

SEED TESTING AND QUALITY CONTROL



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PREFACE

Seed is not only basic to agriculture but also first link to food chain and the foundation for successful and prosperous of agriculture. It is the most important determinant agricultural production potential, on which the efficacy of other agriculture inputs is dependent. Seeds of appropriate characteristics are required to meet the demand of diverse agro-climatic conditions and intensive cropping systems. Sustained increase in agriculture production and productivity is dependent, to a large extent, on development of new and improved varieties of crops and an efficient system for timely supply of quality seeds to farmers at a reasonable price.

The seed sector has made an impressive progress over the last five decades by contributing in increasing food production right from the beginning of green revolution as a result our country has achieved almost fivefold increase in food production from 50 million tonnes to 250 million tonnes (2011-12). The area under certified seeds has increased from less than 500 hectares in 1962-63 to over six lakh hectares and the quantum of quality seed consumption has crossed 15 lakh tonnes during 2011-12. The demand for quality seed by 2075 would be around 25 lakh tonnes in order to produce 350 million tonnes of food production. The production of high quality seeds of various crops has become essential and continuous process for increasing agriculture production as well as enhancing economic status of the farmers. The importance of seed quality in terms of genetic quality, physical quality, high germination/vigour and sound health is increasing day by day. Significant developments have been made globally with respect to seed quality enhancement and assessment of various seed quality parameters. Therefore, thorough exchange of knowledge on molecular methodology for testing GMO seeds and

recent advancement in seed regulations assumes paramount importance.

Keeping all these in view and realizing the need to update the knowledge on various aspects of seed, the Department of Seed Science and Technology, College of Agriculture, University of Agricultural Sciences, Raichur, Karnataka has organized winter school on “Quality Seed production, Processing and Marketing” during 2011 with the financial assistance from ICAR, New Delhi. The compendium of lecture notes brought out in the form of a book entitled “**SEED TESTING AND QUALITY CONTROL**”. This book contains well researched and thoroughly synthesized information on all aspects related to seed viz., seed quality enhancement techniques, Seed testing protocol, Seed quarantine, Seed Policy issues, Seed Legislation, Seed Certification, IPR issues, Detection and regulation on GMOs. We hope that the publication will be very useful reference material for students, teachers, scientists, researchers, policy makers and farmers.

We are grateful to Dr. B.V.PATIL, Vice-Chancellor, UAS, Raichur, Karnataka for his congruent support and encouragement in bringing out this book and we also thank the Vice-Chancellor for writing the Foreword.

We wish to acknowledge and express our sincere thanks and gratitude to Dr. L.B. HUGAR, Dean (Agri.), College of Agriculture, UAS, Raichur and Dr. M. SHEKHARAGOUDA, former Dean (Agri.) and renowned seed scientist of UAS, Dharwad as they are the guiding force in organizing winter school and also for their magnanimous support in bringing out this book.

We wish to thank M/s Agrotech Publishing Academy, Udaipur for their sincere efforts in designing, printing and publishing of this book.

Editors

S.N. Vasudevan

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FOREWORD

Good quality seed is the basic and essential input for sustainable agriculture and other inputs are contingent upon quality of seed for being optionally effective. With changing scenario in terms of technological advancements and global seed trade, we are poised for a major revolution to achieve and sustain food security by ensuring the seeds of best genotypes to the farmers at an affordable price. Today's seeds are ushering unprecedented changes in the scenario of the country. Presently India is witnessing a vibrant Seed Industry with potential of sizeable impact internationally. At this juncture focus on important issues like quality seed production, maintenance, testing of GM crops, role of hybrids and recognition of advances in physiological, biochemical and molecular research is relevant.

Further, in the post WTO regime Indian Seed Industry has greater challenges in the millennium in view of multinational seed company's involvement and aiming of increasing seed export from one per cent to ten per cent by 2020. Therefore, seed production, seed quality control and marketing aspects need to be strengthened in order to compete with the MNC's. In this context, the Seed Technologists have greater responsibilities in guiding the seed growers/producing organizations to make seed production programme most successful, profitable, economically feasible and viable.

With these issues and realizing the need, the Department of Seed Science and Technology, University of Agricultural Sciences, Raichur has brought out this publication based on articles of eminent personalities and scientists who delivered a guest lecture during the ICAR sponsored Winter School on "Quality Seed Production, Processing and Marketing" (02-22 November, 2011). The compilation "**SEED TESTING AND QUALITY CONTROL**" contains well researched and synthesized information on various aspects of seed. I compliment the efforts of editors **Dr. S.N. Vasudevan, Dr. S.R. Doddagoudar, Mr. Rakesh C Mathad and S.B. Patil** faculty of the Department of Seed Science and Technology, in bringing out this publication as it is highly relevant, timely, note worthy and am confident that it will be an important source of reference on various Seed Technological and related aspects to the scientists, researchers, students and policy makers.

(B.V. PATIL)
Vice-Chancellor
UAS, Raichur, Karnataka

ABOUT THE BOOK

Seed is not only basic to agriculture but also first link to food chain and the foundation for successful and prosperous of agriculture. It is the most important determinant agricultural production potential, on which the efficacy of other agriculture inputs is dependent. Seeds of appropriate characteristics are required to meet the demand of diverse agro-climatic conditions and intensive cropping systems. Sustained increase in agriculture production and productivity is dependent, to a large extent, on development of new and improved varieties of crops and an efficient system for timely supply of quality seeds to farmers at a reasonable price.

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This book contains well researched and thoroughly synthesized information on all aspects related to seed viz., seed quality enhancement techniques, Seed testing protocol, Seed quarantine, Seed Policy issues, Seed Legislation, Seed Certification, IPR issues, Detection and regulation on GMOs. We hope that the publication will be very useful reference material for students, teachers, scientists, researchers, policy makers and farmers.

ABOUT THE EDITORS

Dr. S.N. Vasudevan, obtained M.Sc. (Agri.) and Ph. D. in Seed Science and Technology from the University of Agricultural Sciences, Bangalore, Karnataka and has also served in various capacities over 14 years in the Karnataka State Seed Certification Agency, Bangalore. Presently he is Professor and University Head of Seed Science and Technology Department at University of Agricultural Sciences (UAS), Raichur, Karnataka. Dr. Vasudevan has multi-faceted experience in teaching/research/extension of over 26 years and made significant

contributions in the development of seed certification procedures, seed testing protocols and has been instrumental in starting of post graduate degree programme in Seed Science and Technology, establishment of an Elite seed testing laboratory and vegetable seed processing unit at UAS, Raichur. He has developed seed production, processing, storage and seed treatment techniques in field and vegetable crops and guided 18 M.Sc. and two Ph. D. students. He is author/editor of three books, 15 bulletins/manuals, 25 chapters, 55 research/symposia papers in National and International Journals. He is life member of several scientific societies and a Fellow of Indian Society of Seed Technology.

Dr. Shivanagouda R Doddagoudar working as Assistant professor in the Department of Seed Science & Technology, College of Agriculture, University of Agricultural Sciences, Raichur, Karnataka obtained his B.Sc. (Agri) from UAS, Bangalore and M.Sc.(Agri) and Ph.D with specialization in Seed Science & Technology from University of Agricultural Sciences, Dharwad. He is having several years of experience in the area of seed production, processing, seed conditioning, seed testing and seed research when he was earlier associated with Maharashtra Hybrid Seeds Company which is having ISTA accredited laboratory. He has also worked in the ISTA laboratory and actively involved in ISTA accreditation of the laboratory. He has published more than 15 research articles and 25 abstracts related to Seed Research in many national and international Journals. His area of interest includes Seed production, testing, processing, and conditioning.

Mr. Rakesh C. Mathad working as Assistant professor in the Department of Seed Science & Technology, College of Agriculture, UAS, Raichur, Karnataka obtained his B.Sc.(Agri) and M.Sc.(Agri) with specialization in Seed Science & Technology from UAS, Dharwad. He has several years of experience in seed industry. He was previously associated with Seminis (a Monsanto company) which is one of the largest vegetable seed companies in the world and gained experience in the area of production, processing, quality control and enhancement. He has published more than 20 research articles and 25 abstracts in many national and international Journals of repute. His area of interest includes seed production, seed conditioning, seed biology, seed proteomics and nanotechnology.

S B Patil is Seed technologist presently working as Assistant Professor at College of Agriculture, B-Gudi, Karnataka. He has published more than 15 research articles. He is also in-charge of seed village programme for seed production of notified varieties of N-E Karnataka.

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