Modern Technology Of Oils, Fats & Its Derivatives
(2nd Revised Edition)

Author: NIIR Board
Format: Paperback
ISBN: 9788178330853
Code: NI68
Pages: 576
Price: Rs. 1,875.00  US$ 150.00
Publisher: Asia Pacific Business Press Inc.
Usually ships within 5 days

Until recently fats and oils have been in surplus, and considered a relatively low value byproduct. Only recently have energy uses of fats and oils begun to be economically viable. Food value of fats and oils is still far above the energy value of fats and oils. Industrial and technical value of fats and oils is still above the energy value of fats and oils. Animal feeds value of fats and oils tends to remain below the energy value of fats and oils.

With development of new technology oils and fats industry has undergone a number of changes and challenges that have prompted the development of new technologies, and processing techniques. Oils and fats constitute one of the major classes of food products. In fact oils and fats are almost omnipresent in food processing – whether naturally occurring in foods or added as ingredients for functional benefits and, despite the impression given by several sources to the contrary; they remain an essential part of the human diet. However, it is increasingly apparent that both the quantity and the quality of the fat consumed are vital to achieve a balanced diet. They are essential constituents of all forms of plant and animal life. Oils and fats occur naturally in many of our foods, such as dairy products, meats, poultry, and vegetable oil seeds. India is the biggest supplier of greater variety of vegetable oil and still the resources are abundant. The applications of oils are also seen in paints, varnishes and related products. Since the use of oils and fats in our daily life is very noticeable the market demands of these products are splendid.

Special efforts has been made to include all the valuable information about the oils, fats and its derivatives which integrates all aspects of food oils and fats from chemistry to food processing to nutrition. The book includes sources, utilization and classification of oil and fats followed by the next chapter that contain details in physical properties of fat and fatty acids. Exquisite reactions of fat and fatty acids are also included in the later chapter. It also focuses majorly in fractionation of fat and fatty acids, solidification, homogenization and emulsification, extraction of fats and oils from the various sources, detail application in paints, varnishes, and related products is also included. It also provides accessible, concentrated information on the composition, properties, and uses of the oils derived as the major product followed by modifications of these oils that are commercially available by means of refining, bleaching and deodorization unit with detailed manufacturing process, flow diagram and other related information of important oils, fats and their derivatives. Special content on machinery equipment photographs along with supplier details has also been included.

We hope that this book turns out to be considerate to all the entrepreneurs, technocrats, food technologists and others linked with this industry.
Contents

1. SOURCES, UTILIZATION, AND CLASSIFICATION OF OILS AND FATS
   Classification of Fats and Oils
   Milk Fat Group
   Lauric Acid Group
   Vegetable Butter Group
   Animal Fat Group
   Oleic-Linoleic Acid group
   Erucic Acid Group
   Conjugated Acid Group
   Marine Oil Group
   Hydroxy Acid Group
2. PHYSICAL PROPERTIES OF FATS AND FATTY ACIDS
   Oiliness and Viscosity
   Surface and Interfacial Tension
   Density in the Solid State
   Density and Volume of Plastic Fats Dilatometry
   Heat of Combustion
   Specific Heats, heats of Fusion or Crystallization
   Vaporpressure and Boiling Points. Heat of Vaporization
   Thermal Conductivity
   Miscibility with Organic Solvents
   Solubility in Organic Solvents
   Mutual Solubility of Fats and Fatty Acids with Water
   solubility of Gases In Fats
   Refractive Index
   Absorption Spectra
   Resistance
   Dielectric Constant
3. REACTIONS OF FATS AND FATTY ACIDS
   Hydrolysis
   Interesterification
   Saponification with Alkalies
   Formation of Metal Soaps
   Hydrogenation in the Carboxyl Group
   Formation of Nitrogen Derivatives
   Formation of Acid Chlorides
   Hydrogenation
   Halogenation
   Addition of Thiocyanogen
   Addition of Maleic Anhydride
   Sulfation, Sulfonation
   Chemical oxidation Epoxidation and hydroxylation
   Atmospheric oxidations Rancidity
   Polymerization
   Isomerization
   Reactions of Hydroxyl Groups
   Preparation of Ketones, Aldehydes, and Hydrocarbons from Fatty Acids
   Pyrolysis to Produce Motor Fuels
   Manufacture of Sebacic Acid
4. VINYL LAURATE AND OTHER VINYLE ESTERS
5. LINOLENIC ACID AND LINOLENYL ALCOHOL
Some Reaction Products
Linolenyl Alcohol
Linolenyl Aldehydes
Miscellaneous

6. FRACTIONATION OF FATS AND FATTY ACIDS
Fractional Crystallization
Winterization of Vegetable Oils
Cold Clearing of Fish Oils
Fractional Crystallization of animal Fats
Crystallization of Vegetable Stearines
Fractional Crystallization of Fatty Acids
Liquid-Liquid Extraction
Solvents for Liquid-Liquid Extraction Liquid-Liquid Extraction In Practice
Theory and General Practice
Purification of Fatty Acids by Distillation
Fractional Distillation of Fatty Acids
Molecular Distillation
Methods Involving Chemical Reaction
Urea Adducts
Chromatography
Countercurrent Distribution
Recovery of Minor Constituents

7. SOLIDIFICATION, HOMOGENIZATION, AND EMULSIFICATION
Plasticizing of lard and Shortenings
Solidification of Margarine
Solidification of Soap Products
Emulsification
Peanut Oil
Milling of Groundnut
Effect to Storage of Groundnut Kernels of the Yield & Quality of Oils and Cake
Effect to Size Reduction of the Kernels Prior to Crushing
Cooking of Prepared Seed Material
Optimum Quantity of Oils to be left in the First Pressed Cake
Summary of The Results
Olive Oil
Palm Oils
Sesame Oil
Corn Oil
Safflower Oil
Tobacco Seed Oil
Poppyseed Oil
Teased Oil
Kapok Oil
Rice Bran Oil
Sorghum oil
Other Oleic-Linoleic Oils
Rapeseed Oil
Other Erucic Acid Oils
Linolenic Acid Oils
Soybean Oil (91)
Perilla Oil
Hempseed Oil
Wheat Germ Oil
Horse Fat
Other Linolenic Acid Oils
Conjugated Acid oils
Tung Oils
Oiticica oil
Ixes in coating
In Conclusion
Marine Oils
Whale Oil
Sardine or Pilchard Oil
Japanese Sardine Oil
Menhaden Oil
Herring Oil
Fish Liver Oils
Hydroxy Acid Oils
Castory Oil
8. KOKUM
Garcinia Indica Chois
Description
Flowering And Fruiting
Distribution
Estimation of Seed Production
Collection of Seeds
Oil
9. MAHUA
Description
Flowering And Fruiting
Distribution
Locality Factors
Propagation
Estimation of Seed Production
Other Uses
10. NEEM
Description
Flowering and Fruiting
Distribution
Locality Factors
Propagation
Usefulness in Afforestation
Estimation of Seed Production
Collection And Storage of Seeds
Oil
Other Uses
11. PUNNA, UNDI
Flowering And Fruting
Distribution
Locality Factors
Propagation
Estimation of Seed Production
Collection of Seeds
Oil
Uses of the oil
Other Uses
12. KARANJ
Description
Flowering & Fruiting
Distribution
Locality Factors
Propagation
Usefulness in Afforestation
Estimation of Seed Production
Collection and Storage of Seeds
Oil
Uses of the oil
Other uses
13. KUSUM
Description
Flowering And Fruiting
Distribution
Locality Factors
Propagation
Estimation of Seed Production
Collection of Seeds
Oil
Uses of the oil and Cake
14. DHUPA
Description
Flowering and Fruiting
Distribution
Locality Factors
Propagation
Estimation of Seed Production
Collection of Seeds
Fat
Uses of Fat
Other uses
15. NAHOR
Description
Flowering and Fruiting
Distribution
Locality Factors
Propagation
Estimation of Seed Production
Collection of seeds
Oil
Uses fo The oil
Refining of oil
Other Uses
16. KHAKAN, PILU
Description
Flowering And Frutting
Distribution
Locality Factors
Propagation
Usefulness in Afforestation
Estimation of Seed Production
Collection and Storage of Seeds
Fat
Other used
17. PISA
Description
flowering and Fruiting
Distribution
Locality Factors
Propagation
Estimation of Seed Production
Collection and Processing of Seed
Oil
18. TALL OIL
Recovery of Tal oil
Application of Tall oil
19. TALL OIL PRODUCTS IN SURFACE COATINGS
Tall Oil in Alkyd Resing
Tall Oil Formulation in Alkyd Resins
Esters of Tall Oil Products
Other Uses for Tall Oil Products
20. TALL OIL IN THE PLASTICIZER FIELD
Tallate Driers
Esterification of Tall Oil For Plasticizers
Tall oil in Adhesives and Linoleum Cement
Tall oil In Rubber-Based Adhesives
Tall Oil In Hot-Melt Adhesives
Tall Oil Production in Linoleum Cements
Formulation with Tall Oil
Formulation with Tall Oil Esters
Tall Oil in Asphalt Products and Petroleum uses
Tall Oil In Asphalt
Roads
Soil Treatment
Roofing
Adhesives
Antistripping Agents
Plasticizers
Miscellaneous
Tall Oil In Petroleum Application
Oil and Gas Well Fracturing
Drilling Muds
Demulsification Agents
Corrosion Inhibitors
Catalyst
Lubricating Oil Additives
21. TALL OIL IN LIQUID SOAPS
Tall Oil In Disinfectants
Tall Oil In Synthetic Detergents & Wetting Agents
Tall Oil In Biodegradable Detergents
22. TALL OIL IN RUBBER
Styrene-Butadiene Rubber
Foam rubber
Tall Oil In Paper Size
Paper Making Process
Rosin Sizing Materials
Forms of Size Available
Paste Size
Dry Size
Methods of Preparing Liquid Size
Cooking Process
Emulsion Process
Bewoid Process
Delthirna Process
Internal And External Sizing
Effect of Wet Strength Resins and Paper Coating Resins of Sizing
Sizing of Nonconventional paper
Testing of Sizing
23. SOAP AND OTHER SURFACE ACTIVE AGENTS
Commercial Soap Products
Characteristics of Soaps Saponified by different Methods
Effect of Different Factors on Physical Characteristics of Bar Soaps
Types of Commercial Soap
Surface-Active Agents Other Than Soap
Classification of Surfactants
List of Surfactants
Anionic Surfactants
Nonionic Surfactants
Ampholytic Surfactants
Applications
Detergents
Wetting Agents
24. PAINTS, VARNISHES, AND RELATED PRODUCTS
Materials
Unmodified Drying Oils
Modified Drying Oils
Resins and Copolymerizing Materials
Dryers
Thinners
Pigments
Miscellaneous Ingredients
Manufactured Products
Oil Paints
Varnishes And Enamels
Water-Dispersible Paints
Printing Inks
Manufacturing Operations
Cooking of Varnishes and Resins
Mixing and Grinding
Other Mechanical Operations
25. MISCELLANEOUS OIL AND FAT PRODUCTS
Linoleum
Oiled Fabrics
Putty and Other Sealing or Calking Materials
Rubberlike Materials
Core Oils
Lubricating Greases
Cutting Oils
Oil For Leather Treatment
Textile Lubricants and Softening Agents
Plasticizers
Illuminants and Fuels
Cosmetic And Pharmaceutical Oils
Tinning Oils
Hydraulic Oils
Insecticides and Fungicides
Commercial Stearic and Oleic Acids
Other Fatty Acids
Metal Soaps

26. ISOCYANATE-MODIFIED DEHYDRATED CASTOR OIL

Introduction
Materials and Methods
Analytical Methods
Preparation of Urethane Derivatives
Film Characteristics
Results and Discussion

27. STYRENE COPOLYMERISATION OF ISOMERISED TOBACCO SEED (NICOTIANA TOBACUM) OIL AND ITS ALKYD

Experimental
Materials used
Isomerisation
Styrenation of tobacco seed oil
Preparation of styrenated alkyds
Post-strenation Process
Results and Discussion
Isomerisation
Styrenation
Drying Characteristics
Flexibility and Adhesion
Scratch hardness
Water resistance
Acid resistance
Alkali Resistance
Conclusion

28. MODIFIED MAROTI OIL (HYDNOCARPUS WIGHTIANA) FOR ALKYDS

Experimental Techniques and Results
Formulation of alkyds
Evaluation of film properties
Discussion
Conclusion

29. IMPROVED ALKYDS WITH EPOXIDISED RUBBERSEED OIL

Experimental Techniques and Results
Formulation of alkyds
Evaluation of film properties
Discussion
Conclusion

30. ALKYDS BASED ON BLOWN KARANJA OIL

Experimental
Formulation of alkyds
Discussion
Conclusion
31. THE PREVENTION OF GELATION DURING THE MALEINISATION OF DEHYDRATED CASTOR OIL
Experimental
Preparation
Maleinisation
Water solubility
Results and Discussion
Reaction with Acrylonitrile
Reaction with acetic anhydride and phosphorus pentachloride
32. UTILIZATION OF NONCONVENTIONAL OILS
Discussion
Conclusion
33. CASTOR-UREA RESINOUS OIL
Experimental
Discussion of Results
34. PALMDIESEL AS ALTERNATIVE RENEWABLE ENERGY
Chemistry of The Reaction
Laboratory Evaluation of Alkyl Esters as Diesel Substitutes
Stationary Engine test
Preliminary Field Trial
Porim vehicles
Taxis
Exhaustive Field Trial
Pilot Plant
Recovery of Vitamin E & Other Minor Components from Methyl Esters
Future Development
Reduction of pour points of methyl esters
One Step conversion of the process
More uses of Glycerol
Methylesters as kerosene Substitute
Other uses of esters
Conclusion
Inclusion Compounds
Cage (Clathrate) inclusion Compounds
35. EXTRACTION OF FATS AND OILS
Preparation of Animal Material
Preparation of Oil Seeds
Heat Treatment of Oil-bearing Materials
Rendering of Animal Fats
Cooking of Oil Seeds
Batch Pressing
Mechanical Expression of Oil
Continuous Pressing
Low-Pressure Pressing
Centrifugal Expression
Solvent Extraction
Application
Recovery of Oil from Fruit Pulps
Extraction of Olive Oil
Extraction of Palm Oil
36. REFINING AND BLEACHING
Refining & Bleaching Methods
Effect of Refining & Other Processing Treatment on specific Impurities

Refining Losses
Applications
Desliming or Degumming
Degumming by hydration
Preparation of Commercial Lecithin
Acid Refining
Removal of Break Material by Heat Treatment
Alkali Refining
Reffining with Caustic Soda
Color Standards
Chemical Bleaching

37. HYDROGENATION
Importance of Hydrogenation
Heat of reaction
Diversity of Possible Reactions
Selectivity with Respect to Different classes fo Glycerides
Nickel Alloy or Raney Catalysts
Hydrogenation Equipment
Characteristics of hydrogenated Fats
Hydrogenation of Shortening Stocks
Hydrogenation of Margarine Oils
Hydrogenation of Hard Butter Substitutes
Hydrogenation of Inedible Fats and Fatty Acids
removal of Nickel From hydrogenated oils
Special hydrogenation Processes
Hydrogenation to Produce Fatty Alcohols
Fatty Alcohols by Sodium Reduction
Conjugated Hydrogenation
Hydrogenation of Nitriles to Produce Fatty Amines
Hydrogenation in Solvents

38. DEODORIZATION
Historical
Naturel of Deodorization Process
General Design Features
Batch Deodorization
Continuous Deodorization

39. CUTTING OIL
Manufacture of of Soluble Cutting Oil
Soluble Cutting Oil by Sulphonated Oils
Manufacture of Straight Cutting Oils
Process

40. RICE BRAN OIL
Introduction
Process of Manufacture

41. THE COMPONENT GLYCERIDES OF VEGETABLE FATS

42. MACHINERY & EQUIPMENTS
NIIR PROJECT CONSULTANCY SERVICES (NPCS) is a reliable name in the industrial world for offering integrated technical consultancy services. NPCS is manned by engineers, planners, specialists, financial experts, economic analysts and design specialists with extensive experience in the related industries.


NPCS also publishes varies process technology, technical, reference, self employment and startup books, directory, business and industry database, bankable detailed project report, market research report on various industries, small scale industry and profit making business. Besides being used by manufacturers, industrialists and entrepreneurs, our publications are also used by professionals including project engineers, information services bureau, consultants and project consultancy firms as one of the input in their research.

Our Detailed Project report aims at providing all the critical data required by any entrepreneur vying to venture into Project. While expanding a current business or while venturing into new business, entrepreneurs are often faced with the dilemma of zeroing in on a suitable product/line.