

LEAFY VEGETABLES AND MUSHROOMS



B. L. JANA
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PREFACE

India lives in 6.27614 lakh villages with 72.90 percent of her population and 98 percent of her total geographical area as per 2001 Census Report. India is blessed with an enormous diversity of medicinal and aromatic plants vis-a-vis Leafy Vegetables and Mushrooms which are not only nutritional but also medicinal for harnessing good health for all. For challenging good health for all the present disciplines of medicinal science in India like Ayurvedic, Unani, Homoeopathy and Allopathy are enriched with the herbal resources of nearly 80 percent species and genetic diversity of plants in course of time. The health awareness and fear of the side effects of allopathic medicines are the main causes for diversion in herbal treatment and the demand of herbal plants are increasing day by day in the global perspective. India with her 45,000 plant species is considered as one of the regions of the 12 Mega Diversity Centres of the World. It possesses more than 3500 medicinal plant species and more than 200 drugs of mineral and animal origin. In China, about 4000 crude drugs are used for their health care system.

Leafy vegetables are the store-house of useful minerals and vitamins at the cheapest price, and are now-a-days considered as the corner stones of health care system due to presence of many helpful phytochemicals in scavenging the dreadful free radicals generated as by-products in alleviating many serious diseases. Fruits and Vegetables and particularly Leafy Vegetables and Mushrooms containing phyto factor potential are now referred to as functional food or health food being known as protective food. In the modern system of disease control, the Leafy Vegetables and Mushrooms containing strong antioxidants properties or phytochemicals neutralise the injurious effects of free radicals and thus help in specific body functions in sending the risk of incidence of many diseases like cardiovascular problems, various types of arthritis, cancer, AIDS and various other degenerative diseases.

The Phytochemicals present in the leafy vegetables are secondary metabolites and also as antioxidants in neutralising the toxic free radicals as scavengers. Antioxidants have been reported to interfere with cancer growth by blocking the enzyme that activates cancer genes or stop carcinogens from damaging tissues or help to produce enzymes that destroy carcinogens. Others suppress the spread of cancer by interfering with the reproduction of cells those have exposed to carcinogens. It has been found that antioxidants delay initial immune disorders by extending the period between HIV infection and appearance of clinical symptoms of AIDS (Acquired Immuno Deficiency Syndrome).

Mushroom farming has been practised quite long on commercial scale in the developed countries like U. S. A., France, Holland and China. The story of

mushroom cultivation in India is hardly about fifty years old. In India mushroom growing centres are mainly in the North and some in the South and Punjab, Haryana, Himachal Pradesh, Uttar Pradesh and Tamil Nadu which are the important mushroom growing States. In recent years, however, the Eastern States are also taking interest in its cultivation. In fact mushroom technology got a boost up when a project on Mushroom Cultivation was started in Himachal Pradesh followed by the establishment of the National Centre for Mushroom Research and Training during the VI plan and research and training functions in some Agricultural Universities also. At present India is producing only about 25,000 tonnes of mushrooms against the estimated potential of 2.0 lakh tonnes. Nevertheless, more than 30 Indian firms have completed agreements for foreign collaboration in recent years and thus completed agreements for foreign collaboration in recent years and thus poised to enter the multimillion dollar international mushroom market.

Despite these developments in India, the state-of-the-art technology of mushroom has unfortunately remained confined to few centres or growers but not percolated down below to the rural mass due to lack of effective and pragmatic extension system. Whatever trainings on mushrooms are now being organised by the extension functionaries could not satisfy the requirements of interested growers from practical and viable angle. As such, mushroom culture still remains as the illusive enterprise for the entrepreneurs. So there is a great urgency for an effective training and service system for rural mass. Mushroom farming has got tremendous impact in the socio-economic upliftment of the resource-poor farming community as well as self-employment of the rural unemployed youths. When the whole world vis-a-vis our country is suffering from malnutrition and food shortage, we should pay heed to leafy vegetables and mushroom farming on its nutritional and potentials of edible species.

We have ventured to write this book of Leafy Vegetables and Mushrooms for the ultimate benefits of the growers, specially for the rural educated youth giving them an information and technical know how on culture, either on small cottage scale or big commercial venture. We have been prompted to write this book while making us involved in various rural projects assigned to us by the funding agencies. This book may be treated as a practical reference book for students studying in the Universities and Colleges.

We acknowledge our deep gratitude to the elite practical experts of Leafy Vegetables and Mushroom farming and the literature cited while compiling this manuscript. Also we are thankful to Mrs. Pushpa Jana and Mrs. Sova Das for their sustained interest and inspiration for writing the book.

B.L. Jana & P. K. Das

September 2006
Kolkata

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ABOUT THE AUTHORS

MR. BALAI LAL JANA (born on 2nd May, Friday, 1947) stood First in the Higher Secondary Examination under the Board of

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FAI training on Rainfed Agriculture in collaboration with ICRISAT, Hyderabad, etc. He served the erstwhile Fertiliser Corporation of India (FCI), subsequently the Hindustan Fertiliser Corporation (HFC) as a seniormost Senior Agronomist in Technical Publicity, FP & A&D and ODA-funded Rainfed Farming Project. Also served as the Training Organiser of ICAR-funded Krishi Vigyan Kendra, Kalyan, Purulia district of West Bengal and have been working as the Training Organiser, Seva Bharati Krishi Vigyan Kendra, Kapgari of Paschim Medinipore district of West Bengal. He has authored 16 Agricultural books published by the West Bengal State Book Board and Bharati Book Stall, Kolkata and 6 other books published by the Agrotech Publishing Academy, Udaipur. He has published 80 agricultural papers in the Journals of national and international repute. He is the Sub-Editor, "Sabuj Sona", an agricultural fortnightly and the Editor, "Bhawna", a house journal of the Eastern India Pesticides Association (EIPA), Kolkata. He has years of experience in the Rainfed Farming Project of HFCI in West Bengal, Orissa and Bihar supported by overseas Development Agency. He is giving consultancy services to the reputed Organisations like the Agricultural Finance Corporation, The CRS- India program, The

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DR. PRAFULLA KUMAR DAS (born on 15th May 1935) is an Agricultural graduate from Benaras Hindu University in 1958 and subsequently obtained M.Sc Horticulture (Jubilee Medal) from



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LEAF VEGETABLES

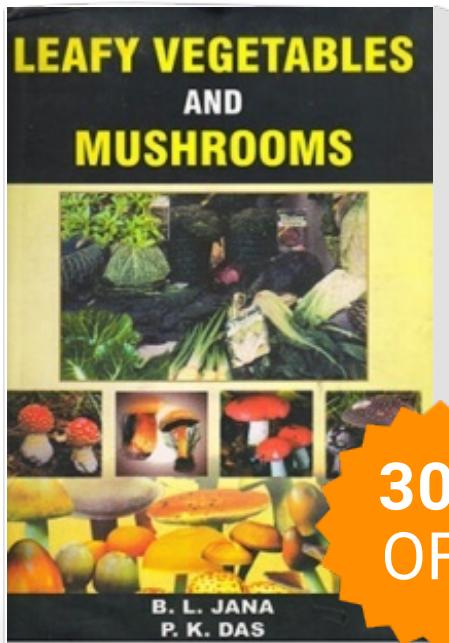
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ANTIOXIDANTS

By definition, *antioxidant* means *an organic compound added to rubber, natural fats and oils, food products, gasoline and lubricating oils to retard oxidation, deterioration, rancidity, and gum formation, respectively.*

Rubber antioxidants are commonly of an aromatic amine type, such as di-beta-naphthyl para - phenylenediamine and phenyl-beta-naphthylamine; a fraction of a per cent affords adequate protection. Many oxidants are substituted phenolic compounds (butylated hydroxy-anisole, di-tert butyl - para - cresol, and propyl gallate). Food antioxidants are effective in very low concentrations (not more than 0.01 per cent in animal fats) and not only retard rancidity but protect the nutritional value by minimizing the breakdown of vitamins and essential fatty acids. Sequestering agents, such as citric and phosphoric acids, are frequently employed in antioxidant mixtures to nullify the harmful effect of traces of metallic impurities. Maximum concentration of food antioxidants approved by FDA is 0.02 per cent.

Leafy vegetables and mushrooms



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