This book is dedicated to my beloved parents.

— Dedication —

This book is dedicated to my beloved parents.
Plants are an integral part of a number of alternative therapies such as herbalism, ayurveda, homeopathy, naturopathy, aromapathy, Unani, and other folklore systems of medicine. Day-by-day interest in gaining knowledge about medicinal plants has been considerably increasing worldwide due to sharp rise in problems as a result of adverse/side effects of modern medical science treatments. According to World Health Organization, 80% of world population is turning towards natural products based, mainly plant based medications for their primary health care needs. Currently plants, which have been documented as traditional medicines, are being examined in the hope of finding new or improved medications or therapeutics. Present volume of this book “Medicinal Plants: Phytochemistry, Pharmacology and Therapeutics”, contain validated scientific data on quality, safety, and efficacy and application of various medicinal plants in many countries including India, Mexico, Brazil, Norway, Nigeria, Iran, South-Africa, Thailand, and Malaysia. It comprises 25 research/review articles, contributed by eminent scientists in detecting the efficacy of various medicinal plants and its active principles as potent antioxidants, anti-diabetic, antibacterial, anti-inflammatory, and anti-ulcerogenic agents. It also describes current research methodologies in view of phytochemistry and pharmacology for developing safe and effective plant based drugs.

I can promise that this book will serve as an excellent data base of medicinal plants towards developing safer, cost effective and potent therapeutics. To my delight, I found that it contain a lot of information that would create great interest to general readers, especially graduates, researchers, pharmacists, phytochemists, medical.
I feel, it is a great honor to have the opportunity to write foreword of this book and I appreciate the painstaking effort of the editors, Dr. V.K. Gupta, Dr. G.D. Singh, Dr. Surjeet Singh, and Dr. A. Kaul to compile a knowledge bank of medicinal plants, phytochemicals and their therapeutic effects.

It is hoped that this book would be extensively read and it benefits the mankind for their prosperity in health aspects.

Professor Dr. S.P. Voravuthikunchai

Director of Natural Products Research Center,
Faculty of Science, Prince of Songkla University,
Thailand
Plants have been the eternal source of food and medicine since antiquity in all traditions and cultures. The exponents of Ayurvedic medicine in Indian and traditional systems of different countries developed great theoretical insights into the subject with comprehensive concepts of plant medicines. Historically, in last 100 years, the majority of new drugs have been discovered from organic natural products isolated from plants and microbial species. Large numbers of US-FDA approved drugs are natural products or their semi-synthetic derivatives/analogues. Despite this consistent track record of success, the pharmaceutical industrial research on natural products has declined in last 15 years due to the promise of combinatorial chemistry and high throughput screening. However, this shift in strategy led to dramatic decline in number of new drug approvals in last 10 years. Hence, the focus is bound to shift back to natural product based drug discovery keeping phytochemistry, pharmacology and their therapeutics in consideration. Furthermore, the World Health Organization estimated that 80% of people worldwide rely on herbal medicines for some aspect of their primary healthcare. This is observed that the upsurge in the use of herbal remedies in developed countries is due to consumer’s preference for products of natural origin. In developing countries on the other hand, inspite of the fact that some people regard phytomedicines as primitive medicine, they still rely on it for the treatment of many illnesses (minor or major) or when orthodox medicines fail to produce the desired results.

Progress in medicinal plant research has undergone phenomenal growth in last few decades. Day by day medicinal plant research is gaining popularity because of its lesser side effects, lesser price, broad spectrum activity and non narcotic nature. Being immense value to the mankind it is the need of the time to increase the safety, effectiveness and efficacy of novel as well as current medicinal plants. Vigorous research on medicinal plants is going on to divulge the secret treasure present in plants as pharmacologically and therapeutically active phytochemicals.

Herbal treatments are the most popular form of traditional medicine, and are highly lucrative in the international market place. Annual revenues in Western Europe
reached US$ 5 billion in 2003-2004. In China sales of products totaled US$ 14 billion in 2005. Herbal medicine revenue in Brazil was US$ 160 million in 2007. Traditional use of medicines is recognized as a way to learn about potential future medicines. In 2001, researchers identified 122 compounds used in mainstream medicine which were derived from ethnomedical plant sources; 80% of these compounds were used in the same or related manner as the traditional ethnomedical use.

The presentation of details of closely interdependent area of sciences is the cumbersome to understand the full potential of a medicinal plant. So authors have put their all sorts of effort to broadly integrate information over diverse group of sciences like phytochemistry, pharmacology, and therapeutics to achieve the over reaching goals. Materials presented in this book is completely updated, it is an outcome of thoroughly involved expertise and has the ability to save others time and effort they need to gather and arrange it in systematic and moreover in a scientific manner. We hope that this book helps in enhancing interest in the study of medicinal plants, against a proper cultural and scientific perspective, as medicinal plants cannot be studied, understood, evaluated and utilized in isolation.

It is owing to a world wide and sustained effort of scientists that an enormous information is being generated and there has been a series of publicatiions on medicinal plant research. Based on this rational, the present volume, “Medicinal Plants: Phytochemistry, Pharmacology and Therapeutics Vol. 2” presents edited information on 25 research and review communications received from eminent scientists from India and abroad. Data topics include: The Importance of Dietary Plant Lectins; Hepatoprotective and Antioxidant Effects of *Rosmarinus officinalis*; Antiulcerogenic Activity of Citrus lemon Essential Oil; Therapeutic Potential of Saptaparna, *Alstonia scholaris* in Treatment of Cancer; Jeju Seaweeds Inhibit Proinflammatory Cytokines, iNOS and COX-2 Expression in Macrophage RAW Cells; Mining of Novel Antifungal Proteins from Medicinal Plants; Role of Herbal Medicines Use in HIV / AIDS Treatment; Effect of *Alternanthera brasiliana* (L.) Kuntze on Modified Swim Test in Rats; Growth Characteristics, Phytochemicals and Mineral Composition of *Ocimum gratissimum* Applied with Albit® Biosubstance; Effect of Mulberry (*Morus inica* L.) Leaves on Blood Glucose, Glycosylated Hemoglobin and Serum Glucogenic Enzymes in NIDDM Patients; Treating Diabetes Mellitus with Natural Products; *In vitro* and *In vivo* Efficacy of Some Ethno-Medicinal Plant Species Against *Xanthomonas oryzae*; Effects of *Hypericum scabrum* Plant Extract on Signs of Morphine Withdrawal Syndrome in Rats; Importance of *Labisia pumila* (Kacip Fatimah), a Malaysian Medicine Herb etc. will definitely be eye-catching chapters and shall provide useful information regarding the uses of medicinal plants in combating a number of diseases and for their excellence over the modern medicine.

The first volume of this book series has already been submitted to general perusal in 2010. It was a big success. We hope that the volume II of the series will also become a boom for the researchers of this area. In this volume experts may rationally endeavor to impart more updated and fruitful information on the topics, hence accomplishment of this book is expected.

_V.K. Gupta_
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1 Hepatoprotective and Antioxidant Effects of Rosmarinus officinalis in Nimesulide-induced Liver Damage in Rat

Patricia Yahuaca-Mendoza¹*, Rosalinda Gutiérrez-Hernández¹ and José L. Alvarado-Acosta¹

ABSTRACT

The non-steroidal anti-inflammatory drugs (NSAID), extensively used in the therapeutic of pain and inflammatory diseases, have caused liver damage in some patients. One of these NSAID is Nimesulide, a more selective inhibitor for COX-2 than COX-1, whose administration has been associated to some cases of acute hepatitis in humans. There is no reported data for characterizing of toxicity by nimesulide, and this knowledge is necessary to establish security basis in the use of analgesic and anti-inflammatory therapy. In this work, we considered convenient to study the extent of damage by Nimesulide and also try a hepatoprotective therapy with Rosemary (Rosmarinus officinalis, L.), which has shown beneficial antioxidant effect in experimental liver damage. It was raised an acute model, in adult Wistar male rats (weighing 200 g) separated into 5 groups of administration (during 5, 10 and 15 days): (1) vehicle, (2) Nimesulide, (3) Nimesulide plus R. officinalis and (4) R. officinalis alone (10 mg/kg weight); group 5 received carbon tetrachloride (CCl₄) to compare against our model. After treatments, liver damage was evaluated measuring markers oxidatives, metabolic, enzymatic and histological. Results showed abnormalities confirming liver damage; Nimesulide increased the degree of lipoperoxidation (> 4 times against control), gradually over the time, in the same

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