Dedicated to

Prof. C. K. Atal

Former Director, Indian Institute of Integrative Medicine, Jammu
(Erstwhile, Regional Research Laboratory, Jammu)
The twenty-nine chapters of the book *Medicinal Plants: Phytochemistry, Pharmacology and Therapeutics, Volume 1*, edited by Dr. V. K. Gupta, Dr. G. D. Singh, Dr. Surjeet Singh and Dr. A. Kaul (2009) represent enormous progress, as they cover themes currently under discussion in all of these research fields. Some of the contributions are still based on Ayurvedic herbs and medicine, but most are of general interest, addressing herbs with antioxidant, antilipemic, vasodilatory, opioid, antiinflammatory, antisickling, antimicrobial, antiabetic antiparasitic, antimalaria or antiaging activities. This wide spectrum of themes may be of great value for research in natural products chemistry and biology, and to medical doctors as well.

I congratulate the editors and appreciate their efforts in bringing out such an excellent book which will give all round readers an exciting and serious reading material and also continuing the outstanding works for which Indian Institute of Integrative Medicine (CSIR), Jammu (Formerly Regional Research Laboratory, Jammu) has been known.

It is a pleasure for me to recommend this volume without reservation to all researches in the field of phytomedicine. I wish the book much success and a broad distribution.

I do hope that this book will be followed by second volume in the next years.

Dr. H. Wagner

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Preface

Plants have been used for alleviating human suffering from the very beginning of human civilization, and records of the use of plants are available since about 5000 years ago. The active principles isolated, have provided leads in the development of several life saving drugs, which are in use today. Different civilizations developed their own indigenous system of medicines. Historically, about two centuries ago, our medicinal practices were largely dominated by plant-based medicines. However, the medicinal use of herbs went into decline in the West when more predictable synthetic drugs were made commonly available. In contrast, many developing nations continued to benefit from the rich knowledge of medical herbalism. For example Ayurvedic medicine in India, Kampo medicine in Japan, Traditional Chinese Medicine and Unani Medicine in the Middle East and South Asia are still used by a large majority of people.

All around the world there is talk about ‘health for all’ but it has been realized that modern pharmaceuticals are and will remain out of reach of a large proportion of the human population for the foreseeable future. This necessitates the use of other sources of human knowledge to provide common health benefits. Thus, herbal medicine is now regarded as important but underutilized tool against disease. The World Health Organization (WHO) recognized this fact in the early 1970s and encouraged governments to effectively utilize local knowledge of herbal medicines for disease prevention and health promotion.

There is now a popular belief that allopathic drugs have serious side effects on human body. As against the same, herbal medicines work better and provide long lasting healing effect and are without any side effects. As such there is now a growing demand of herbal medicines and herbal therapeutic applications. The primary health care of 70-80 per cent of the world’s population is based on the use of medicinal plants derived from traditional systems of medicine and local health practices. During the past few decades public interest in traditional, complementary and alternative medicine (TCAM) and use of herbal medicines has increased dramatically in industrialized countries. Traditional
medicine has a bright future and an immense potential to extend medical relief to millions, who for lack of resources remain deprived of it. When undesirable side effects of certain drugs have unnerved the patients, herbal medicine is the only hope in India where 60 per cent of the population lives below the poverty line.

This has increased the international trade in herbal medicine enormously. WHO said in 2003 that the global market for herbal medicines stood at US $ 60 billion and was growing steadily. Global sales of herbal products including herbal medicine has already crossed 100 billion in the last five years and is expected to exceed one trillion in the next 20 years at the present growth rate. In India, the herbal drug market is about $ one billion and the export of plant based crude drugs is around $ 80 million.

Many pharmaceutical companies are showing interest in the production and marketing of herbal medicines. The sales for herbal medicine products have plateaued to such an extent that these products have become available to consumers as positive healthcare just like vitamins. Herbal medicines are in great demand in the developed as well as developing countries for primary healthcare because of their wide biological activities, higher safety margins and lesser costs.

Out of 20,000 plants recognized of medicinal value, only a very few are in use. Their use is not scientifically validated much with the scientific data. Plant extracts of therapeutic relevance are of paramount importance as reservoirs of structural and chemical diversity. A recent report reveals that at least 120 distinct chemical substances from different plants have utility as lifesaving drugs. This has been achieved through chemical and pharmacological screening of only 6 per cent of the total plant species.

It is for their world wide and a sustained effort of scientist’s that an enormous information is being generated and there has been a series of publications on medicinal plant researches. Based on this rational, the present book “Medicinal Plants: Phytochemistry, Pharmacology and Therapeutics - Vol. 1” presents information on review/research communications received from eminent scientists from India and abroad, providing recent and present state of the art data on therapeutic properties, action and uses of medicinal plants in combating a number of diseases and condition for which there is lesser satisfactory treatment in modern medicine.

It is hoped that the present volume will attract wide acceptance of phytochemists, pharmacologists, medical personals in particular and a host of other scientists and biologists to facilitate further research on medicinal plants.

V.K. Gupta
G.D. Singh
Surjeet Singh
A. Kaul
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Chapter 1

Resveratrol: A Natural Polyphenol, that Prevents Illness and Increases Longevity–An Overview

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ABSTRACT

Resveratrol, a natural polyphenol that occurs widely in several plants and foods, was found to be a strong antioxidant, cardioprotective agent, antidiabetic, antiinflammatory compound and anticancer agent. Resveratrol is one of the polyphenolic constituents in wines and is believed to be the basis for ‘French Paradox’. Its importance has grown further after it was recognized that it acts as calorie restriction mimic and increases longevity.

Keywords: Polyphenol, Resveratrol, Red wine, Cardioprotective, Anticancer, Longevity.

Introduction

Polyphenols, a group of naturally occurring compounds, are characterized by chemical structures with aromatic rings possessing number of hydroxyl groups. These compounds are responsible for the colors observed in flowers and fruits of many plants. Polyphenols are strong antioxidants and offer potential health benefits. Among the group of naturally occurring polyphenols (tannins, flavonoids, stilbenes and lignans), stilbenes are gaining increasing importance, recently.

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