

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

Author:- NIIR Board

Format: paperback

Code: NI68

Pages: 576

Price: Rs.1875US\$ 150

Publisher: NIIR PROJECT CONSULTANCY SERVICES

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.

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
Ises 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 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-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
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

Private 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

About NIIR

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, Start up Business Opportunities, entrepreneurship projects, Successful Business Plan, Industry Trends, Market Research, Manufacturing Process, Machinery, Raw Materials, project report, Cost and Revenue, Pre-feasibility study for Profitable Manufacturing Business, Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Business Opportunities, Investment Opportunities for Most Profitable Business in India, Manufacturing Business Ideas, Preparation of Project Profile, Pre-Investment and Pre-Feasibility Study, Market Research Study, Preparation of Techno-Economic Feasibility Report, Identification and Section of Plant, Process, Equipment, General Guidance, Startup Help, Technical and Commercial Counseling for setting up new industrial project and Most Profitable Small Scale Business.

NPCS also publishes various 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.

NIIR PROJECT CONSULTANCY SERVICES, 106-E, Kamla Nagar, New Delhi-110007, India.
Email: npcs.india@gmail.com **Website:** NIIR.org

Thu, 01 May 2025 16:54:17 +0000