

USEFUL HERBS OF
PLANET EARTH

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Preface

The primitive man was totally dependent on herbs for his very existence. With the advancement of civilization, new and varied items were added to his life which contributed significantly to his progress and welfare. Today though the modern man uses a number of products of animal and mineral origin, he is almost entirely dependent on plants for items like food stuffs, timbers, fibers, oil, etc. in which the fundamental investing of solar energy has taken place and thus are produced cheap and in large quantities. There are many complex natural mixtures like those present in spices, beverage, perfumes, etc. for which the synthetic substitutes are not at all satisfying. Along with them there are complex items such as rubber, reserpine, quinine, rotenones, caffeine and dyes which are readily available from plants and are difficult and/or uneconomical to be synthesised. With the steady depletion of fossil hydrocarbon fuels, there is a resurgence of interest in plants as the renewable sources of energy. New subjects based on herbals such as *Nutraceuticals*, *Herbal Cosmetics*, *Antioxidant therapy*, *Aromatherapy*, *Biopesticides* and *Biofertilisers* are hot topics of discussion in social as well as academic circles.

Every economic product owes its property to some compounds present in it, which provide the infrastructure responsible for its form and functional behaviour. The cereals are valued for their carbohydrates, pulses for proteins and oils, vegetables for the mineral and vitamin contents, woods for the cellulose and lignin content and essential oils for their monoterpenes. A knowledge of these constituents and their isolation methods helps us to utilise them in a much profitable way and open up new vistas of many useful compounds which can be derived from them. Wood, the foremost structural and fuel material in the past, now yields more than fifty industrial products such as rayon, paper, plastics, wood, alcohol and a number of silvichemicals. This is a result of the increasing knowledge of wood chemistry. Cellulose, the principal fibre material, yields plastics, sugars and explosives now. The knowledge of their chemistry helped to convert toxins like curare and cardiac glycosides to muscle relaxants and cardiotonics respectively. Narcotics like opium and cocaine are well known in medicines today. The

purified monoterpenes are used to produce high grade perfumes and cosmetics. Many naturally occurring compounds are moulded in different ways to synthesise a number of compounds used similarly or for entirely different purposes. Citral, the principal component of citronella oil, is used as the raw material for the synthesis of ionones, which form an excellent substitute for the highly expensive oil of violets and are used for the synthesis of vitamin A. Synthetic vanillin is prepared from eugenol and camphor from α -pinene. THF (tetrahydrofuran), an industrial solvent, is prepared from xylose obtained by the hydrolysis of xylans, a group of matrix polysaccharides. Thus if the chemistry of plant products is phytochemistry, than a major chunk of this subject, the chemistry of useful plant products is an integral part of economic botany.

A knowledge of plant chemistry is most useful in the development of new drugs. The skeletons available with the common active principles provide templates for the synthesis of analogues and/or derivatives which may have equivalent or better activity than the parent molecule. For example, cocaine yielded information that led to the production of a number of related anesthetics such as prococaine and a number of anticholinergic drugs derived from tropane nucleus. Azidomorphine and 14-OH azidomorphine are at least 300 times stronger analgesics than morphine with no addiction at all. In certain cases the action of some components were prevented/masked by other principles in the crude drug. Leurocristine, an active neoplastic alkaloid was obtained in high yield from the extracts of *Catharanthus roseus* while the total alkaloid fraction was devoid of any activity. Leurosine was another active antitumor alkaloid present in the same extract. In such cases a study of each compound in isolation is essential to obtain desirable results.

A number of Indian plants are included in this text. A great deal of reference work on the chemistry, pharmacognosy and economic botany has been done. All the current researches on these plants have been incorporated and the references cited at appropriate places. The data available in older literature such as various textbooks, Wealth of India volumes and other monographs have been freely borrowed. Most of the plants, important in the context of world economy have been given a thorough treatment.

This book is meant for teaching useful plants under the subject heading of "Economic Botany". The most important useful herbs of the planet earth are explained in terms of their active chemical compounds and relevant properties. All the conventional topics such as Food plants, spices, timber etc have been revamped with the latest research inputs on those plants and the new features of these products. The chapter on medicinal plants has been enlarged greatly to include almost all the recently discovered plants as well

as the new medicinal properties of the old plants. A number of chapters including the present day 'Hot Topics', which are of interest for the common man and thus make headlines in Magazines and Newspapers, such as *Nutraceuticals, Herbal Cosmetics, Antioxidant therapy, Natural Dyes, Perfumery, Aromatherapy, Biopesticides, Biofuel, Biofertilisers and Herbal Veterinary Medicine* are added which will increase the acceptance of plant-based courses. In addition, in the beginning of each chapter, relevant chemistry of natural products is added which will explain the said actions in a meaningful way.

This book is presented with man as the focal point and the role of herbs in his foods, taste, health beauty and comforts are discussed. There are five major sections and they are entitled as "Your Food", "Your Taste", "Your Health", "Your Beauty", and "Your Comforts". That is to say that the herbs and the herbs alone can fulfill the myriads of demands of man and make the life more exciting and fun.

It is sincerely hoped that the publication of this treatise will initiate discussions on revamping and restructuring the age-old courses on "Economic Botany". It is expected that, this book fills a long felt void by introducing an interdisciplinary area of Phytochemistry in a plant science curriculum. It is my sincere desire that the basic philosophy which guides the production of this book gains wider acceptance.

As a pioneer in the field, this book may have a few short comings. Suggestions and frank criticism from readers will be useful in improving the contents of the book.

M. DANIEL

13th November, 2012

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Section - 1.

YOUR FOOD

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- 1.2. Cereals
- 1.3. Pulses
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