The Complete Technology Book on Dairy & Poultry Industries With Farming and Processing (2nd Revised Edition)

Author:- NIIR Board Format: paperback Code: NI62 Pages: 720 Price: Rs.1275US\$ 125 Publisher: NIIR PROJECT CONSULTANCY SERVICES Usually ships within 5 days

Dietary habits of people have changed over the last few decades. Growing consciousness for protein rich food has given an impetus to both the dairy industry and poultry farming. Today, the dairy industry is a large organized sector with both private and government participation whereas poultry farming has indicated a rapid growth of 20% in the past few decades as well. Poultry is one of the fastest growing segments of the agricultural sector in India today. The production of agricultural crops has been rising at a rate of 1.5 to 2 % per annum that of eggs and broilers has been rising at a rate of 8 to 10 % per annum. From a backyard hobby it has culminated into an industry. The venture has largely been entrepreneurial and poultry farmers prefer to target their efforts to breeding & broiler farming for sale of ready broilers or layer farming for eggs. Poultry is the second most widely eaten meat in the world, accounting for about 30% of meat production worldwide. Dairy plants process the raw milk they receive from farmers so as to extend its marketable life. India has only a few specialized dairy farms. It is the production that characterizes the dairy industry. India is the worlds highest milk producer and all set to become the worlds largest food factory. Dairying is an important source of subsidiary income to small/marginal farmers and agricultural labourers. The manure from animals provides a good source of organic matter for improving soil fertility and crop yields. Since agriculture is mostly seasonal, there is a possibility of finding employment throughout the year for many persons through dairy farming. Thus, dairy also provides employment throughout the year. The main beneficiaries of dairy programmes are small/marginal farmers and landless labourers. Developments in the dairy and poultry industries during the last decade have been important enough to bring out a considerable amount of materials on dairy and poultry farming; processing of milk and poultry related products.

The major contents of the book are dairy farming, poultry production, breeding, fertility, forage grass and concentrates, cow behaviour and health, manufacture of butter and cheese, process measurements and controls, components of poultry diets etc. This book also describes about the feed manufacturing process, butter and cheese manufacturing processes with diagrams, housing system and management of broilers and more.

The first book of its kind which covers complete details of dairy and poultry farming, processing how to feed cows, birds in dairy and poultry, kind of diseases and their cure and other information related farming. This book will be an invaluable resource to dairy and poultry technology, institutions and for those who want to venture in this field.

1. Dairy Farming Management of Dairy Stock Pre-natal and Post-natal Weaning Care of Weaned Calf Feeding Schedule for Calves on Calf-starters Factors Affecting Maturity **Care During Parturition** Post-parturition Care Frequency of Calving Secretion of Milk **Factors Influencing Secretion** Composition of Milk Water Fat Casein Albumin Globulin Non-protein Nitrogenous Substances Lactose Minerals **Enzymes and Vitamins** Milk Flavours Variation in the Composition of Milk **Properties of Milk** Specific Gravity Densitv **Refractive Index** Viscosity Surface Tension **Freezing Point** Heat Stability of Milk **Testing of Milk** Milk Sampling Milk-fat Adulteration of Milk Urea Ammonium Sulphate Glucose Freezing Point of Test Bacteriology of Milk Public Health Aspects of Milk and Milk Products **Detection of Bacterial Contamination** Use of Detergents for Cleaning of Utensils Cleaning In-place (CIP) Washing and Sterilization of Utensils Judging the Quality of Milk Clot-on-boilingTest. Alcohol Test. Methylene Blue Reduction Test Processing of Milk **Cooling Media** Storage of Chilled Milk

Clarification of Milk Homogenization Standardization of Milk Pasteurization Holder Method. High Temperature Short Time (HTST) Method. Operation of the Plant. **Cold Storage Uperization Process** Aseptic Filling Process Sterilized Milk Supply of Milk to Customers Dispensing in Cans. **Dispensing in Bottles Single Service Containers** Storage of Bottle Milk Transport of Pasteurized Milk **Milk Products** Cream **Cream Separators** Pasteurization of Cream Vacreation **Sterilized Cream** Curd (DAHI) Starter Cultures Butter Desi Butter **Creamery Butter** Ghee **Prestratification Method** Manufacture of Butter-oil **Condensed Milk** Milk Powder Infant Food Weaning Food Humanized Infant Food Khoya Ice-cream Softy Ice-cream Milk Shake Lassi Acidophilus Milk Chhana Cheese Processed Cheese Shrikhand Lactose Casein Milk Supply Schemes Indian Dairy Corporation **Operation Flood Project** Marketing of Milk and Milk Products Research in Dairying

Indigenous Milk Products Whey Protein Isolates Dairy Engineering Research 2. Breeding **Breeds of Cattle** Lyre-Horned Grey Cattle Kankrej Kanwariya Kherigarh Malvi Tharparkar White or Light Grey Cattle With Coffin-Shaped Skulls Bachaur Gaolao Hariana Krishna Valley Mewati Nagauri Ongole Rathi Animals with Heavy Built and Curly Horns Dangi Deoni Gir Nimari Red Sindhi Sahiwal Mysore Breeds with Prominent Foreheads and Long Horns Hallikar Amritmahal Khillari Kangayam Alambadi **Hilly Breeds** Ponwar Siri **New Breeds** Karan Swiss Karan Fries **Breeds of Buffaloes** Murrah Bhadawari Jaffarabadi Surti Mehsana Nagpuri Nili-Ravi Herd Book **Eeonomic Zones** Temperate Himalayan Region **Dry Northern Region** Wet Eastern Region

Southern Region **Coastal Region** Improvement Programme Performance Evaluation Arttifical Insemination and Embryo Transfer Technology Meat Potential Economics of Dairy Farming Animal Health Feeding of Cattle **Mineral Matter** Nutritive Requirements of Dairy Cattle for Maintenance Nutritive Requirements for Growing Animals **Requirements for Milk Production** Nutrient Requirements for Work Cattle 3. Breeding and Fertility Inheritance Systems of Breeding **Practical Application** Large-scale Breeding Evaluating a Bull for AI Choosing an AI Sire The Oestrus Cycle Heat Detection Postpartum Interval **Conception Rate Control of Oestrus Pedigree Cattle Embryo Transplants** Culling 4. Cow Behaviour and Health Grazing and Eating Ruminating and Lying Down Walking and Other Activities Social Rank Normal Health Duna **Other Indicators** Milk Yield **Preventive Medicine** Mastitis **Cell Counts Control Hygiene** Summer Mastitis Milk Fever **Grass Staggers** Acetonaemia Bloat Lameness Metabolic Profile Test 5. Feeding Dairy Cows **Food Constituents Organic Matter** Digestion

Digestibility **Products of Digestion Utilization of Digested Products** Food Energy **Dry-matter Intake** Indigestible Organic Matter Liveweight Changes New Protein System Feeding Allocation of Concentrates Minerals Vitamins **Relative Feed Costs** 6. Forage Crops and Concentrates Succulent Fodders **Turnips and Swedes** Mangolds, Fodder Beet and Sugar Beet Carrots, Parsnips and Potatoes Kale Cabbages and Rape Root Tops Cereals Forage Maize **Red Clover** Grass and Forage Crops **Comparative Yields** Straw Straw Processing **Concentrated Foods Energy Straights Protein Straights Concentrate Formulation** Fats and Oils Urea and Biuret **Blocks and Liquid Feeds Brewers' Grains** 7. Hay and Dried Grass Hay Making Barn Hay Drying Hay Quality and Feeding Hay 'Condition' Types of Hay Artificially Dried Grass **Dried-grass Feeding** Dried Grass and Silage 8. Silage Silage Fermentationq Wilting Chopping Additives Filling and Sealing Silage Quality Silage Feeding

Tower Silage **Big-Bale Silage** Silage Effluent 9. Slurry Composition of Slurry The Legal Position Moving Slurry Slurry Storage Short-term Storage Long-term Storage Earth-walled Compounds Foul Run-off Separators **Organic Irrigation** 10. Milking and Milking Machines **Udder Anatomy** Lactation Physiology Rate and Frequency of Milking **Milking Machines** The Cluster Assembly Conveying the Milk **Producing Clean Milk** Cooling and Storing Milk Maintenance and Testing The Machine and Milking Efficiency Milking Machines and Mastitis 11. Milking Parlours and Cowsheds Static Parlours **Rotary Parlours** Cowsheds Elements of the Work Routine Parlour Performance Selecting a Parlour Parlour and Dairy Buildings Cow Marshalling 12. Reception and Storage of Milk Milk Reception Milk Transport Tanks **Construction of Transport Tanks** Inner Construction Storage Tanks Silo Tank **Refrigerated Storage Tank Process Tanks** Aseptic Tank 13. Milk Composition Milk Constituents Effect of Breed Age of Cow Stage of Lactation and Season Type of Food Effect of Energy and Protein Milking Intervals

Disease **Quality Payment Schemes Taints and Flavours** Keeping Quality of Milk Milk in the Diet 14. Manufacture of Butter and Cheese **Butter Manufacture** Churning Methods of Butter Making Batch Method **Continuous Method Fritz-Eisenreich Process** Alfa Process **Contimab Process** Anhydrous Milk Fat **Cheese Manufacture** Cheese Vats **Cheese Press** Cooling Mechanised Cheesemaking **Curd Production** 'Double O' Vat Pasilac Cheesemaking Vat Swiss Cheese Vat **De-wheying and Texture Forming** Draining/Matting Conveyor **Finishing Coolers Curd Recovery Systems** Prepressing and Mould Filling Pressing Horizontal Creeping or Gang Press Vertical Press Vacuum Press **Continuous Block Former** Packaging Vacuum Packaging Machine **Gas-flushing Machine** Vacuum-Skin Packaging Machine Ultra Filtration Manufacture of Casein 15. Milk Pasteurization Pasteurization vs. Sterilization Reasons for pasteurization The Time and Temperature used for Pasteurization **Commercial Methods of Pasteurization** The Efficiency of Pasteurization Some other Effects of Pasteurization 16. Milk Sterilisation In-bottle Sterilization **Batch Sterilization** UHT Processing Indirect Heating Systems using Plate Heat Exchangers Direct Heating (Injection System Type)

Fouling of Heat Exchangers **Fouling Material** Ways to Reduce Fouling 17. Creaming and Cream Separation The Measurement of Creaming Ability The Importance of Creaming How Fast can Cream Rise on Milk? The Formation of Clusters Methods of Separation The effect of separation temperature 18. Lactose and the Carbohydrates The Importance of the Carbohydrates The Composition of the Carbohydrates Some Properties of the Sugars Lactose Other Carbohydrates in Milk 19. Lactose and Lactic Acid Lactic Acid Production The Manufacture of Lactose Uses of Lactose Some Physiological Properties of Lactose 20. Casein The Manufacture of Casein Some Properties of Commercial Casein **Coated Papers Casein Glues Casein Paints** Casein Plastics Casein Fibers Casein in Medicine and Nutrition Other uses for Casein 21. Ice-Cream The Importance of the Ice-cream Industry The Composition of Ice Cream The Ingredients of Ice Cream The Manufacture of Ice Cream **Overrun and Dipping Losses** Some Defects of Ice Cream 22. Butter The Location of the Butter Industry The Grading of Butter The Composition of Butter The Manufacture of Butter **Accelerated Aging Tests Butter Substitutes** 23. Homogenization Effects Produced by Homogenization Homogenizing Machinery The operation of Homogenizers The Effect of Homogenization upon Various Products Advantages and Disadvantages of Homogenization Composition and the Effects of Homogenization 24. The Minor Constituents of Milk

Fatlike Substances Some Physical and Chemical Properties of Lecithin The Importance of Lecithin The Sterols The Vitamins Beta Carotene and Vitamin A Thiamin, Vitamin B1 Ascorbic Acid, Vitamin C Vitamin D Riboflavin, Vitamin B2 or G Other Vitamins of Milk The Ash Constituents of Milk The Enzymes of Milk Phosphatase Amylase Peroxidase Lipase Oleinase Other Enzymes Some Nitrogenous Constituents of Milk Some Odds and Ends 25. Proteins The Importance of the Proteins The Composition of the Proteins Some Properties of the Proteins The Structure of the Proteins The Amino Acids 26. The Fats of Milk The Composition of Milk Fat Some Physical Properties of Milk Fat The Melting and Solidification Points of Milk Fat. Some Factors Affecting the Composition of Fat **Chemical Changes in Milk Fat** Factors Affecting the Hydrolysis of Fat The Oxidation of Fat 27. Process Measurements and Controls **Pressure Measurement Bourdon Tube** Helix Spirals Low Pressure (Vacuum Measurement): Units of vacuum **Temperature Measurement** Solid Rod Thermometer **Bimetallic Thermometer** Filled-System Thermometer Liquid-in-Glass Thermometer **Pressure Thermometer Thermal System Bulbs Mechaical Flowmeters Bellows-actuated Flowmeters** Measurement of Total Flow Measurment of Liquid Level Hydrostatic Pressure

Capacitance Level Gage Weight Measurment Controllers **Pneumatic Controllers** Controllers Process Control **Transmitters** Flow Transmitter **Density Transmitter Regulating Device** 28. Physical Properties of Dairy Products Density Over-run **Boiling and Freezing Point Refractive Index** Acidity and PH **Rheological Properties** Viscosity Non-Newtonian Fluids Food Texture **Surface Properties** Foaming **Thermal Properties of Foods Specific Heat** Latent Heat **Thermal Conductivity** Thermal Diffusivity **Electrial and Dielectric Properties** Electric Conductance **Dielectric Properties** Changes in Milk and its Constituents **Changes During Storage** Oxidation of Fat Oxidation of Protein Lipolysis Effect of Heat Treatment Fat Protein Enzymes Lactose Vitamins Minerals 29. Poultry Production **Common Poultry Breeds** American Class Asiatic Class Mediterranean Class **English Class Indigenous Breeds** Karaknath **Genetic Principles Quantitative Characters Dominant and Recessive Characters**

Chromosomes Inheritance of Quantitative Traits **Objective of a Breeding Programme Basis of Selection Selection Methods** Mating Systems Methods of Mating Important Economic Traits in Poultry Egg Production Egg Weight Egg Quality **Body Size** Conformation Growth Feed Efficiency Fertility and Hatchability **Commercial Poultry Breeding Principles and Practices Commercial Hybrid Chicken Breeding Systems** Performance Testing of Commercial Crosses Culling for Better Returns **Culling from Outward Appearance** Culling on the Basis or Moulting Culling on the Basis of Pigmentation Hatching of Eggs Incubation **Testing of Incubated Eggs** Hatchery Management Sexing of Chicks **Poultry Management Brooder Management Grower Management** Layer Management Male Management Housing for Poultry Feeding of Poultry Minerals Vitamins Feed Ingredients **Conventional Poultry Feeds** Non-conventional Poultry Feeds **Energy Sources Vegetable Protein Sources Animal Protein Sources Economising Feeds Cost** Processing, Preservation and Marketing Composition and Nutritive Value of Egg Maintenance of Shell Egg Quality Grading Preservation of Shell Eggs Preservation of Liquid Eggs Egg Marketing **Distribution Channel**

Marketing Agencies **Poultry Meat** Preservation of Poultry Meat Tenderization Poultry by Products **Poultry Disease** 30. Digestive System of Poultry The Digestive System Supplementary Digestive Organs The Digestive Process 31. Nutrient Requirements of Poultry Nutrition of Layer-type Chickens **Pre-lay Period** Nutrition of Broiler Type Chickens Salt for Poultry-Deficiency Symptoms Salt Levels in Poultry Diets Salt and Trace Minerals for Poultry Common Salt for Poultry **Trace Minerals for Poultry** Trace Mineral Mix for Layers and Broilers 32. Components of Poultry Diets Energy and Its Definition **Disposition of Dietary Energy** Carbohvdrates Proteins and Amino Acids Fats **Minerals** Vitamins Water 33. Basic Ingredients in Poultry Feed and Diet Formulation Evaluation of Feed Stuffs Formulating Feeds with Locally Produced Raw Materials Choosing the Right Raw Materials for Quality Feeds Feed Production Least-cost Formulations Preparation of a Formulation Without the Aid of a Computer 34. Feed Manufacturing **Economic Feasibility of Feed Plant** Is Pelleting Necessary 35. Composition of Broiler Feeds 36. Housing System and Management of Broilers Housing Needs of Broilers Temperature Heat Production Heat Loss Heat loss For Winter General Characteristics of A Broiler House Location & Salient Features of A Broiler Farms **Grower Equipments Broiler Management** Location of the Farm

Broiler Chicks Systems of Broiler Production **Management Procedure** Litter and litter management Temperature Space Requirement **Brooder Guards** Supply of Water to Chicks Supply of Feed to Chicks Light Management of Broilers Light System for Broilers Some Important Points Regarding Growth, Feed Consumption and Efficiency of Feed Conversion in Broilers 37. Composition of Layer Feeds Phase Feeding of Laying Hens 38. Composition of Breeder Feeds 39. Modern Hatchery for Commercial Chick Production Location and Size of Hatchery Administrative Block Hatchery Building Egg Receiving, Cleaning and Fumigation Room **Fumigation Chamber** Storage Room Incubator Room Hatching Room Sexing Room Vaccination, Packing and Dispatch Room Washing Room Store Generator Room Use of Solar Energy in Incubation and Hatching Incubation Do's and Don'ts 40. Modern Breeds of Broiler Chicken **Plymouth Rock** Jersey Black/White Giant Cornish Sussex Dorking Indian breeds Aseel Chittagong Kadaknath **Commercial Broilers** Franchise Hatcheries 41. Machinery & Equipments of Poultry Industries 42. Machinery & Equipments of Dairy Industries

About NIIR

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Fri, 09 May 2025 05:11:58 +0000