

Syllabus for Entrance Examination – M. Tech. in Oils, Oleochemicals and Surfactants Technology

2024-25

Chemistry of Vegetable Oils: Classification of oils and fats based on sources, fatty acid composition, soap making characteristics and polymerization tendency, Chemical analysis of oils (AV, IV, SV, HV, PV etc.) Colour tests for identification of adulteration of edible oils, Bellier Turbidity Temperature Test, Esterification, Interesterification/ Transesterification, halogenation, Reduction and hydrogenation, Pyrolysis and alkali fusion, Metathesis, Thermal and Oxidative Polymerization, Diels-Alder reaction, Autoxidation and rancidity: Mechanism of rancidification, general characteristics of fat oxidation, antioxidants, prooxidants and synergists, flavor reversion

Technology of Production of Oils and Fats: Production of oils and fats by mechanical expelling, solvent extraction, super critical fluid extraction etc. Conventional and newer techniques of refining of oils and fats. hydrogenation and winterization of oils or edible purposes, manufacture of butter, margarine, ghee, Vanaspati, bakery and confectionery fats

Nutraceuticals and Important Minor/Non-triglyceride Constituents of natural oils and fats: Phospholipids, Galactolipids, sphingolipids, Diacylglycerols, Monoacylglycerols, Sulfolipids, Waxes, sterols, triterpene alcohols, and their esters, Tocopherols/tocotrienols, lipid- soluble vitamins, hydrocarbons, Pigments, Phenolic compounds, etc.

Chemistry and Technology of Oleochemicals: theory and practice of fat splitting, and purification by fractional distillation; Processes for treatment of sweet water and spent soap lye, Manufacture of glycerin, Grades of glycerin, properties and utilization of glycerin; manufacture of fatty alcohols, fatty esters, Metallic soaps and fatty amines

Essential oils: Extraction from different sources, separation and purification. Enflourage, Maceration, solvent extraction, supercritical extraction, water distillation, water steam distillation and steam distillation. Analysis of essential oils for RI, optical rotation, density, solubility, boiling point, melting point

Soaps, Surfactants, and Detergents: Phases in soap boiling, processes employed in the manufacture of soap, various types of soaps and cleaning preparations, Synthesis and surface activity characteristics of anionic, cationic, nonionic and amphoteric surfactants, HLB, Surfactant properties, Kraft and Cloud point. Formation and stability of emulsions, de-emulsification, microemulsions, use of cosurfactants Formulation and Production of detergents. Design of Spray Dryer, BIS methods of testing and evaluation of soaps and detergents.

Lubricants and Greases: Basics of tribology, Fundamentals of Friction, wear & lubrication. Flash point, viscosity, viscosity index, pour point etc. Functions and

applications of Lubricants and additives, Manufacture of biolubricants through chemical modification of oils- Epoxidation, Hydroxylation, Ozonolysis, Estolide synthesis etc.

Chemical Engineering: Unit operations and Purification techniques: Material and energy balance calculations, laminar and turbulent flow, mixing, size reduction, solid handling, solid-solid separations, drying, evaporation, distillation, extraction, adsorption, membrane separations etc., design of different heat exchangers, basics of reaction engineering and design of reactors, Reaction Equilibrium and associated thermodynamics and kinetics, catalysis, various engineering/ safety factors, various Forms of Corrosion for Metals, Choice of material of construction,

