

# Handbook on Rice Cultivation and Processing

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Rice is the staple food of over half the world population. Rice is normally grown as an annual plant, although in tropical areas it can survive as a perennial crop and can produce a ratoon crop for up to 30 years. The rice plant can grow to 1 to 1.8 m tall, occasionally more depending on the variety and soil fertility. Since its origin, the spread of rice cultivation is extensive and rice is now being grown wherever water supply is adequate and ambient temperature are suitable. The rice grain is covered with a woody husk or hull, which is indigestible and is to be removed in the first step during processing for making the rice edible. Rice cultivation is well suited to countries and regions with low labor costs and high rainfall, as it is labor intensive to cultivate and requires ample water. Rice can be grown practically anywhere, even on a steep hill or mountain. The traditional method for cultivating rice is flooding the fields while, or after, setting the young seedlings. This simple method requires sound planning and servicing of the water damming and channeling, but reduces the growth of less robust weed and pest plants that have no submerged growth state, and deters vermin. While flooding is not mandatory for the cultivation of rice, all other methods of irrigation require higher effort in weed and pest control during growth periods and a different approach for fertilizing the soil. Drying is an essential step in the processing and preservation of paddy; it is the process that reduces grain moisture content to a safe level for storage. Milling is a crucial step in post production of rice. The basic objective of a rice milling system is to remove the husk and the bran layers, and produce an edible, white rice kernel that is sufficiently milled and free of impurities. India is the second largest rice producing country of the world after China. India also grows some of the finest quality aromatic rice of which basmati is the most high quality rice.

This book basically deals with history, origin and antiquity of rice, seed rice and seed production, harvest and post harvest operations, water management practices for rice, diseases and pests of rice and their control, application of biotechnology in aromatic rice improvement, traditional methods of parboiling, modernization of parboiling process, solvent extractive rice milling, general types of quick cooking rice processes, dry milled rice products in brewing, breakfast cereals, rice flakes, puffed rice, rice in multi grain cereals etc.

The present book contains cultivation and processing of rice in various ways. The book is very resourceful for the entrepreneurs, technocrats, research scholars etc.

## CHAPTER 1

### HISTORY, ORIGIN AND ANTIQUITY OF RICE

#### Antiquity

#### Species Ancestral To Rice

Genetic Process Involved In Domestication

Diversification and Spread

## CHAPTER 2

### BREEDING

Period of Inter-Racial Hybridization Between Japonicas and Indicas

Period of Inter-Racial Hybridization Between Semi-Dwarf Taiwanese Types/Derivatives and Indicas

Breeding Upland Rices With Tolerance To Drought

Breeding for Water-Logged and Lowland Conditions

Deep Water Conditions

Flood Resistance

Breeding for Insect Resistance

Breeding for Resistance

Biotype Variation

Breeding for Resistance

Breeding for Disease Resistance

Variability In *Pyricularia Oryzae*

Resistance Breeding

Rice Tungro Virus-Disease (Insect Vector: *Nephotettix Virescens*)

Resistance Breeding

Breeding for Multiple Resistance

Breeding for Saline Conditions

Screening Techniques

Breeding for High Altitude Areas

Quality Breeding

Breeding for Higher Protein Content In Rice

Breeding High-Yielding, Scented Rice Varieties

Other Methods

Summing Up

## CHAPTER 3

### SOILS-THEIR CLASSIFICATION AND AGRO-CHEMICAL CHARACTERISTICS

Classification and Distribution

The Soils on Which Rice Is Grown In India and Their Classification

Distribution of Various Kinds of Soils In India

The Physical, Chemical and Agronomic Characteristics of Rice Soils

The Special Requirements of The Rice Crop

Chemical Characteristics To Be Looked for In Rice Soils

Physical Properties of Rice Soils

Agronomic Characteristics of Rice Soils

Measures Needed for Realizing The Rice-Production Potential of The Major Soil Groups of The Various States

## CHAPTER 4

### SEED RICE AND SEED PRODUCTION

Sources of Pure Seed

Classes of Seed

Seed Rice Culture

The Control of Red Rice

The Time and Method of Harvesting Seed Rice

Processing and Storing Seed Rice

Drying, Cleaning and Grading

Storing Seed Rice

## CHAPTER 5

### RICE CULTURE

Crop Rotations

Cropped Land Structure

The Krasnodar Territory

The Don River and Cis-Caspian Lowland

The USSR Far East

The Ukraine, Uzbekistan, and Southern Kazakhstan

Intensified Cropping Systems

Fallowing

Catch-Crops

Land Preparation

Basic Soil Treatment

Tilling Grassland for Rice

Tilling Land for Fallow-Sown Crops

Preparing Seedbed for Rice

Current Land-Smoothing or Planing

Preparing Seedbed for Early and Deep Planting of Rice

Wet or Underwater Levelling

Minimum Tillage for Rice

Fertilization

Mineral Nutrients and Sources

Soil Liming

Fertilization Practices

Seed and Seeding

Classification of Seed

Pre-Plant Treatment of Seed

Rate of Seeding

Method of Seeding

Water Management

Systems of Water Management

Managing Water for Nonchemical Weed Control

Managing Water for Chemical Weed Control

Soil Herbicides

Managing Water for Saline Soils

Managing Water for Insect and Pest Control

Managing Water for Early and Deep-Seeded Rice

Crop Tending

## CHAPTER 6

### HARVEST AND POST-HARVEST OPERATIONS

Draining for The Harvest

Pre-Harvest Chemical Drying

Pre-Harvest Operations

Harvesting Rice

Grain Moisture Content

Post-Harvest Operations

## CHAPTER 7

### WEEDS AND THEIR CONTROL

Weed Control Practices

Nonchemical Weed Control

Chemical Weed Control

## CHAPTER 8

# PEST PROFILE AND INTEGRATED PEST MANAGEMENT IN AROMATIC RICES

Introduction

Diseases

Stem Rot

Narrow Brown Leaf Spot

Insect Pests

Integrated Pest Management

Future Outlook

## CHAPTER 9

### WATER MANAGEMENT PRACTICES FOR RICE

The Effect of Land Submergence on The Growth and Yield of Rice

The Depth of Submergence

Effect of Partial Submergence

Water Requirement of The Rice Crop

Drainage Requirement of The Rice Crop

Water-Management Practices for Salt-Affected Areas

Effective Rainfall

## CHAPTER 10

### DISEASES AND PESTS OF RICE AND THEIR CONTROL

Rice Diseases

Pests of Rice

Environmental Considerations In Rice Production

## CHAPTER 11

### HYBRID BREEDING IN AROMATIC RICE

Introduction

Heterosis Breeding In Basmati Rice

Development of Basmati-Type Cms Lines

Restorer Breeding

Breeding Approaches

Quality Characteristics of Basmati Restorer Lines

Stability Analysis of Basmati Hybrids

Effects of Cytoplasm on Yield and Quality Traits

Basmati Hybrids Under Evaluation

Tagging of Fertility Restorer Gene (S) In Basmati Rice

Problems and Future Prospects

## CHAPTER 12

### BIOTECHNOLOGY AND MOLECULAR BREEDING OF AROMATIC RICE

Introduction

Functional Genomics

Cloning Disease Resistant Genes

Molecular Analysis of Rice Genes

Production of Transgenic Rice Plants

Gene Silencing

Application of Biotechnology In Aromatic Rice Improvement

In India

Diagnostics and Dna Fingerprinting

Marker Tagging of Individual Genes and Qtls

Future Prospects and Conclusion

## CHAPTER 13

### DRYING OF PADDY

Theory of Grain Drying

Methods of Drying

Methods of Mechanical Drying  
Drying of Parboiled Paddy  
Method of Drying  
Tempering After Drying  
Types of Dryers  
Operation Data of Drying Plants  
Problems

#### CHAPTER 14

#### MILLING OF PADDY

Traditional Methods  
Modern Methods  
Mini Rice Mill  
Problems of Modern Rice Mills  
Economics of Modern Milling

#### CHAPTER 15

#### PARBOILING PROCESSES

Traditional Methods of Parboiling  
Modernisation of Parboiling Process  
Modern Processes  
Process Description of The Different Parboiling Plants

#### CHAPTER 16

#### BASMATI RICE

Introduction  
What Does Basmati Mean?  
Ancient Records of Rice In India  
Basmati Rice In The 19th Century  
Basmati In The 20th Century  
Breeders should Work on The Sastika (Sathi) Cultivar  
The Name Basmati-Specific or Generic?  
Conclusion

#### CHAPTER 17

#### ROUGH RICE STORAGE

Deterioration of Stored Rice By Fungi  
Factors Influencing Deterioration  
Storage Technology  
Pest Control

#### CHAPTER 18

#### SOLVENT EXTRACTIVE RICE MILLING

Introduction  
The X-M Concept  
The Development of X-M  
Process Description  
X-M Products  
Rice Milling Yields  
Economics  
Technology Expansion Prospects

#### CHAPTER 19

#### QUICK-COOKING RICE

Introduction  
General Types of Quick Cooking Rice Processes  
The "Soak Boil Steam Dry" Methods  
The Expanded Dry Pregelatinized Rice Methods  
The Rolling or "Bumping" Treatment

Dry Heat Treatments  
The Freeze Thaw Process  
Gun Puffing  
Freeze Drying  
Chemical Treatments  
Combinations of Methods  
Miscellaneous Processes  
Conclusion  
CHAPTER 20  
RICE IN BREWING  
Manufacture of Beer  
Adjuncts In Brewing  
Dry Milled Rice Products In Brewing  
Malted Rice In Brewing  
Specifications for Brewer's Rice  
Effects on Beer Manufacture and Quality of Using Rice  
As Adjunct  
Problems In Using Rice As Adjunct  
Differentiation Between All Malt and Malt Adjunct Beers  
Summary  
CHAPTER 21  
RICE BREAKFAST CEREALS AND INFANT FOODS  
Breakfast Cereals  
Rice Flakes  
Puffed Rice  
Oven Puffed Rice Cereal  
Shredded Rice Cereal  
Rice In Multi Grain Cereals  
Product and Ingredient Characteristics  
Enrichment  
Packaging  
Areas for Further Research  
Rice In Infant Foods  
Precooked Infant Rice Cereal  
Nutritive Value of Rice Cereal  
Formulated Baby Foods  
Inspection of Raw Material and Finished Goods  
Acknowledgments

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