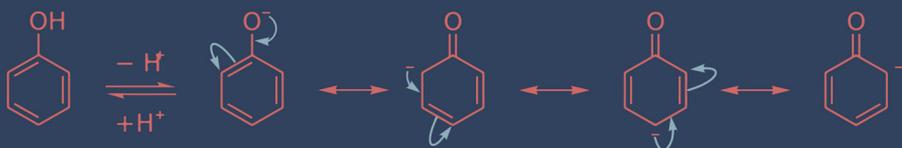


Phenolic: Antioxidants and Health Benefits



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Antioxidants and Health Benefits

Dr. U. D. CHAVAN



Dr. U. D. Chavan obtained his B. Sc. and M. Sc. (Agri. in Biochemistry) degrees from Mahatma Phule Krishi Vidyapeeth Rahuri in 1985 and 1987 respectively. He received his Ph.D. degree in Food Science from Memorial University of Newfoundland St. John's Canada in 1999. He has done International training on "Global Nutrition 2002" at Uppsala University Uppsala, Sweden in 2002. He also attended follow-up International workshop on "Global Nutrition 2002" at Hanoi, Vietnam in 2002. Dr. Chavan visited Denmark, Finland, Ireland, France, Switzerland, Poland, Spain, Vietnam, Thailand, England, and U.S.A. under "Global Nutrition 2002" Programme sponsored by Swedish International Development Agency (SIDA). During this programme he worked on human nutritional diet and disorders as well as on genetically modified organisms (GMO).

Dr. Chavan worked as Senior Research Assistant in the Department of Biochemistry and Food Science and Technology at Mahatma Phule Krishi Vidyapeeth Rahuri from 1988 to 2000. During his Ph. D., he worked as Technician/Research Associate at Atlantic Cool Climate Crop Research Center and Agriculture and Agri-Food Canada. He received D.Sc. degree in 2006 from USA. He has guided 25 students for M.Sc. (Agri.) in Biochemistry and Food Science and Technology. From 2000 to 2004 he worked as Assistant Professor of Biochemistry at Mahatma Phule Krishi Vidyapeeth Rahuri.

Dr. Chavan received Korgavkar Trust Fellowship, under-graduate and post-graduate merit scholarship as well as Senior Research Fellowship from ICAR, New Delhi and United States Department of Agriculture U. S. A. He received University Graduate Fellowship from Memorial University of Newfoundland St. John's Canada for his Ph. D. programme. Dr. Chavan also received international Scholar Award and Excellentiam Award for his Ph. D. research work from Memorial University of Newfoundland St. John's Canada. He has received a "Certificate of Appreciation" from the U.S. Department of Agriculture in 1992 for his work on processing of groundnut under the guidance of Dr. S. S. Kadam (Principle Investigator). He has written 135 research papers and 140 popular articles. He has authored 19 books in Marathi, 23 books in English and eight book chapters in English. Dr. Chavan has visited 23 countries in the world for research and teaching programmes. He has been awarded "**Literary Award**" for his best book on "**Growth Regular**" on agriculture during 1997 by Government of Maharashtra. Dr. Chavan was selected as a best group leader and best presentation for "Global Nutrition 2002" by SIDA. He has been awarded "Life Time Achievement Award 2004" for his outstanding contribution in post-harvest technology of fruits and vegetables and allied fields by United Writers' Association of India. He has been elected as a Fellow of United Writers' Association of India in 2004. Dr. Chavan received pride of nation and Maharashtra Gunigan Ratna Award for 2006. He also received Jewels of India Award for 2006 for his contribution in the field of Food Science and Technology. He has been awarded "**Literary Awards**" for his best book on "**Sorghum Grain Processing**" on agriculture during **2009-2010** and "**Pulses cultivation to processing and value addition**" for **2012** by Government of Maharashtra. He is recipient of "Krishi Goorav Award-2011" from Bhartiya Krishak Samaj, Maharashtra State, Nasik. He also contributed in the development of crop varieties in wheat NIAW-917 and in Sorghum Phule Anuradha (RSV-423), Phule Chitra (RSV-1546), Phule Suchitra (RSV-1098), Phule Vasudha (RSV 423), Phule Revati (RSV-1006), SPV-1626, Phule Panchami (RSPOV-3) for Sorghum pops, Phule Godhan (SPV-2057) for forage single cut, CSH-50 (Sweet Sorghum), Phule Madhur (RSSGV-46) for sorghum *hurda* and Phule Rohini (RPASV-3) for sorghum *papad*. Now he is working as a Professor in the Department of Food Science and Technology, as well as a Senior Cereal Food Technologist in Sorghum Improvement Project and Foreign Student Advisor at Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist, Ahmednagar, Maharashtra, India.

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FOREWORD

The relationship between diet, moderate physical activity and health is of much current interest. Although initial evidence for this relationship was mainly epidemiological in nature, recent advances and developments in the area of nutraceuticals and functional foods have led to substantiation of claims by preclinical and clinical studies. Furthermore, availability of sophisticated analytical tools has led to the identification and appreciation of non-nutrient bioactives in the diet. Another motivating factor has been mounting health care costs that have emphasized a need for a preventive rather than a treatment approach by consumers, health professionals, researchers and perhaps some government departments in certain countries. The emerging findings in nutrigenomics and proteomics and the advent of nanotechnology for better delivery of bioactives have opened the way for individualized dietary regimes in the hopefully not too distant future. Over the past decade or two there has been a surge in the publication of research findings and developments in the field, although often in a non-targeted and fragmentary manner. Therefore, to fill the existing gap, the launch of a dedicated book for **“Phenolic: Antioxidants and Health Benefits”** was deemed necessary. This idea was first come in the mind of author and Mr. Tanay Sharma, Scientific Publishers (India), Jodhpur committed to publish this type of book. In this book mechanism of action of phenolic antioxidants, measurement of activity, classifications of antioxidants, natural sources and their health benefits as well as natural health products information are given. I think author has chosen the wright subject of the book and I hope this book will serve the purpose of students, teachers, readers, consumers and professional industrial processors.

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PREFACE

Latest advances are fast transforming raw materials into the processed products from a means of subsistence to an organized industry. This has stimulated a great deal of interest among widely diversified group of scientists. In this era of high yielding crop varieties and multiple cropping techniques, global competition in the quality of food products has put every country on the alert to improve upon nutritional quality, postharvest techniques and value addition sector.

Cereals, legumes, fruits and vegetables, oilseeds and plant oils, beverages, tree nuts, herbs and spices are important constituents of our diet which provide dietary fibers, vitamins, phytochemicals, and minerals in addition to proteins, carbohydrates and a small amount of lipids. These contribute more than 50% requirement of vitamin A. The dietary fibers aid in digestion, bowel movement and utilization of more concentrated foods in human diet.

Processing of agricultural produce and their postharvest management with additional phytochemical nutritional values are an emerging area in the present scenario encompassing a widely diversified group of scientists. India has now attained the stage where apart from enhanced production of crops, emphasis is being laid on processing and nutritional value addition of cereals, legumes, tree nuts, oilseeds, fruits and vegetables and herbs and spice crops.

Phenolic and polyphenolics compounds, ubiquitous in plants, are an essential part of the human diet and are of considerable interest due to their antioxidant properties and potential beneficial health effects. These compounds range structurally from a simple phenolic molecule to complex high-molecular-weight polymers. There is increasing evidence that consumption of a variety of phenolic compounds present in foods may lower the risk of health disorders because of their antioxidant activity. When added to foods, antioxidants control rancidity development, retard the formation of toxic oxidation products, maintain nutritional quality and extend the shelf-life of products.

The ever-increasing scientific research on the subject (Antioxidants and health benefits) has resulted in a large body of knowledge which can be found scattered in various scientific journals and technical reports and is not easily accessible. The available material needs to be assembled and briefed in order that the students/technologists/agriculturists/horticulturists/

engineers and others actively engaged in quantitative studies can have it as a ready reference. Antioxidants and health benefits book provides a comprehensive but concise treatise on the subject matter information.

U. D. Chavan

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U.D. Chavan

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