medicine	7
Conclusion	8
References	9

## **2 PRE-PROCESSING OF MULBERRY LEAF AND FRUIT**

Introduction	13
Uses of Mulberry	14
Pre-processing of Mulberry Fresh Leaf for Sericulture	15
Pre-processing of Mulberry Leaf	16
Processing the fresh leaf for herbal tea	16
Processing the dried leaf into powder	17

Pre-processing of Mulberry Fruit	17
Sundry	18
Mulberry drying process using food dehydrator, oven, toast, and microwave	18
Conclusion	20
References	21

### **3 REVIEW ON EXTRACTION TECHNIQUES OF MULBERRY**

Introduction	23
Pre-extraction Preparation of Plant Samples	25
Fresh vs dried samples	25
Grinded vs powdered samples	25
Air-drying, microwave-drying, oven-drying and freeze drying (lyophilisation) of plants samples	26
Extraction Methods	28
Factors influencing the extraction process	28
Selection of the solvent	29
Particle size of the raw materials	29
Extraction temperature	29
Extraction duration	29
Conclusion	37
References	37

### **4 PHYSICOCHEMICAL PROPERTIES OF MULBERRY PLANT EXTRACT AND ANALYSIS OF PLANT EXTRACT**

Introduction	43
Morphological Image of Mulberry Leaves	45
Ethnobotanical Uses of Mulberry	46
Property Test for Mulberry Extract	48
Antioxidant test	48
Phenolic test	49

Conclusion	51
Acknowledgement	51
References	51

## **5 ANTIMICROBIAL ANALYSES ON MULBERRY EXTRACTS**

Introduction	53
Plant Metabolite Extraction	55
Metabolite Extraction by Maceration	56
Mulberry Extract as Antimicrobial Agent	57
Antimicrobial Assay on Mulberry Extracts	59
Conclusion	65
References	65

## **6 STATISTICS ANALYSIS FOR HERBAL DATA**

Introduction	69
Statistical Analysis vs Data Analysis	70
Types of Data	72
Categorical Data	73
Numerical Data	74
Categories of Analysis in Statistics	76
Descriptive Statistics	77
Inferential Statistics	80
Typical Statistical Tests Used for Analysing Herbal Data	82
Comparison of Means	82
Correlation Test	83
Regression	83
Statistical Analysis Software	84
Considerations in Statistical Analysis and Data Analysis	84
Conclusion	85
Acknowledgement	86
References	86







---

## PREFACE

---

Mulberry plant is a well-known medicinal plant. The plant is commonly known as *Morus*, the genus of a flowering plant belonging to the Moraceae family. In Asian countries, mulberry plant has been grown to produce silkworms as the leaf is a major and important nutrient source for silkworms. Mulberry not only used in cooking and silk but it also provides a number of health benefits that make them highly appealing.

This book aims to provide a brief and simple description of the background, agronomy aspects and physicochemical properties of mulberry plant. This book will provide readers a comprehensive aspect of pre-processing methods of mulberry plant, and the potential of this plant as antimicrobial agent. Finally, this book also provides readers with a self-contained guide on the application of statistical analysis in mulberry plant related research.

Therefore, this book is designed as a quick reference text, with the aim that researchers, students, academicians with little experience in mulberry plant could grasp their understanding of the scientific aspects of the plant. This book will also be of significant interest to those working or doing research in the applied sciences.

Siti Nuurul Huda Mohammad Azmin  
Huck Ywih Ch'ng





---

# 4

---

## **PHYSICOCHEMICAL PROPERTIES OF MULBERRY PLANT EXTRACT AND ANALYSIS OF PLANT EXTRACT**

Siti Nuurul Huda Mohammad Azmin  
Faculty of Agro-Based Industry,  
Universiti Malaysia Kelantan, Malaysia

### **INTRODUCTION**

Mulberry plant is a well-known medical plant. The plant is commonly known as *Morus*, the genus of a flowering plant belonging to the Moraceae family. In Asian countries, mulberry plant has been grown to produce silkworm as the leave is major and important nutrient source for silkworms. Besides, this plant has been utilised as an excellent source of nutrient or functional food (Srivastava et al., 2006).

The mulberry leaves are single toothed with small-pointed ridges around its edge as shown in Figure 4.1(A). The leaves are usually shiny, dark green and smooth. These non-toxic leaves are found to be more palatable than other leafy vegetable. In China, mulberry leave has been used as a medicinal herb while leaf juice has been served as traditional drink.