

A GUIDEBOOK TO PLANT SCREENING: Phytochemical and Biological

REVISED EDITION 2005



Edited by Beatrice Q. Guevara

A GUIDEBOOK TO PLANT SCREENING: PHYTOCHEMICAL AND BIOLOGICAL

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FOREWORD

The Research Center for the Natural Sciences (then Research Center) of the University of Santo Tomas, in 1980 published a guidebook to plant screening entitled *Phytochemical, Microbiological and Pharmacological Screening of Medicinal Plants* as a supplement to the **Acta Manilana**. This was revised in 1985. The book was conceptualized and prepared from the 'hands-on' disciplined research experience of faculty researchers in the field of natural products of the University of Santo Tomas, a product of the collaborative efforts of the botanist, chemists, microbiologists and pharmacologists.

The book contained the **Herbarium Section**, contributed by Alicia L. Claustro, the **Phytochemistry Section** with Alfredo C. Santos, Beatrice Q. Guevara, Alicia M. Aguinaldo, Maribel G. Nonato and Belinda V. Recio as contributors. The **Microbiology Section** had Patrocino S. Santos and Nimfa M. Chua as contributors while the **Pharmacology Section** was contributed by Rosalinda C. Solevilla and Lourdes V. Songco. Editors of the book were B. Q. Guevara and B. V. Recio.

The present book *A Guidebook to Plant Screening: Phytochemical and Biological* is made more user-friendly. This book provides updated 'doable' procedures in the screening of plants for bioactive constituents, whether they are for potential drug sources or for nutritional purposes. References given at the end of each section are the literature used by the past and present researchers in devising their screening procedures.

A panoramic overview of the entire guidebook illustrates at a glance the analytical assays for plant screening in the four sections of the guidebook. In this overview, the researcher is led to the series of further studies in order that the plant material, found promising in the screening procedures, may eventually be developed into a new product, a natural product for medicinal or nutritional purposes.

The four sections of the present guidebook are the **Botany Section**, the **Phytochemistry Section**, the **Microbiology Section** and the **Pharmacology-Toxicology Section**. Each section is introduced by an overview of the series of procedures/ assays to conduct for plant screening in the discipline. Ethical issues and concerns in plant collection and screening are included in the **Botany Section** which policies on research involving animals and their ethical considerations are included in the **Pharmacology - Toxicology Section**.

Contributors to the **Botany Section** are A.L. Claustro and Rosie S. Madulid, to the **Phytochemistry Section**, A. M. Aguinaldo, B.Q. Guevara, Erlinda I. Espeso and M.G. Nonato. The **Microbiology Section** was contributed by Edward Quinto and Mary Ann G. Santos, while the **Pharmacology-Toxicology Section**, by R.C. Solevilla, Mafel C. Ysrael, Gloria C. Bernas, and Rhodora E. Gonzales.

In preparing this guidebook we had in mind the undergraduate and graduate science students who desire to explore the drug potentials of plants. However we

strongly recommend that they conduct the studies under the supervision of science advisers.

It is hoped that with this guidebook more science students are encouraged to pursue interdisciplinary studies to unlock the secrets of plants for the well being of humanity. Let the results of such studies serve as the engine of more concrete efforts at conserving and propagating our rich plant resources in their natural biodiversity.

B. Q. Guevara

PREFACE

to

Phytochemical, Microbiological and Pharmacological Screening of Medicinal Plants (Revised Edition – June 1985)

There has been in more recent times an awakening towards the use of drugs and their preparations in a kind of “back-to nature” movement, instead of the classical synthetic compounds manufactured in advanced countries.

While the use of synthetics is of undoubted value, especially in advanced stage of illness, it is believed that the use of herbal medicines of properly-tested efficacy would be of great advantage in a developing country like ours, which is still blessed with bountiful plant resources; the idea should be to keep people healthy by treating illness at an early stage instead of resorting to treatment when already at an advanced stage.

It is with this idea that a manual for phytochemical, microbiological and pharmacological screening has been conceived to awaken the interest of the beginning scientist in establishing scientific evidence in the use of herbal medicine. This manual has been prepared specifically for the use in the laboratory screening of medicinal plants for biologically active constituents. The methods used have been so designed as to provide a simple and rapid method for screening with a minimum of equipment, reasonably selective for the kind of constituents under study with provisions for some quantitative measure of evaluation.

The phytochemical screening is confined to the detection of important phytochemical constituents that usually exhibit biological activity like the alkaloids, saponins, cardenolides and bufadienolides, flavonoids, tannins and polyphenolic compound, anthraquinones and cyanoglycosides.

The microbiological screening is designed to detect anti-microbial activity of the plant extracts against representative test organisms of gram-positive, gram-negative and acid-fast groups including yeast and fungi.

Pharmacological screening is basically for determining stimulant and depressant effects of the plant extract at the same time determining the lethal dose and toxicity effects.

It is hoped that hereafter, the interested student will go deeper into the study of natural products and become conversant with chromatographic and spectral methods of analysis used in the isolation and structure elucidation of plant constituents thereby acquiring a training that will prove useful in many branches of industry.

Alfredo C. Santos
National Scientist, 1978
1900 - 1990

ACKNOWLEDGEMENT

Our heartfelt gratitude to Dr. Fortunato Sevilla III for challenging us to update and upgrade the Acta Manilana supplement entitled *Phytochemical, Microbiological and Pharmacological Screening of Medicinal Plants*, which was published in 1980. We thank the contributors to this supplement who have moved on to other countries or have joined our Creator.

To the university authorities for the kind and whole hearted support to research and its extension service to the community, to the UNESCO Network for the Chemistry of Natural Products in Southeast Asia and to the Australian adjunct Network for the Chemistry of Biologically Important Natural Products for strengthening the competencies and capabilities of natural products research at the UST Research Center for the Natural Sciences, to them goes the whole hearted gratitude of the contributors to this guidebook.

We gratefully acknowledge the kind help of Dr. Ma. Natalia R. Dimaano for the computer generated graph of the microbiological assay data shown in Figure M11.

The final stage of this guidebook would not have been possible without the help of young talents, Mr. James R. Janier, who did the line sketches in this guidebook and Ms. Rollin S. dela Cruz, who patiently and ably transcribed and formatted the encoded text and scanned figures into the electronic form ready for the first prints of the book. Of course, we are grateful for the kind support of the office staff of the Research Center, Ms. Charmaine M. Caiga, Ms. Ma. Aida A. Cañalete and Mr. Marcelo A. Gazo.

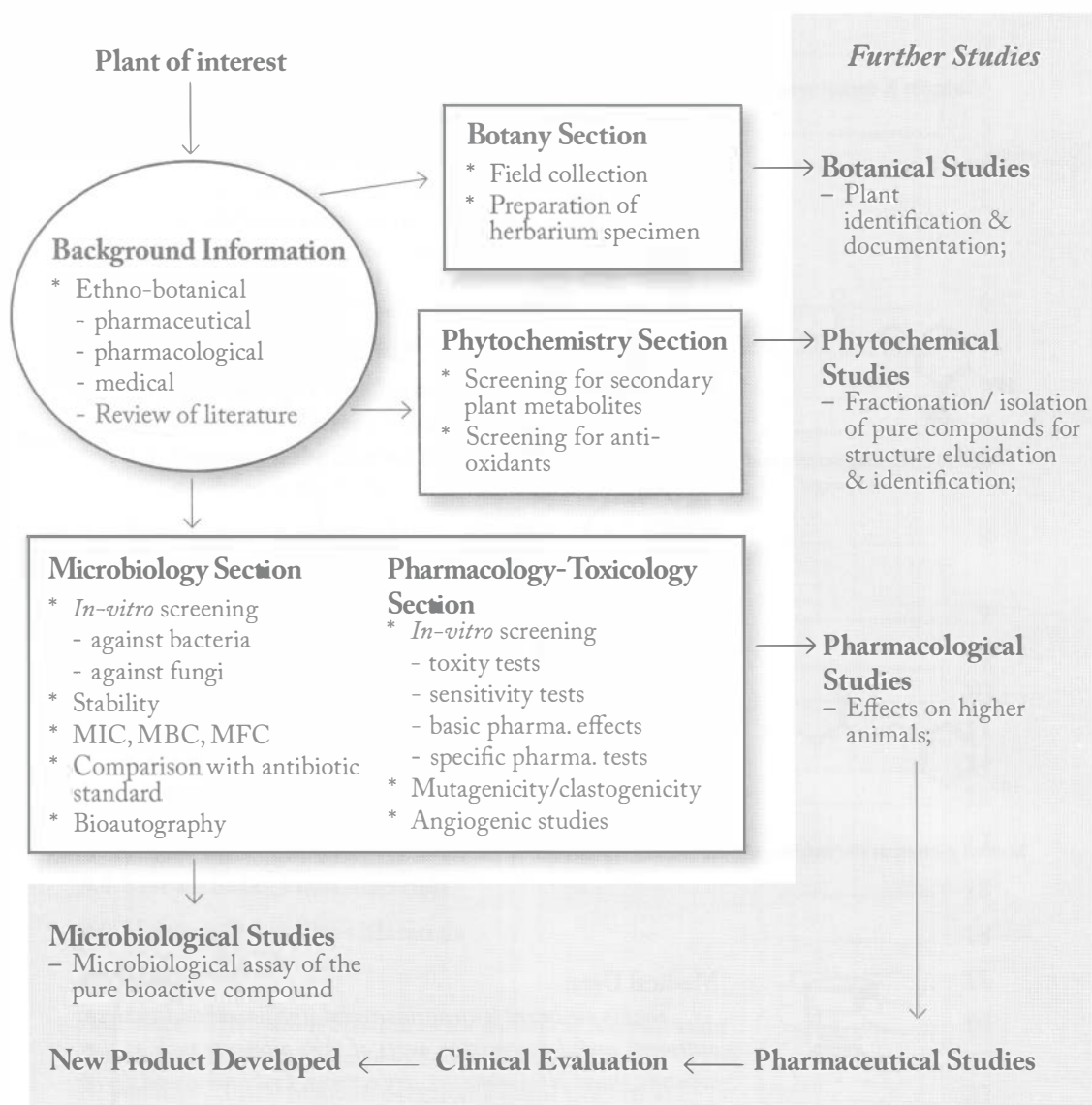
We gratefully acknowledge the UST Research and Endowment Foundation, Inc. for the initial financial support in the preparation of the updated guidebook and to the Philippine Council for Health Research and Development, Department of Science and Technology the grant for the first printing of the guidebook.

To our fellow researchers, our humble gratitude for their suggestions and comments which are now included in this revised edition of the guidebook.

A Guidebook to Plant Screening

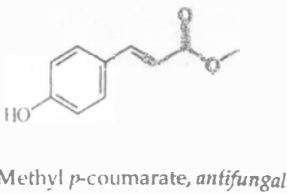
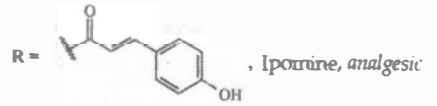
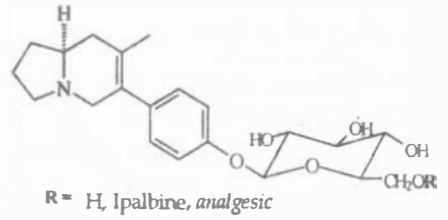
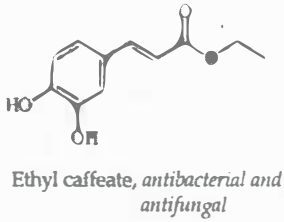
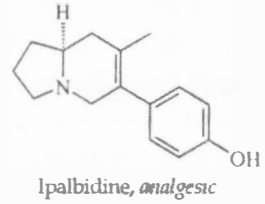
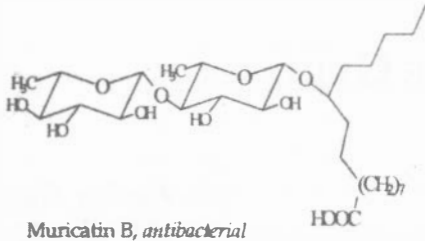
Phytochemical and Biological

AN OVERVIEW OF THE GUIDEBOOK





Drug Development of Ipomoea muricata L. Jacq,
"Tonkin"
 at the
 Research Center for the Natural Sciences, University of Santo Tomas



Medical Uses:

Tonkin ointment is an antibacterial, antifungal and analgesic ointment useful in common types of skin ailments such as cuts, wounds, insect bites, abscesses, dry eczema, first and second degree burns.

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