

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

Author: NIIR Board

Format: paperback

Code: NI68

Pages: 576

Price: Rs 1875 | US\$ 150

Publisher: NIIR PROJECT CONSULTANCY SERVICES

Shipping: 5 days

About the Book

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 of Storage of Groundnut Kernels on the Yield & Quality of Oils and Cake

Effect of 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
Uses 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 Fruiting
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 Engredients

Manufactured Products

Oil Paints

Varnishes Adn 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-styrenation 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

Concluion

30. ALKYDS BASED ON BLOWN KARANJA OIL

Experimetal

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

Discussioh

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 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.

Our various services are: Detailed Project Report, Business Plan for Manufacturing Plant, Start-up Ideas, Business Ideas for Entrepreneurs, Market Research, Manufacturing Process, Machinery, Raw Materials, Project Feasibility, Investment Opportunities, Technical Consultancy and Startup Help.

NPCS also publishes process technology books, technical books, startup books, directory, business database, detailed project reports and market research reports.

Our Detailed Project Report aims at providing all the critical data required by entrepreneurs for starting new business ventures.

NIIR PROJECT CONSULTANCY SERVICES

106-E, Kamla Nagar, New Delhi-110007, India

Email: npcs.india@gmail.com **Website:** <https://www.niir.org/>