



DELIVERING THROUGH TECHNOLOGY

Vegetable Oilseeds,
Oils and Fats

Oleo Chemicals

Bio-Diesel

Filtration

Mectech is an **Engineering Process Company** engaged in manufacturing of plant & machinery on turnkey basis for Vegetable Oils and Fats, Biodiesel and Oleo Chemical Industry.



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WHO WE ARE

Mectech Process Engineers Pvt Ltd an EPC Company, undertakes turnkey projects, supplies Equipments & Machineries for Oil & Fats industries (All kind of vegetable oils like Cotton Seed Oil, Ground Nut Oil, Rice Bran Oil, Soya bean oil, Corn Oil, Palm Oil, Palm Kernel Oil, Coconut Oil, Sunflower Oil, Safflower Oil, Rapeseed Oil, Canola Oil, Mustard Oil, Olive Oil, Castor Oil, Sesame Oil, Hazel Nut Oil etc or Animal Fats)

Vegetable Oil Extraction (Preparatory sections, Milling, Expellers, Solvent Extractions)

Vegetable Oils Pretreatment (Degumming, De waxing, Bleaching) Vegetable Oils Refining (Physical, Chemical)

Modification of Oils & Fats using Hydrogenation or Dry Fractionation/ Crystallization, Esterification, Inter esterification, Transesterification

Value Added or Specialty Products like Margarine, Bakery Shortenings, MCT, Lecithin, Tocopherol & Tocotrienol

Bio-Diesel (From any kind of Vegetable Oils, used cooking oils, Acid Oils, Fatty Acid Distillates, Tallow/Animal Fat)

Oleo Chemicals like Distilled or Fractionated Fatty Acids, Distilled or Fractionated Esters, Refined Glycerin, Soap Noodles (Pretreatment, Splitting, Glycerin Refining, Distillation -Plain or Fractional, Hydrogenation, Esterification, Saponification, Flaking, Beading)

By-Products or Waste Products Recoveries like Extraction of oil from Spent Earth/catalysts.

Mectech can supply Batch, Semi-continuous, Continuous type plants with manual operation or fully automated PLC/DCS controlled with remote monitoring for any capacities for commercial production and Pilot facilities including storage facilities, utilities and packaging facilities of finished products.

Mectech has emerged as the leading brand, not just in India, but globally because of continuous technological innovations keeping in mind the present and future needs of the Oils & Fats industry. In a number of projects, Mectech has given tough competition to the well-known Multinational brands in terms of technological advancement, innovation, maintaining quality as per world standards. Because of our customer oriented policy and the kind of relationship we maintain with our clients, most of customers return with repeat orders. In our 4 state of the art factories, equipped with modern machineries, we manufacture projects as per ASME, CE Standards and also have the capability to manufacture our projects as per any International standards/ codes specific to any country.

In the course of 40 years of existence, Mectech has evolved as a one-stop shop for Vegetable oil Industry.

All the projects offered by Mectech are fully customized and designed as per clients' requirements.



Mr. Ishwar Sahai
Chairman & Managing Director - Mectech

“Adaptability
to change is the
key to future”

A leader is one who knows the way, goes the way, and shows the way.
-John C. Maxwell

This quote by Maxwell aptly sums up all that Mr. Ishwar Sahai, Chairman & Managing Director of Mectech, represents.

A chemical engineer by qualification, Mr. Sahai is a person of indomitable courage and pioneering spirit. His rich experience and entrepreneurship revolutionized the concepts of extraction, refining and hydrogenation / vanaspati technology in the Indian edible industry.

As a true leader, he has carefully nurtured ability and integrity. Little surprise then, there is no dearth of capable people in the company. Under his stewardship has been built a team of reputed and dedicated skilled project engineers, technologists and a result – oriented work force. Together, the team has achieved high operational efficiency with immense in-house knowledge each time.

Over **400+** projects
supplied world over on
turnkey basis during
the last **40 years**

MECTECH

Mectech-a trailblazer in the Oil & Fats sector, since its inception in 1978, has acted as a catalyst in the development & growth of oil & fats industry in India by manufacturing and supplying customized, highly energy efficient, innovative, Turnkey Projects ,plant and equipments for Oil extraction, pretreatment & refining, modification of oil & fat, value added specialty products, oleo chemicals or waste products recoveries, Bio Diesel & Filters.

Under the leadership of Mr. Ishwar Sahai, the founding father and the Managing Director of the company, over the years, Mectech has emerged as a leading brand, not just in India, but globally, because of continuous technological innovations keeping in mind the present and the future needs of the oil & fats industry. In a number of projects, Mectech has given tough competition to the well-known global brands in terms of technological advancement, innovation, productivity & cost effectiveness.

Leaving its impressive footprints behind, the brand has only forged ahead with an unwavering focus on providing the best. Dynamic as the nature of the industry is, Mectech has stayed ahead by extending expertise and solutions all through the journey. And in the process, it heralded technological revolution in solvent extraction, chemical and physical refining, vanaspati (hydrogenation), Interesterification, dry fractionation of palm oil, dewaxing and winterization of rice bran oil, oleo chemicals and other allied processes.

The key approach has been to maximize profits through a judicious use of technology and providing long-term and customized solutions that would beat the tests of time. The company collaborates with each client at a deeper level to set up a plant. Counseling the client towards selection of the best technology and right equipment, recommending techniques during the stages of installation, operation and steady monitoring of results – all come under the purview of Mectech's consultancy services.

Mectech EXPERTISE

With a powerful team and cutting edge technology as its two pillars, the company is a bastion of reliability and delivering within set parameters.

Mectech has carved a niche for itself, in the following processes:

- Oil Milling
- Solvent Extraction
- Vegetable Oil Refining
- Dry fractionation of vegetable Oil (Palm Oil and Palm Kernel Oil)
- Continuous Dewaxing and Winterization of Vegetable Oil
- Hydrogenation of Oil & Fats (Semi-Continuous & Fully-Continuous)
- Interesterification
- Esterification and Transesterification
- Fat Splitting
- Sweet Water Treatment and Concentration
- Glycerin Refining
- Fatty Acid Distillation (Plain/Fractional)
- Lecithin Extraction
- Cocoa Butter Substitute
- Flaking and Beading
- Tocopherol / Tocotrienol Extraction from Fatty acids
- Castor Oil Derivative Products
- Greenfield projects
- Filtration

Mectech ADVANTAGE

- Most Cost Effective Solution Provider
- The Most Capable and Experienced Technical Team
- In-house Advanced Manufacturing Workshops
- Technical Collaboration for Advanced Technologies

Mectech UNDERTAKES

- Planning
- Research & Development
- Engineering
- Manufacturing
- Installation
- Commissioning
- Standardization of Projects
- Training of Personnel
- Improvement & Modification Existing Plant

Why MECTECH?



Most Cost
Effective
Solutions



400+ Projects
Supplied in
18+ Countries



Conception
to Completion



In House Advanced
Manufacturing
(3 units)



40+ Years
of Expertise



Best in Class



The Most
Capable
Technical Team



World Wide
Technical
Collaborations

Seed Preparation



Seed cooking & flaking

Milling of oil implies the breaking down of the oil seed into a form ideal for efficient extraction of oil. It is not only economical but also environment friendly to extract optimally. Various processes are combined to achieve this.



Seed Preparation

Mectech employs the following milling techniques for seed preparation:

Roller Mill: The seeds are crushed into tiny particles in these mills. The process involves preparation of oil seeds prior to direct solvent extraction.

Flaking Mill: Oil seeds need to be flaked to ensure profitable extraction. This process disintegrates the cellular structure of seeds. The equipment is fitted with smooth rolls, suitable for flaking oil seeds or cakes prior to solvent extraction.

Cookers-conditioner: This equipment is designed to condition the seed for better extraction by heating and adjusting moisture content to optimum level.

Expander- Extrudes the flakes to increase the bulk density of the material, thereby enhancing the percolation of hexane circulation within any raw material to improve the extract ability.



3D View - Solvent Extraction Plant

Solvent Extraction

‘Solvent losses as low as 1.5 Liters
per ton of material processed’



MECTECH'S BELT-TYPE HORIZONTAL EXTRACTOR

The extraction plant comprises of extraction De-solventizing Toaster, a Distillation System and a solvent recovery system. The extractor enables removal of the solvent from the meal, toasts the meal to maintain inherent nutrition, and stabilizes its moisture as well as temperature. This equipment is efficiently designed to achieve the best of performance in terms of quality of oil, quality of DOC, consumption of utilities and hexane loss.

Solvent extraction is a multi level process used to extract oil from the seeds by use of a solvent. Post milling, the meal is ready, which means that the seed has been improved to a form which enhances its surface area for solvent absorption. This meal is transferred to the extractor, where it comes in contact with hexane (solvent). The oil meal and miscella are the outputs which are further processed and distilled for optimum extraction of oil and solvent removal.

MECTECH ADVANTAGE -

- Latest continuous belt type extractor with multi-spray system.
- Multi-Stage DTDC De-Solventizing toaster to achieve the best quality of DOC, suitable for export.
- Multi-Stage Distillation System and Solvent recovery system to minimize the solvent losses and to have the final oil with optimum flash point.

SALIENT FEATURES

The strides made by Mectech in solvent extraction technology have resulted in achieving very high efficiency. Adapting to the latest technology of extraction equipment, this process involves low hexane loss. Continuous Solvent extraction plants designed and supplied by Mectech are the most efficient and economical in processing cost.



Inside view of Solvent Extraction Plant

Capacity to **build**
and **supply** plants
from **50 to 2000**
tonnes per day

Vegetable Oil Refining



Solvent extraction and distillation process produce crude Oil, which contains inherent harmful constituents like Free Fatty Acids (FFA's), gums, sediments, odoriferous and coloring materials, phosphatides, hydrocarbons, traces of pesticides and heavy metal, that need to be refined for human consumption. Refining is the process to remove such undesired constituents from the extracted oil, without losing out on the useful factors or affecting the composition.

Continuous Longmix, Degumming, Neutralizing & Washing

Soya bean oil is highly unsaturated oil and is susceptible to repulsive colour and smell. Hence, this oil needs to be treated under controlled conditions of temperature, vacuum and addition of chemicals to achieve the desired quality of finished oil.

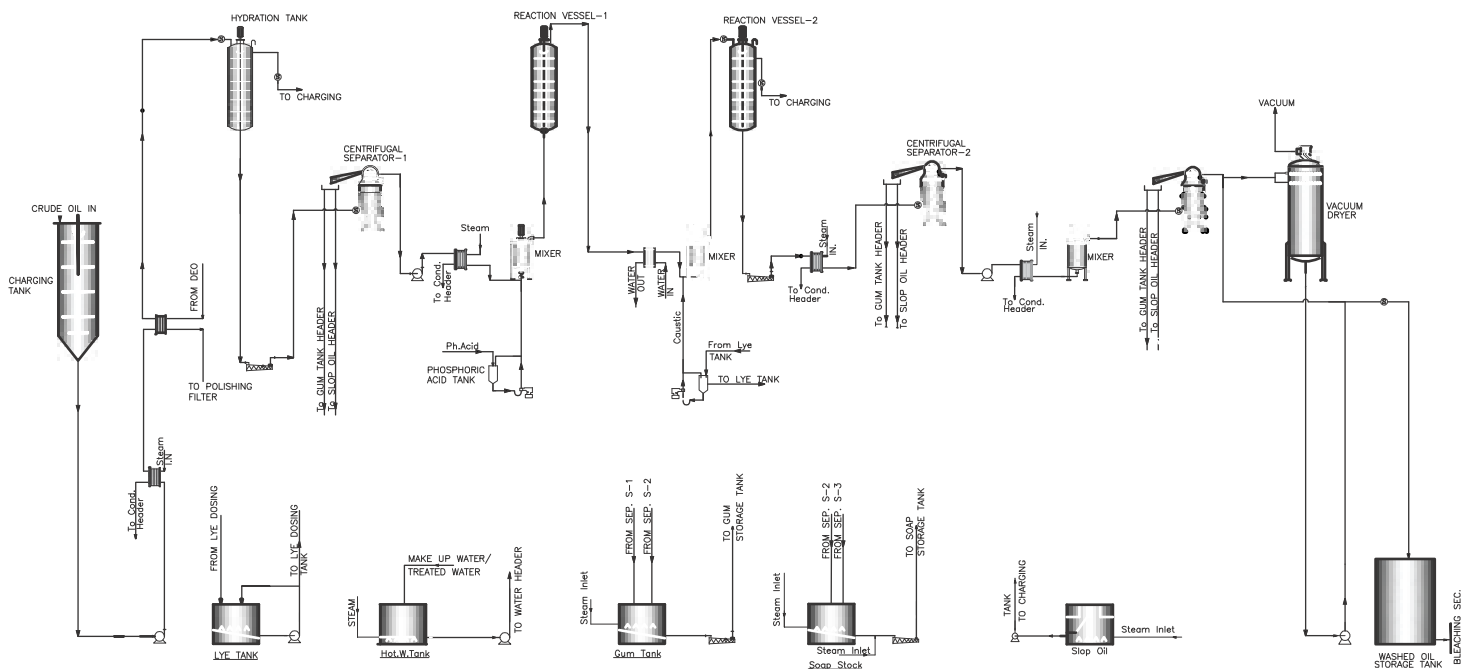


Salient features

For the successful Degumming, Neutralization and Washing of crude vegetable oil, the inherent phosphatides and free fatty acid need to be removed. Mectech achieves this through a highly evolved continuous process, in which Degumming is carried out by reaction with Phosphoric acid under controlled conditions. This reduces the Phosphorous content as well as the Hydratable & Non Hydratable gums. It is a Longmix process

Free Fatty Acids are reduced through reaction with caustic soda in a centrifugal separator under controlled conditions. As a result, fatty acids are removed as soap stock.

The Oil feed is finally washed in centrifugal separator under controlled conditions to achieve refined vegetable oil, free from gums and fatty acids.



Longmix Degumming / Neutralization / Washing section

Continuous Bleaching

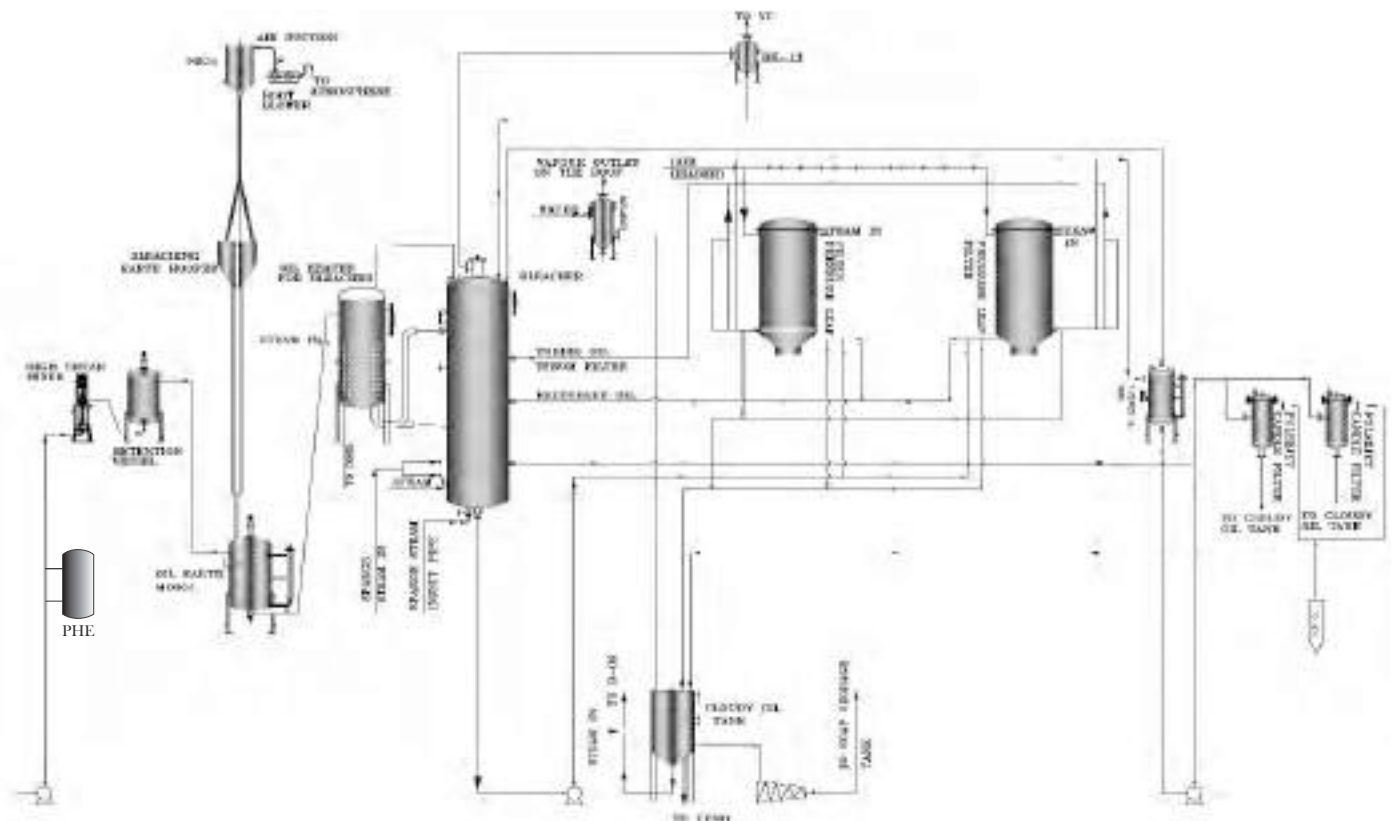
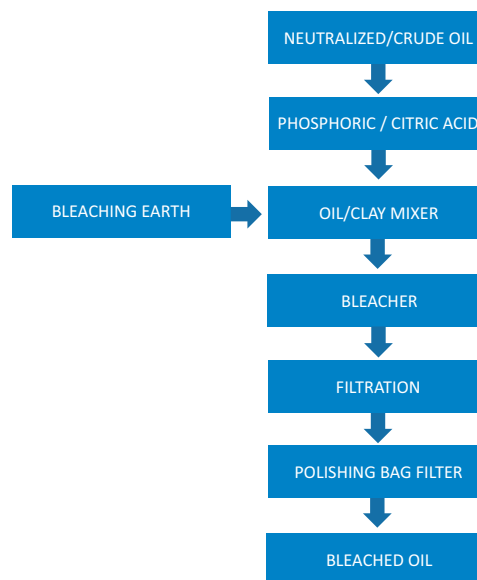


CONTINUOUS BLEACHING CHART

Mectech Advantage

Mectech's wet bleaching process keeps bleaching earth under suspension thereby avoiding dead areas. This results in lower consumption of bleaching earth.

Mectech's unique design of bleacher requires no mechanical agitation and bleaching is carried out under optimum conditions of moisture content to achieve perfect results. This gives saving in power consumption for the system.



Continuous Bleaching Section

Continuous Deodorization

1. Continuous Deodorizer for High FFA Oils

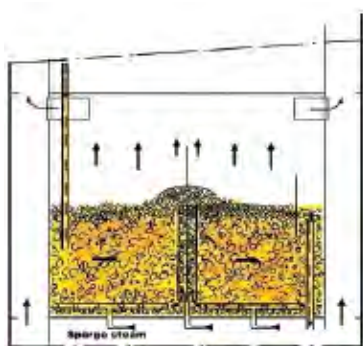
Vegetable oil is heated to the desired temperature in a multi-compartment Vacuum Heater with counter current flow of vegetable oil and heating medium i.e. High Pressure Steam or Thermic Fluid.

Pre-heating is gradual and methodical so that all of the oil comes in contact with this sparging system at the free surface exposed to vacuum.

Packed Column with packings of large surface area is provided on the top of Deodorizer. This ensures reduction of Free Fatty Acids to the desired level.

An additional top heating tray is provided below the Packed Column to compensate for the unavoidable loss of heat due to evaporation of Fatty Acids.

Perfect deodorization is accomplished by providing large free surfacing area contact between oil and stripping steam at an absolute pressure of 2 m bar. This results in furnishing oil surface layer of numerous bubbles having 5 - 10 mm diameter. These small bubbles burst and they discharge the water vapour saturated with distilled fatty acids and the odoriferous compounds. These ascending vapours are immediately and freely taken out into lateral ducts through the large section opening provided on top of each stripping tray. This ensures virtually no pressure drop from top to the bottom tray.



Inside view of Continuous Deodorizing Stripping Tray



Deodorization is a process of removing of-flavors, colors and other undesired constituents like free fatty acids from the pretreated and bleached oils.

Mectech supplies 2 kinds of Deodorizers:



Inside view of Continuous Deodorizer for high FFA oil

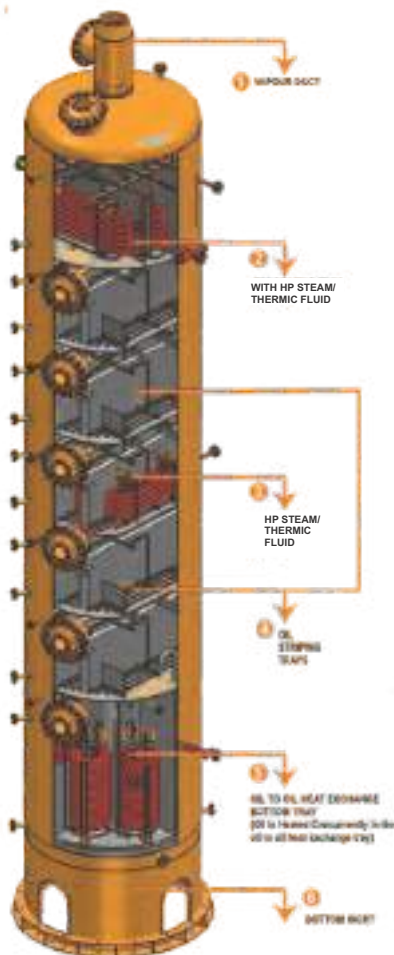


2. Continuous Deodorizer with Packed Column

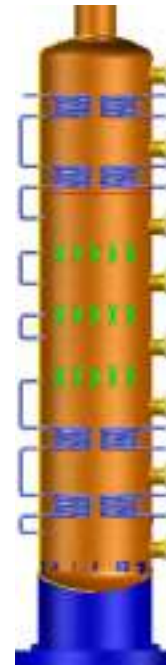
Deodorization is a vacuum stripping process in which a given amount of a stripping agent (usually steam) is passed for a given period of time through hot oil at a low pressure. Hence, it is mainly a physical process in which various volatile components are removed.

Salient features:

1. Most efficiently designed oil to oil heat exchanger fitted in last tray of Deodorizer ensures minimum heat energy requirement.
2. Elaborate and efficient design of fatty acid scrubbing recovery system ensures virtually no carry over fatty acid scrubbing condenser.
3. Most efficiently designed heating coils which prevents charring of oil during the process.



Continuous Deodorizer

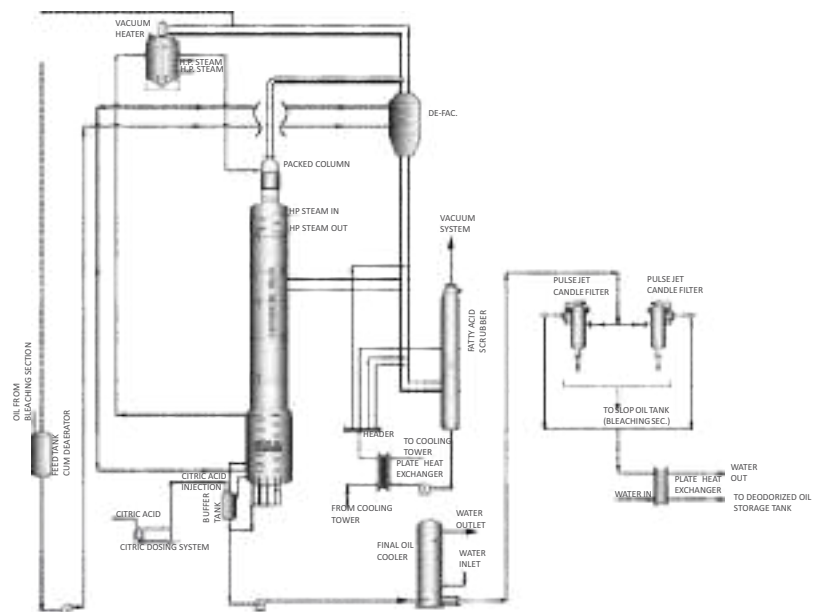


Inside view of Semi-Continuous Deodorizer for specialty fats

3. Semi Continuous Deodorizer for Specialty Fats

Heating of bleached oil is by heat recovered from hot oil of Deodorizer by thermo-siphon arrangement.

Changeover of feed oil at short intervals without any mixing of new feed oil with existing oil under deodorization.



PFD - Continuous Deodorizer for high FFA oil

Continuous Dewaxing and Winterization of Rice Bran Oil/Sunflower Oil



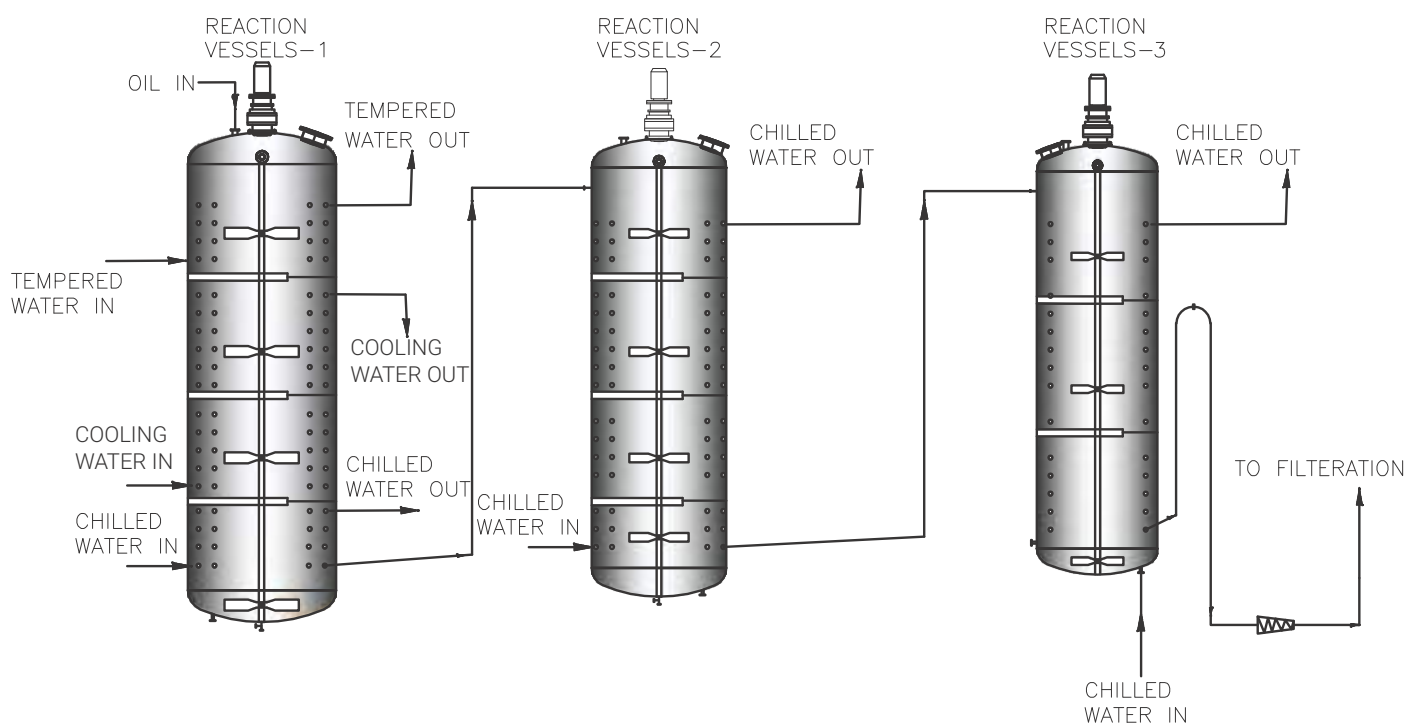
Dewaxing

Dewaxing of oil is a process of eliminating higher melting point constituents like waxes or triglycerides from oil by gradually cooling vegetable oils and separating saturated glycerides from the oil.

Normally Dewaxing process is carried out at a temperature of (10-14°C) to avoid the crystallization of saturated triglycerides & amalgamation of waxes & Saturated Triglycerides.

Winterization

Waxes & Saturated triglycerides which are fairly visible at low temperatures are removed in this process to keep the appearance oil clean. Degummed, Bleached & Dewaxed oil is cooled and filtered to achieve the requisite quality.



Continuous Dewaxing

Dry Fractionation of Palm Oil

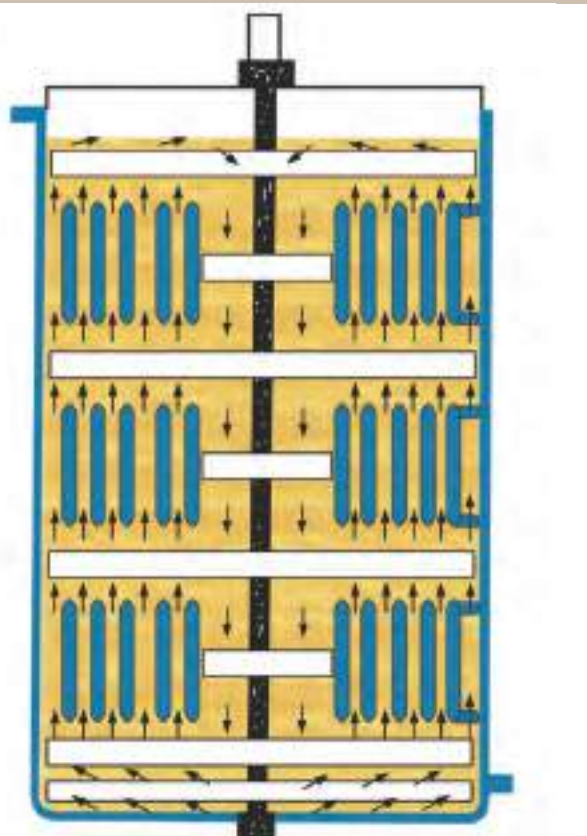
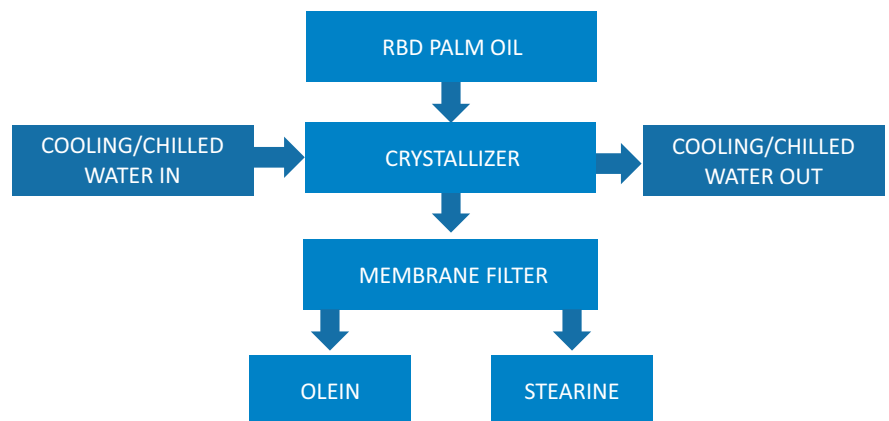


In edible oil processing, a fractionation process consists of a controlled cooling of the oil, thereby inducing a partial, or 'fractional', crystallization. The remaining liquid (olein) is then separated from the solid fraction (stearin) by means of filtration process .

Fractionation is the process where the crystallization of saturated triglyceride takes place in a mechanical equipment called the crystallizer. Crystallized oil is further passed through a filter where separation of solid and liquid phase takes place. Solid phase remains in the chamber. Liquid phase comes out through the taps and is collected in the storage tank.

Entire process takes place in several steps which including: Oil heating, oil charging, and crystallization, filtration, squeezing and cleaning of filter.

PROCESSING FLOW CHART Palm Oil Fractionation



ADVANTAGE

Large heat transfer area with regard to the oil charge in the crystallizers.

Optimal position of the heat exchange surfaces with regard to the impellers, which complement the oil circulation in the vessel.

All parts of the processed oil are driven close to the heat exchange surfaces.

The cooling programme is applied with precision. At the end of each cooling step the temperature difference between cooling water and oil is close to 1°C.



Double Scrubbing



Double Scrubbing System to improve FFA of fatty acid distillate

This system is included in the Deodorization system to improve the FFA of Fatty Acid Distillate. FFA of fatty acid distillate in palm oil deodorization is about 88-89%.

Advantage

The FFA increases to 93-94% with the addition of Double Scrubbing System.

Close Loop Water Cooling for Deodoriser

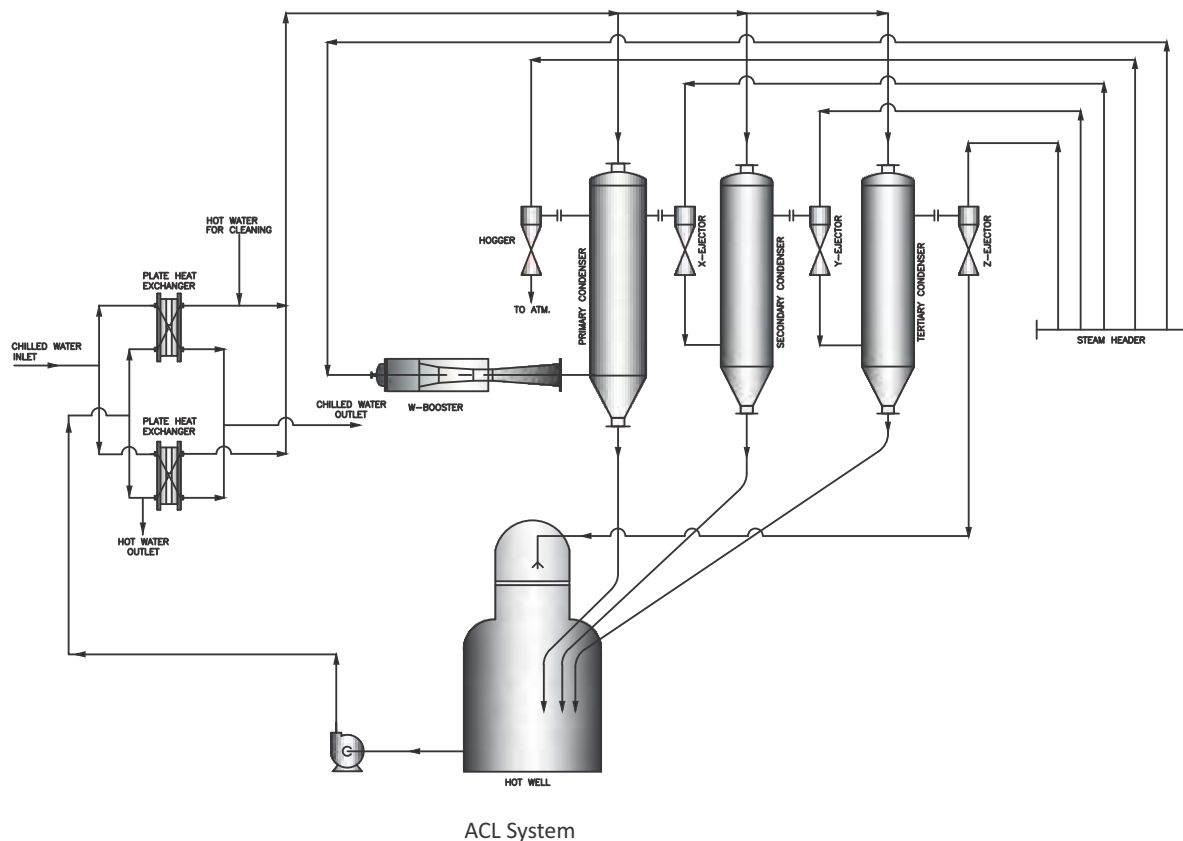
The close loop water cooling system is introduced in the Deodorizer and has the following advantages:

Advantage

It resolves the issue of odour pollution due to dirty water cooling tower. The process renders only clean water cooling tower for use, eliminating the use of dirty water tower.

Generation of effluent water is minimized.

Use of 7°C cooling water in Barometric Condensers of Vacuum System reduces the steam consumption considerably.



Castor Oil Derivatives



Castor Oil is colorless or pale yellowish oil extracted from the seeds of the castor (*Ricinus Communis*) plant. It is a fatty acid with 18 carbon atoms and a double bond between the ninth and tenth carbons

It is also known as 12-hydroxyoctadec-9-enoic acid. Its derivatives are processed through subjecting the oil to specific reactions and processes, to yield a wide variety of chemical derivatives, which is used for diverse applications.

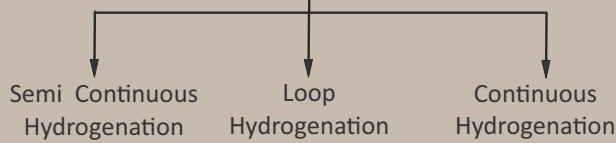
Following are Castor oil Derivatives Products which are produced in plant supplied by Mectech

- Ricinoleic Acid
- Hydrogenated Castor oil (HCO)
- 12- Hydroxystearic Acid (12-HSA)
- Methyl Ricinolate
- Hydrogenated Methyl Ricinolate (HMR)
- Dehydrated Castor oil (DCO)
- Blown Castor oil

Castor oil and its derivatives are used in the manufacture of soaps, lubricants, hydraulic and brake fluids, paints, dyes, coatings, inks, cold resistant plastics, waxes and polishes, nylon, pharmaceuticals and perfumes



Hydrogenation



MECTECH ADVANTAGE

The simple procedure of hydrogenation in the presence of Nickel Catalyst is carried out with such perfection that Mectech has become a trend-setter.

Semi Continuous Hydrogenation

The unique design of agitation system enables hydrogenation cycle to be reduced to a minimum.

High degree of automation to control flow, temperature and pressure in autoclave ensures selective hydrogenation and excellent quality product.

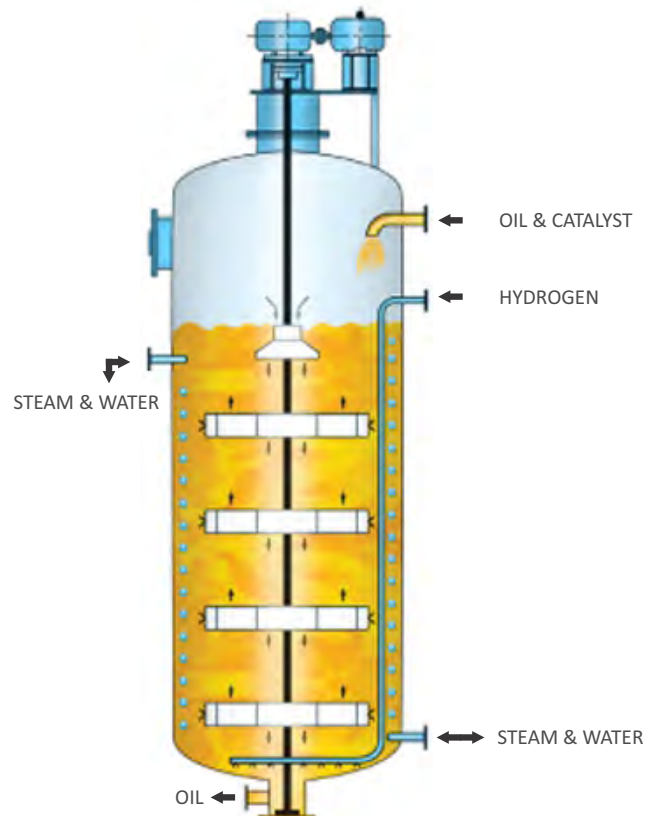
100% reproducibility of product ensured.

ABSTRACT

Zero steam consumption. (Steam is required only once for the first charge of oil while starting the plant operation). This is achieved with the most efficient design of oil to oil Heat Exchanger.

Practically maintenance free – due to low speed agitation system in Autoclave.

Low power and catalyst consumption.



Loop Reactor for Hydrogenation of Oils / Fats

Candle filter with auto wash arrangement are used for filtration of catalyst.

MECTECH ADVANTAGE

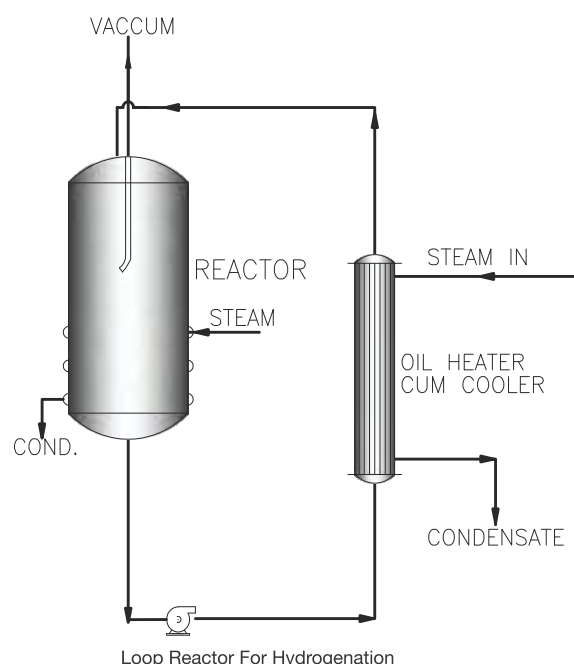
Low iodine value i.e., upto 0.5 is achieved.

Nickel catalyst consumption is minimized with high flow rate circulation in Reactor.

Temperature Control is achieved with high degree of automation.

Continuous Hydrogenation

Hydrogenation of Oil / Fats is one of the largest modification processes in oil & Fats Industry. It consists of the direct addition of Hydrogen atom at double bonds in the Fatty Acid chain. The degree of Hydrogenation is directly related to the Iodine number. Hydrogenation is a means of converting the Liquid Fats to Plastic Fats or, in other words, reducing the Iodine value by reducing the double bonds in the fatty acid chain

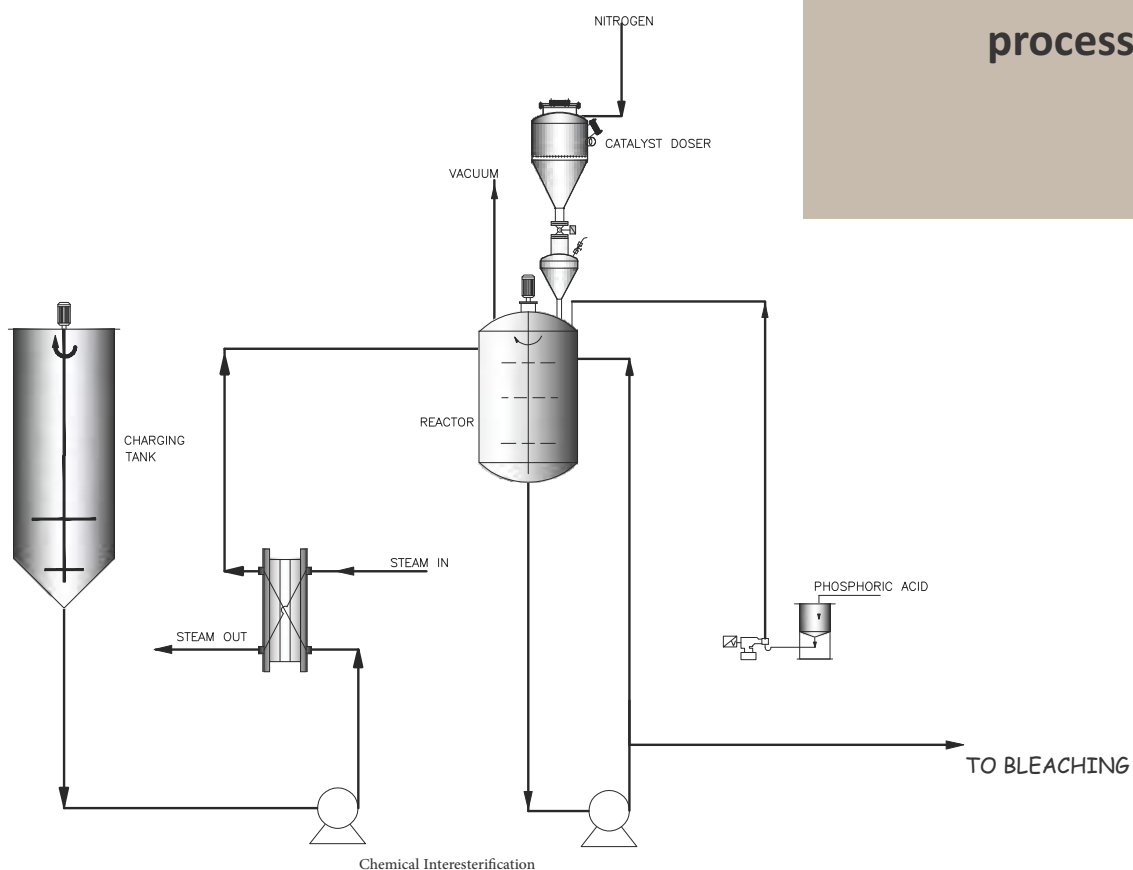


Interesterification



Interesterification process is random chemical process is the most general applied. The best known catalysts are alkali metals such as sodium, potassium and their alloys and alkoxides such as sodium methylate or sodium ethoxide. Fatty acid neutralization and drying is therefore necessary prior to the addition of the phosphoric acid.

Mectech provides
chemical as well as
enzymatic
Interesterification
processes

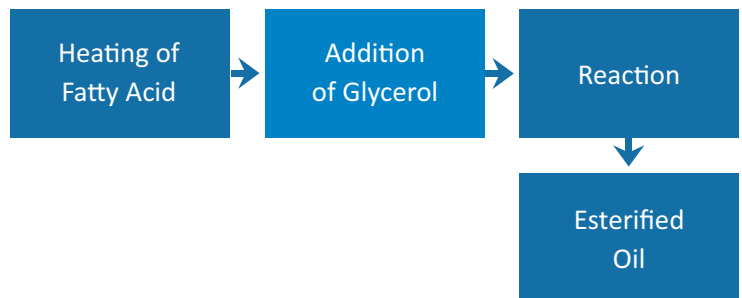


Glycerolysis



It is well known that Oil is the ester of Glycerol and fatty acids, which can be decomposed in to their original constituents (Fatty Acid and Glycerol) or synthesized in to Triglycerides by Fatty acids and glycerol.

GLYCEROLYSIS PROCESS



ABSTRACT

Glycerolysis reaction is reverse of Hydrolysis process. It is carried out by reacting fatty acids with glycerol. In addition to esters, water is also a product of Glycerolysis. The reaction is reversible and proceeds to completion only if water is removed from the medium. The equilibrium between the forward reaction (Glycerolysis) and the reverse reaction (Hydrolysis) is controlled by water content of the reaction mixture. In the presence of excess water, hydrolysis predominates, whereas under water eliminating conditions Glycerolysis is favored.

MECTECH ADVANTAGE

Mectech supplies PLC automated continuous Esterification plants to convert fatty acids into oil with 0.1% final FFA.



MCT from Coconut Oil, & PKO

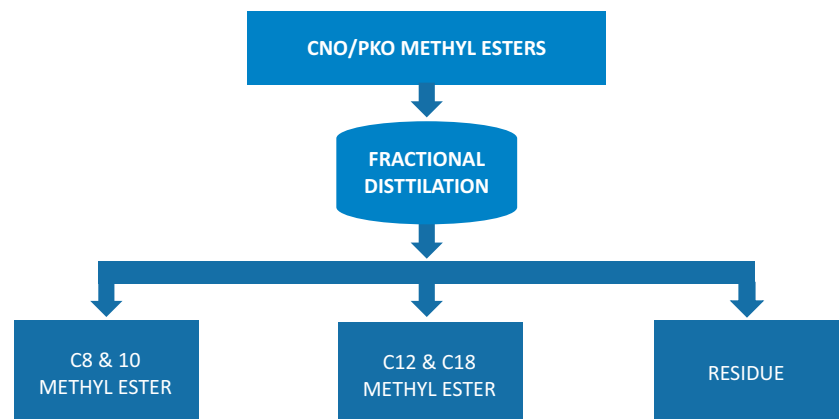


Medium Chain Triglycerides (MCT) are Triglycerides whose fatty acids have an aliphatic tail of 6-12 carbon atoms.

The fatty acids found in MCT's are called Medium Chain Fatty Acids (MCFA's). Like all Triglycerides MCT's are composed of a glycerol backbone and three fatty acids.

In case of MCT's, 2 or 3 of the fatty acid chains attached to glycerol are of medium length.

FRACTIONAL DISTILLATION



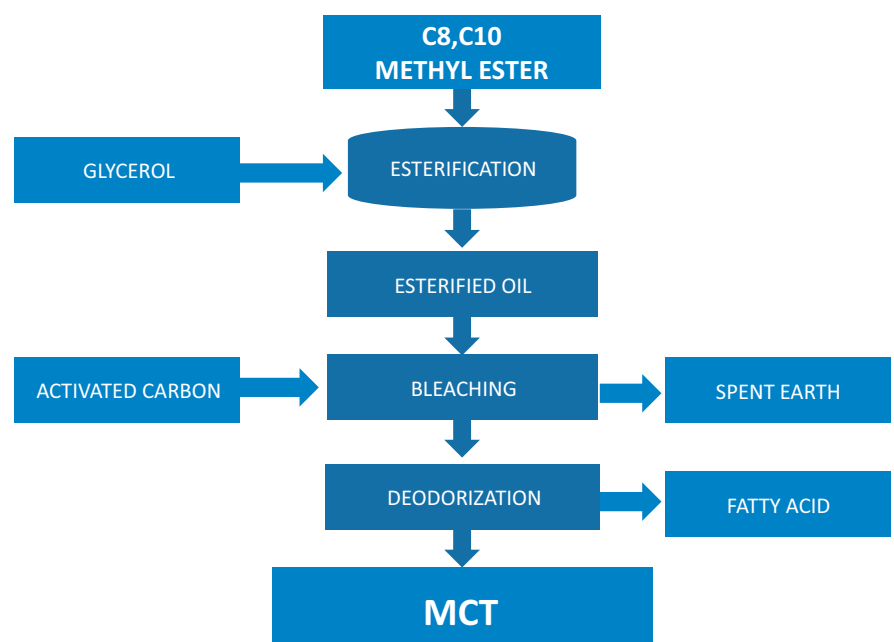
APPLICATION

Dietary
Relevance

Medical
Relevance

Technical
Uses

PROCESSING STEPS FROM CNO/PKO METHYL ESTER TO MCT



Bakery Shortening & Margarine



Shortening occurs when any type of solid fat is used to prevent the formation of a gluten matrix in baked goods, allowing for the creation of non-elastic pastries like cakes. Lard, hydrogenated (solidified) oils, and even butter can be used as shortening. Usually, shortening refers to hydrogenated oil.

MARGARINE PROCESS FLOW CHART

INGREDIENTS PREPARATION
SECTION, MELTING, MIXING,
PASTURIZATION

MIXING

H.P. PUMP

COOLING

RESTING

PACKING



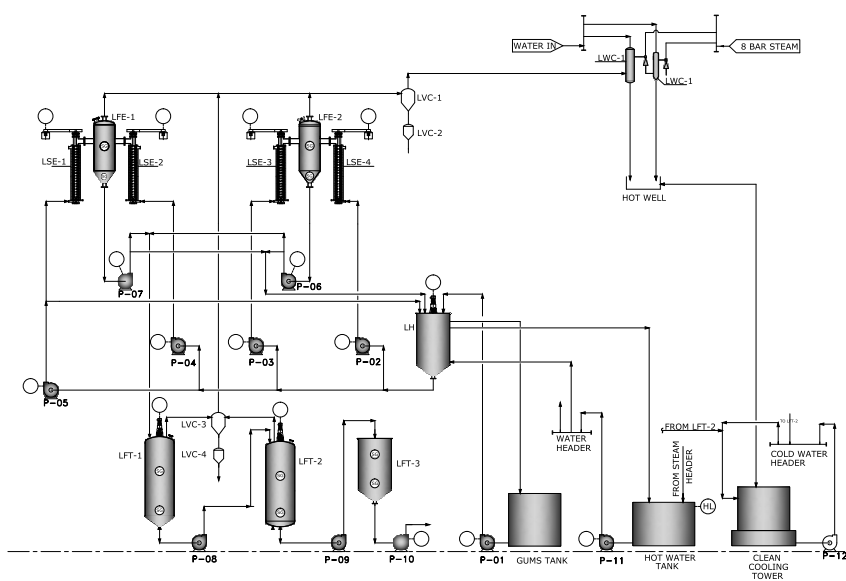
Lecithin



Recovery of wet Lecithin is done from hydratable gums of soyabean oils, rice bran oils and sunflower oil.

Lecithin is the predominant source material for food and pharmaceutical. Food lecithin is usually de-oiled to improve its functionality. The major phospholipids as listed below are the source of the Lecithin

- Phosphatidylcholine
- Phosphatidylethanolamine
- Phosphatidylinositol
- Phosphatidylserine
- Lysophosphatidylcholine
- Lysophosphatidylethanolamine
- Phytoglycolipids
- Phytosterines



The Phosphatdylcholine enriched fraction is excellent oil in water emulsifier and the Phosphatdylinositol enriched fraction is an excellent water in emulsifier and is often used in the chocolate industry.

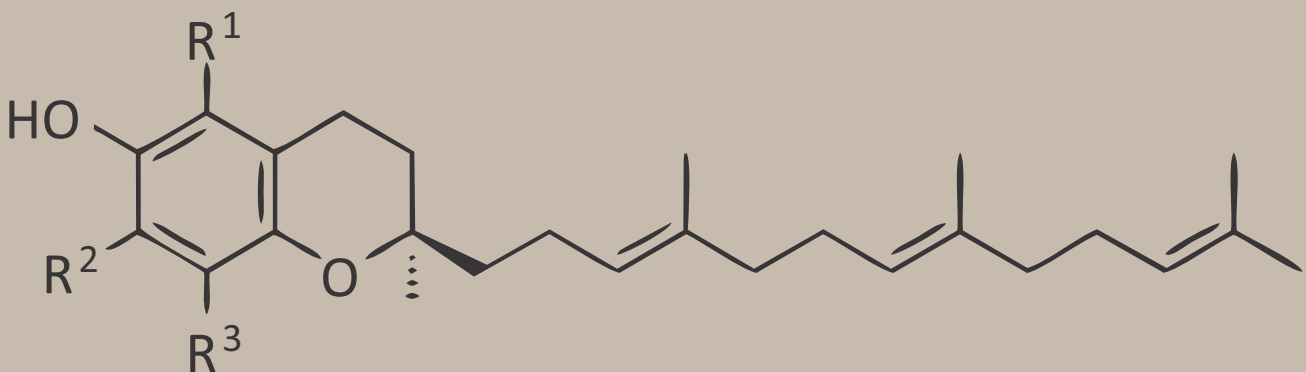
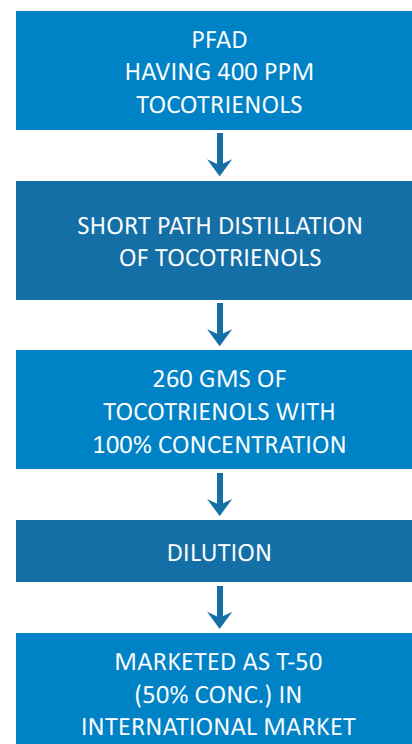
Tocotrienol



Tocotrienols encompass all the compounds that happen naturally occur at higher levels in numerous vegetable oils. These span across palm oil, rice bran oil, wheat germ, barley and certain other types of seeds, nuts and grains, as well as the oils derived from these.

The vitamin E family has two closely related groups encompassing them. These comprise four Tocotrienols categorized as alpha, beta, gamma, delta as well as four Tocopherols- similarly categorized as alpha, beta, gamma, delta. The critical and the significant chemical structural difference between the two is that Tocotrienols have unsaturated isoprenoid side chains with three carbon-carbon double bonds. Tocopherols, on the other hand, possess saturated side chains.

Processing Steps: Tocotrienols from PFAD



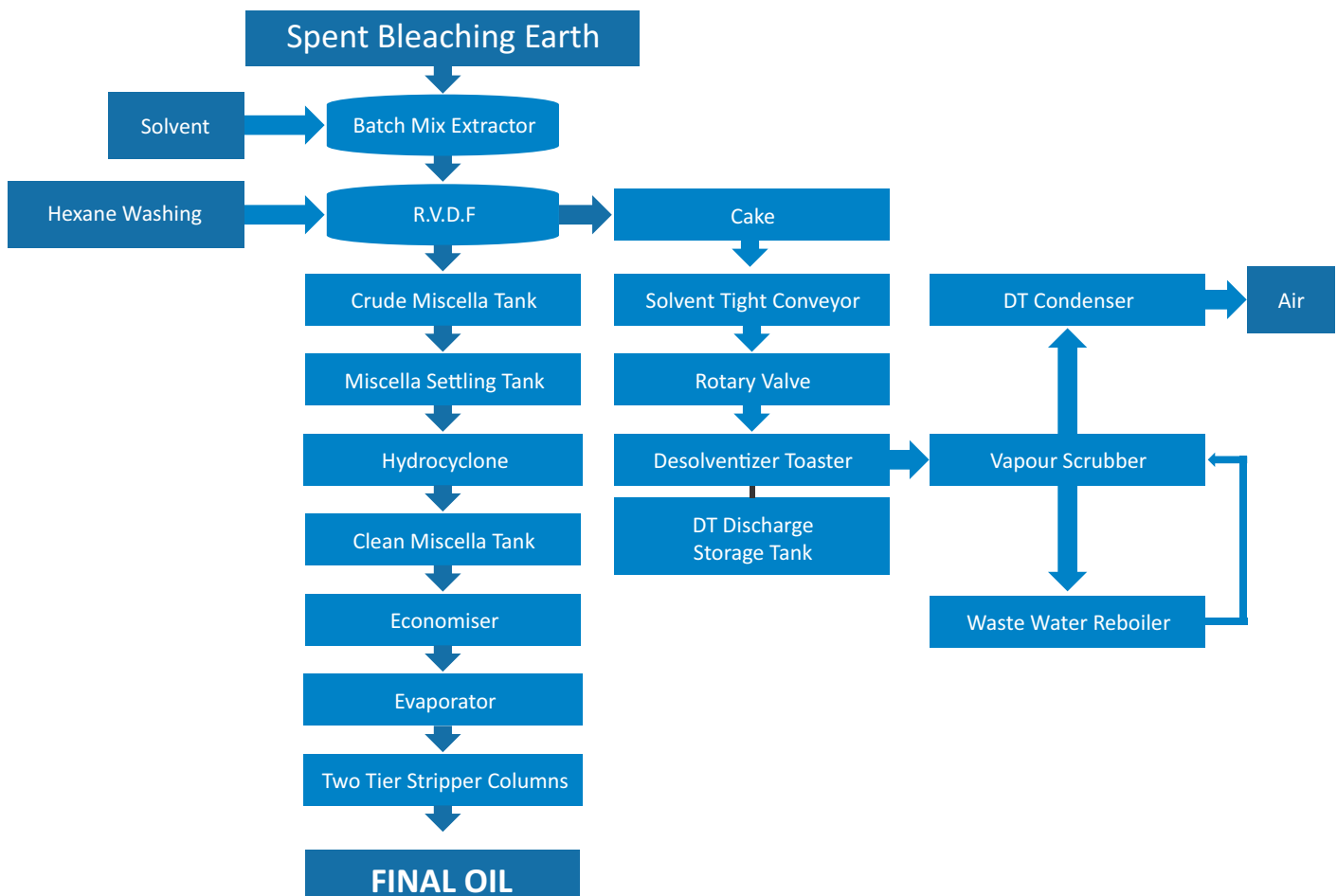
Spent Earth Oil Recovery



The process refers to recovery of oil from spent bleaching earth recovered from vegetable oil refining process. The process involves three sub- processes comprising of a) reacting the spent bleaching earth with a solvent selected from a group consisting of toluene, acetone, xylene, isopropyl alcohol or n-hexane at a temperature between 35°C. to 50°C.; b) separating the solids and liquid from slurry formed in the previous step; and c) extracting oil from the liquid fraction obtained in the previous step. The separation of the solids and the liquid from slurry can be achieved in two steps. The slurry mixture of solids and liquid is first separated into a solid fraction and a liquid fraction. The solid fraction so separated still contains a significant portion of oil. Therefore, the solid fraction is reacted with some solvent. The other slurry of solids and liquids is again separated into a solid fraction and a liquid fraction.

Typical Vegetable Oil Physical Refining process involves the Degumming of Crude Vegetable Oils such as Palm Oil to remove Gums and Phosphatides by Hydration with Phosphoric Acid, which is then settled out as Soap Stock. This reduces the Phosphatides in the Oil to approx. 20ppm. This oil is then bleached with Activated Earth in order to reduce the color in the Oil and, more importantly, to remove Peroxides, Residual Gums and Soaps which still exist, despite the prior separation process Industries such as the Crude Palm Oil Refining industry, large quantities of Spent Earth is generated and there exists a strong need to recover the Oil in the Spent Earth in an economical manner.

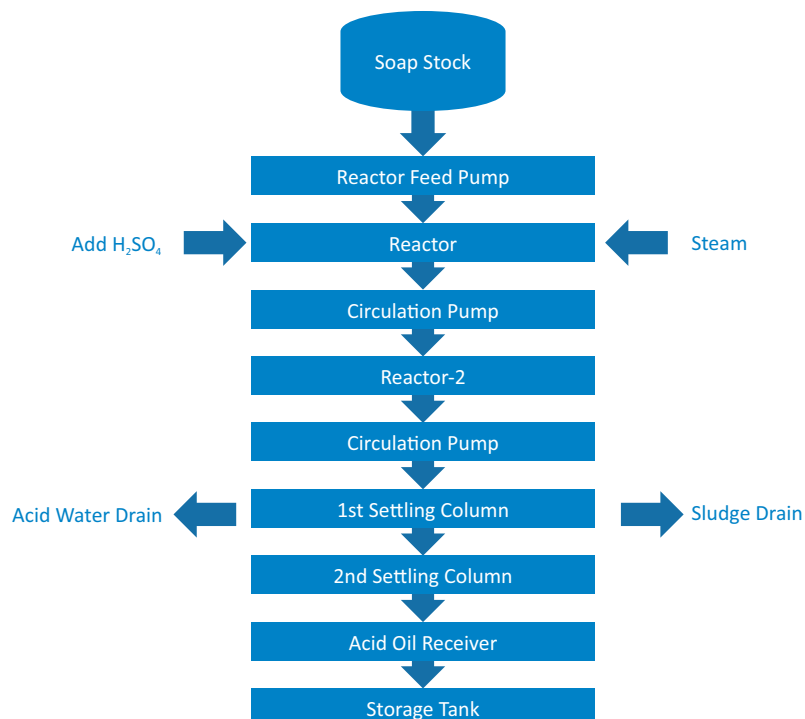
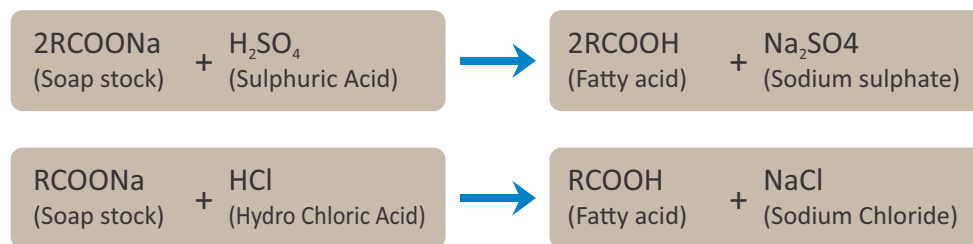
PROCESS FLOW CHART



Soap Stock Splitting



Acid oil is produced by splitting of vegetable oil soap stock with sulphuric acid or hydrochloric acid. Splitting process can be performed either in batch or in continuous process, but considering the production cost and quality of acid oil, continuous process is more economical than the batch process.



Continuous Saponification Plant



PROCESS DESCRIPTION

ABSTRACT

Mectech provides Continuous Saponification Plants ranging in capacity starting from 1 TPH. Soap Noodles are manufactured from the Fatty Acids of oil and fats derived from vegetable oil. Soap Noodles have a wide application in the manufacture of Toilet Soaps, Laundry Soaps and Bathing Bars.

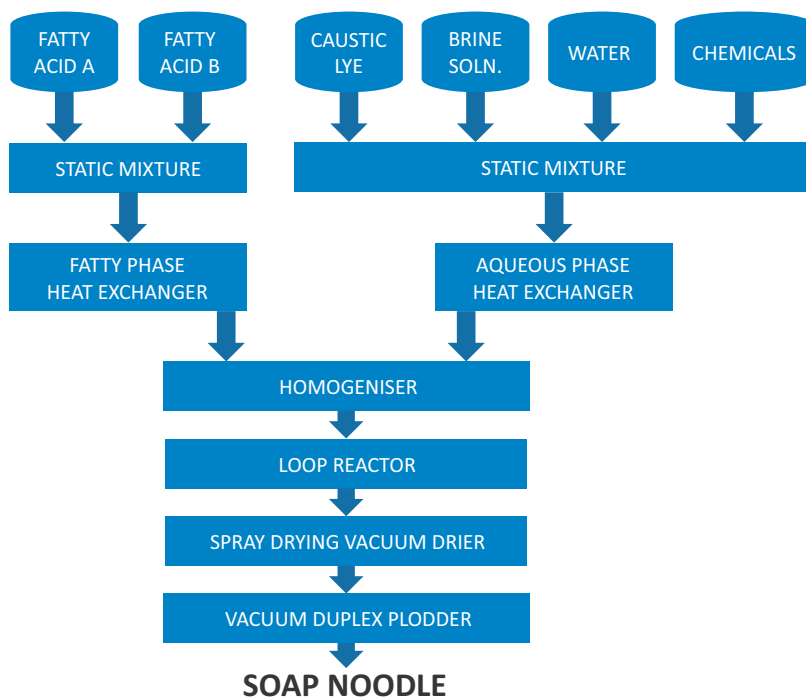
Measured and controlled streams of Fatty phase and aqueous phase, from their respective constant level dosing tanks, are pre-heated up to 95°C (max) before entering into the homogenizer. Fatty phase is a blend of fatty acids. The aqueous phase comprises of Caustic Lye - to saponify fatty acids, Brine Solution- to maintain the viscosity and other chemicals - to enhance the shelf life of the soap noodle as well as the final product. In the homogenizer, neat soap temperature is raised upto 135°C without using any external steam. This rise in temperature is brought about by the heat liberated from exothermic saponification reaction. The saponified mass then passes through a loop reactor for maturing and gives a constant flow of neat soap to Vacuum Spray Drier. The neat soap is sprayed into the vacuum spray drier to convert liquid neat soap into dry soap by removing moisture following which it goes into vacuum duplex plodder to produce soap noodles of desired TFM.

We use mass flow meters of very high accuracy (0.1%) and the signal is directly in Mass flow Units. Intensive mixing of the fluids in homogenizer provides a homogenous product at a faster rate. The continuous process allows easier achievement of a good and constant product quality because the operations are all instrument based and do not rely on operator inputs. This process produces clean neat soap. Continuous Saponification process requires lesser Steam, Water and Power which in turn minimizes Operating Cost and Payback Period.

MECTECH ADVANTAGE

- Plant is Fully Automatic.
- This is the only Continuous Saponification plant which gives precise control over free alkali content in Soap Noodle.
- No external heating of Neat Soap is required which in turn minimizes the utility consumption.

PROCESS FLOW CHART



Bio Diesel



Biodiesel refers to the addition of a methyl /ethyl group to the aliphatic chains in vegetable oils or animal fats rendering them equivalent to the properties of diesel. This is achieved by chemically reacting lipids (e.g., vegetable oil, Fatty acids, animal fat and used cooking oil) with an alcohol (Methyl/Ethyl) producing fatty acid esters.



Feed Stock

The feedstock for Bio Diesel can be categorised into two broad segments, viz:

Low Grade Feed Stock

Which includes used cooking oil, Acid Oil, Low grade fatty Acid, High FFA vegetable oil

High Grade Feed Stock

This includes Low FFA vegetable oil (CPO, Soya, Sunflower, etc.), Palm Stearin, High Grade Fatty Acid & Tallow

Blends

- Blends of biodiesel and conventional hydrocarbon - based diesel are products most commonly distributed for use in the retail diesel fuel marketplace. Much of the world uses a system known as the "B" factor to state the amount of biodiesel in any fuel mix
- 100% biodiesel is referred to as B100
- 20% biodiesel, 80% Petro diesel is labeled B20
- 5% biodiesel, 95% Petro diesel is labeled B5
- 2% biodiesel, 98% Petro diesel is labeled B2

Highlights

The plant is capable of manufacturing Bio-diesel conforming to EU (EN 14214) and BIS 15607:2005 standards.

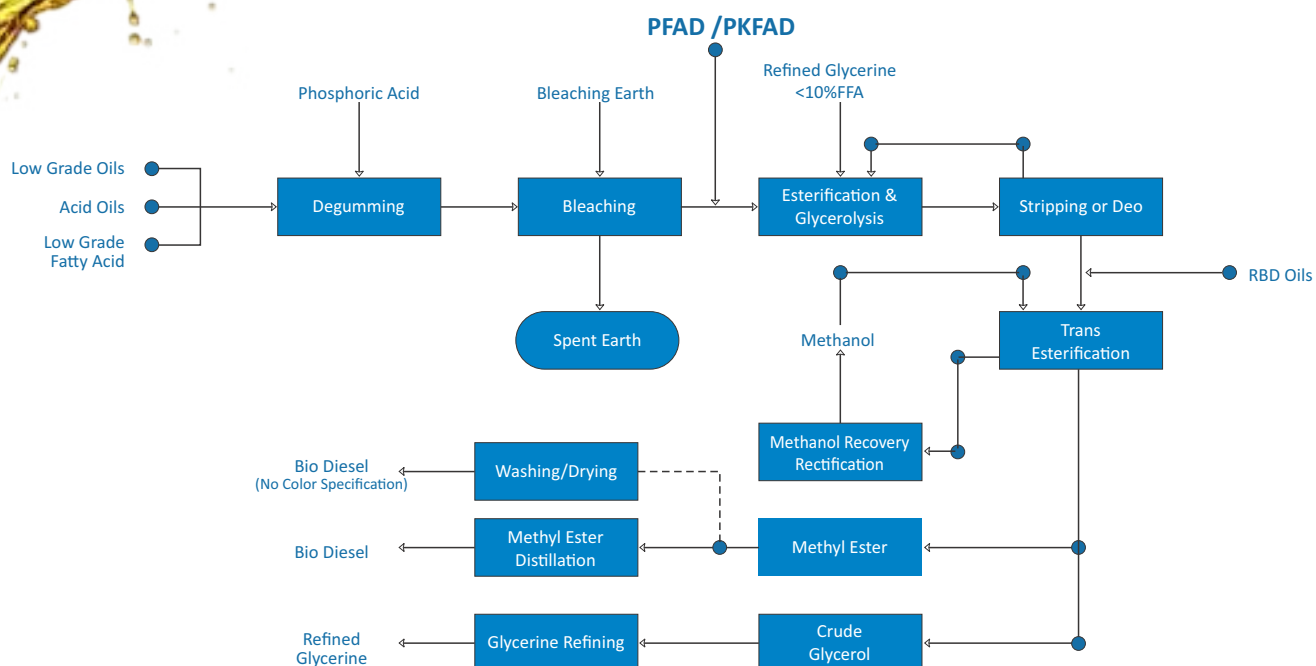
Extremely low Sulphur content; which helps checking Air Pollution.

Better industry benchmarks in ash & moisture content, total contaminations and carbon residue indicators.

MECTECH ADVANTAGE

1. Any Vegetable oil / Used Cooking Oil / by-products of refinery and animal fats can be processed
2. Single plant with Multi Feed Stock options
3. Very Low Soap Formation
4. Reduced Catalyst Consumption
5. Conversion Rate is very high
6. Low Methanol Consumption
7. Pharma Grade Glycerin
8. High Quality Bio Diesel as per International Standards
9. Highly Energy Efficient Plant
10. Utility Consumption Very Low
11. Waste Water is very low
12. Emission Standard very low
13. Fully Automatic PLC Operated Plant
14. 100 % customized Plant available in Batch Type & Continuous Type

Process Flow Chart



Fat Splitting Plant

Splitting is the process through which the triglyceride hydrolysis is carried out, breaking up the molecules to obtain fatty acid and glycerine. The mechanism of this reaction goes through three steps – the triglyceride is successively transformed into diglyceride, monoglyceride and glycerine, liberating fatty acid in each step. Mectech has built several plants for thermal pressure splitting of fats and oils with water into fatty acid and glycerine. It is a simple economical process and does not pollute the environment. Mectech provides Fat Splitting Plant ranging in capacity from 30 – 1000 TPD.



Process Description

The continuous, counter-current, high pressure fat- splitting process is the most efficient of the current methods of fat hydrolysis. The high temperature and pressure used permit short reaction time. Full counter-current flow of water and oil produces a high degree of splitting without the need of a catalyst. The splitting tower is at the heart of the process.

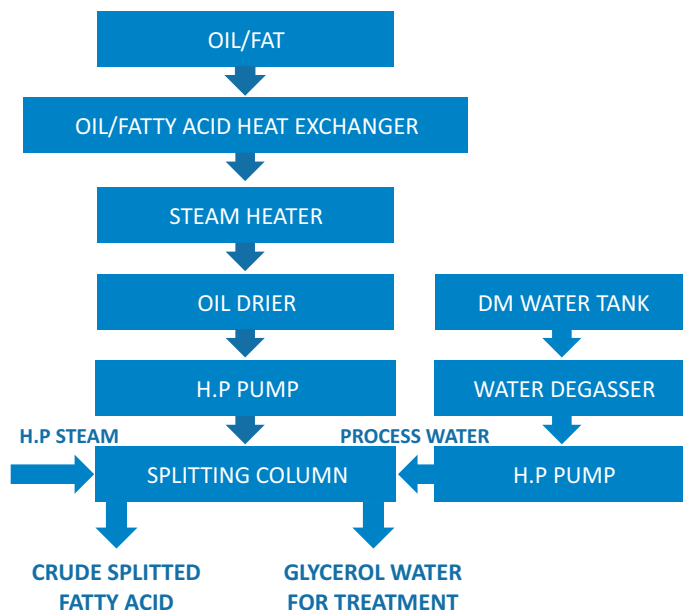
The Process water is introduced from the top and flows down through the continuous up-flowing oil phase. This is then dispersed with efficient distributors at the top and after regular intervals to ensure a MINIMUM SPLITTING DEGREE OF 99%.

High pressure steam (60 bar g) is injected into the splitting tower at 3 points.

- Bottom Steam: To bring input oil to temperature of splitting column, provide heat for reaction, and solubilisation netted against heat from outgoing sweet water.
- Middle Steam: Provide heat of reaction, maintain the optimum temperature for the splitting reaction.
- Top Steam: To bring water to temperature of the splitting column, netted against heat from outgoing Crude Fatty Acid and heat of water de-solubilisation.

Split fatty acids exits from the top of the splitting tower and sweet water from the bottom

FAT SPLITTING - FLOW CHART



MECTECH ADVANTAGE

- This is a Single Tower Design
- Our splitter working at the modern pressures of 50 - 55 bar G gives high degree of splitting 99%
- The splitter design has internal heat exchangers for heat recovery of outgoing streams.
- Distributors are placed strategically that redistribute the two phases that allow us to achieve this level of splitting efficiently.
- The splitter volume allows for 4 hours of residence time in order to fully complete the splitting.
- This section in our plant includes Pre-Concentrators to recover heat from the Flash Steam so that the sweet concentration from the process is in the range of 26–30% rather than the 10–11% that is obtained in older technology systems. Furthermore, heat is also recovered from the outgoing products.

Glycerine Recovery Glycerine Water Treatment & Evaporation



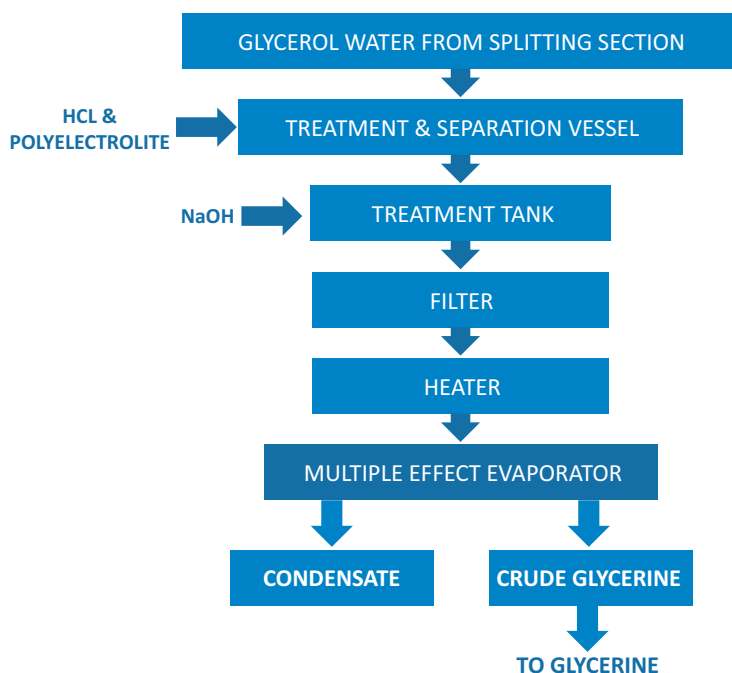
Glycerine is a ubiquitous substance that is widely found in nature and has a broad range of uses ranging from Cosmetics to Food Products. Mectech has long experience in the Oils & Fats and Oleo-Chemical industry sectors which has long been associated with the production of Glycerol as a by-product. Plants executed by Mectech produce Glycerol by the following means – the Transesterification of Methyl Esters, from Fats Splitting and by Saponification which is used to produce soap.

The Glycerine / Sweet Water purification and evaporation allows maximum recovery and pre-treatment before evaporation to produce Crude Glycerine. The pre-treated sweet water is concentrated in Triple Effect or Quadruple Effect Evaporation systems under vacuum. The use of multiple effects reduces the requirement of steam.

ADVANTAGE

- Energy saving devices attached to Splitter reduce the size of Glycerine Evaporation Plant thereby reducing the Overall Consumption of UTILITIES for the Sweet Water Pre- Treatment and Evaporation Section.
- MULTIPLE EFFECT EVAPORATION SYSTEM is designed for Glycerine Evaporation which makes efficient use of Steam required for Evaporation.
- The Condensate water from the System is collected and RECYCLED FOR SPLITTING.
- The extremely efficient HEATING CANDLES strip the last possible traces of Glycerine from the residue to maximum recovery.

GLYCERINE WATER PRETREATMENT AND EVAPORATION- FLOW CHART



Fatty Acid Plain/ Fractional Distillation



FATTY ACID PLAIN DISTILLATION

Fatty acids from splitting tower contains several impurities, such as odour bodies, unsaponifiable matter, aldehydes, water, together with high boiling components—unsplit glycerides, phosphatides, etc. These impurities are removed by adequate distillation in order to obtain a pure product with light colour and good stability. Distillation is one of the most effective purification techniques. It is an economical and successful method of producing high purity fatty acids.

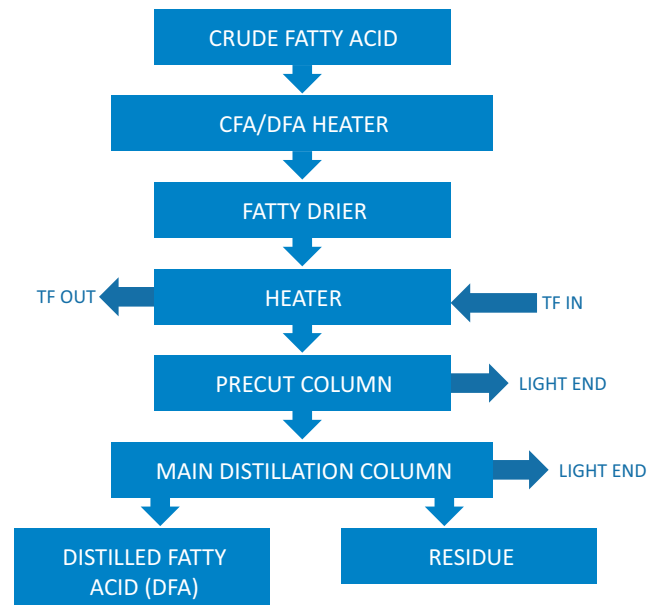
FATTY ACID FRACTIONAL DISTILLATION

Fractional distillation is used for separation of Fatty acid mixtures into composite cuts or even individual components.

This process is used to produce high purity fractions of fatty acids.

The fatty acids are fractionated in fractionation columns having structured packing which allow high separation efficiency and low pressure drop. Falling films are provided to gently evaporate the liquid phase and vapors are condensed in surface condenser. The operation depends on the feed composition or is based on the origin of raw material and the product fractions composition or purity. The number of fractional distillation column are selected and operated in series.

FATTY ACID DISTILLATION COLUMN



ADVANTAGE

- The Pre-Cut Column allows the system to handle the worst possible feed-stocks available in the market today like PFAD, Acid Oils etc., and still produce a high grade Distilled Fatty Acid for Soap Noodles
- Optimizes the recovery of heat and produces 3 bar steam for use Reduces the thermal stress on the product by the use of Falling Film Evaporators
- Mectech system has a structured packed column for efficient distillation and separation of odours, colours and fractions
- The use of the internal heavy end sections results in the best product colour

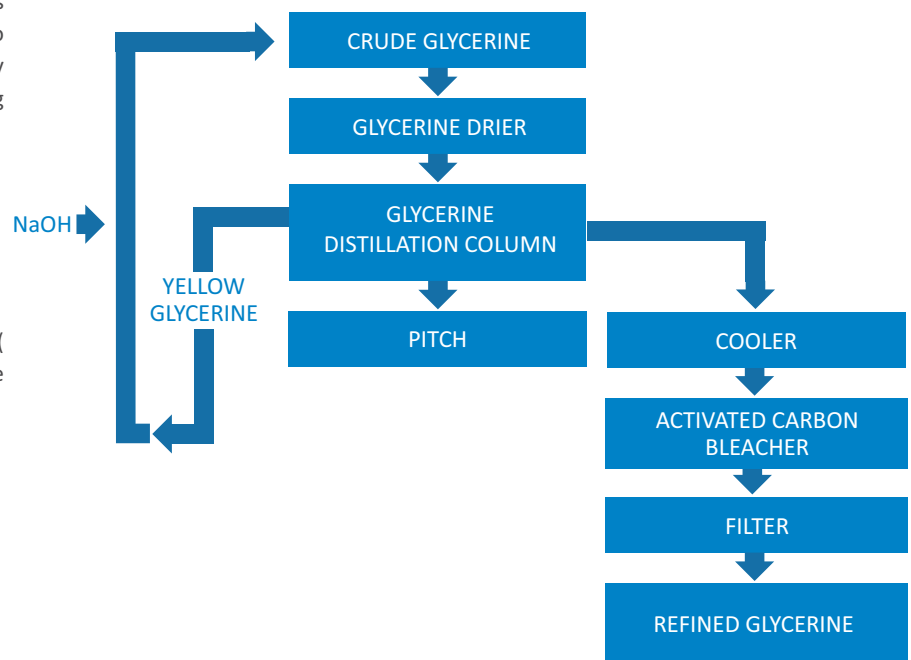
Glycerine Refining



The Crude Glycerine obtained from the process of Oils / Fats splitting (Sweet Water Crude) OR Saponification (Spent Lye Crude) OR Trans esterification (Biodiesel Crude) can be converted to Refined Glycerine of different grades (Chemically Pure, Industrial or Pharma) by using the following processes in sequence

- Drying cum Deaeration
- Distillation & Deodorization
- Bleaching
- Salt Decanter or Agitated / Wipe Film Evaporator (Optional – To improve yield & reduce waste generation)

GLYCERINE REFINING - FLOW CHART



ADVANTAGE

- Low Energy consumptions
- Maximum Yield
- Packed column design

Pilot Plants



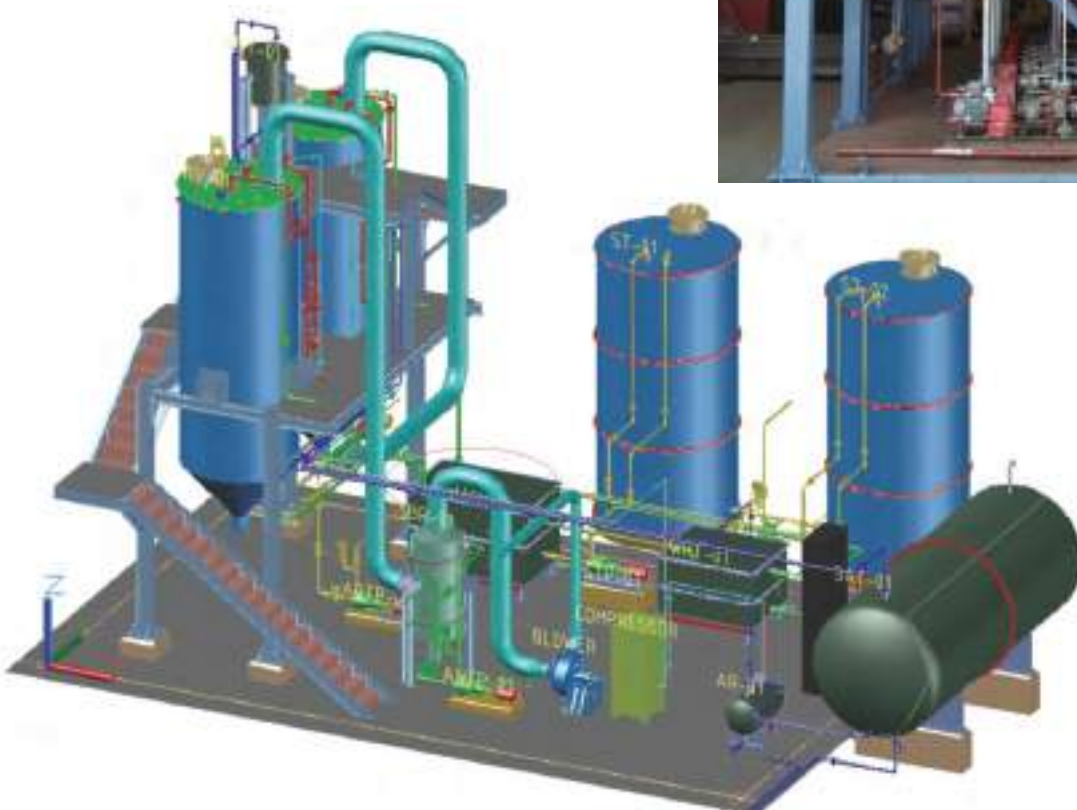
Mectech' recognizes the fact that R &D is an integral part of any manufacturing company who wish to launch a new product in the market. For the said purpose, Pilot Plants are required for ascertaining the desired product parameters , taste, composition , look & feel etc. , before going for mass production.

Mectech Process Engineers, can provide pilot plants from the capacity of 50 Kg/ Day to any capacity as desired . The Pilot Plants offered by Mectech are 100% customized and can be made skid mounted or can be set up in the R&D Shed of the customer.

Mectech can provide Pilot plant for the following:

- . Vegetable oil Refinery
- . Fractionation
- . Hydrogenation
- . Bio Diesel

Apart from the same if any other pilot plant is desired with respect to Vegetable oil Refining & Oleo Chemicals, Mectech' will consider the same & shall extend all cooperation.





Multiple trains

The reduced staffing that automation makes possible, coupled with the enormous expansion in data work-up and mining capabilities offered by today's computers will promote the increased use of multiple trains. This will increase the complexity of pilot plants as well as their support and maintenance requirements — but the added

productivity and effectiveness will outweigh the higher costs. Such setups may consist of multiple trains on the same unit or multiple copies of a single unit, depending upon the organization's requirements. They will provide not only traditional data but also more-in-depth analytical and operational results for use in evaluation and design.

Unit size

The days of the size of pilot plants shrinking every generation are probably realistically approaching an end. However, the use of very small high-throughput “pilot plants” (which actually are more akin to very complex experimental equipment) will increase. These high-throughput units will handle much of the screening currently performed more slowly and expensively in standard small pilot plants. Highly automated pilot plants then will run the promising leads at a more realistic and scalable range, to evaluate synergistic effects and operations at transient conditions as well as process conditions more realistic of a plant environment. The combination, when properly applied, will produce a greater number of high quality leads faster, and provide a means to screen these for the next generation of process or product improvements. Modeling will continue to augment and validate pilot-plant operations and, in the always symbiotic relationship, pilot plants will continue to augment and validate modeling.



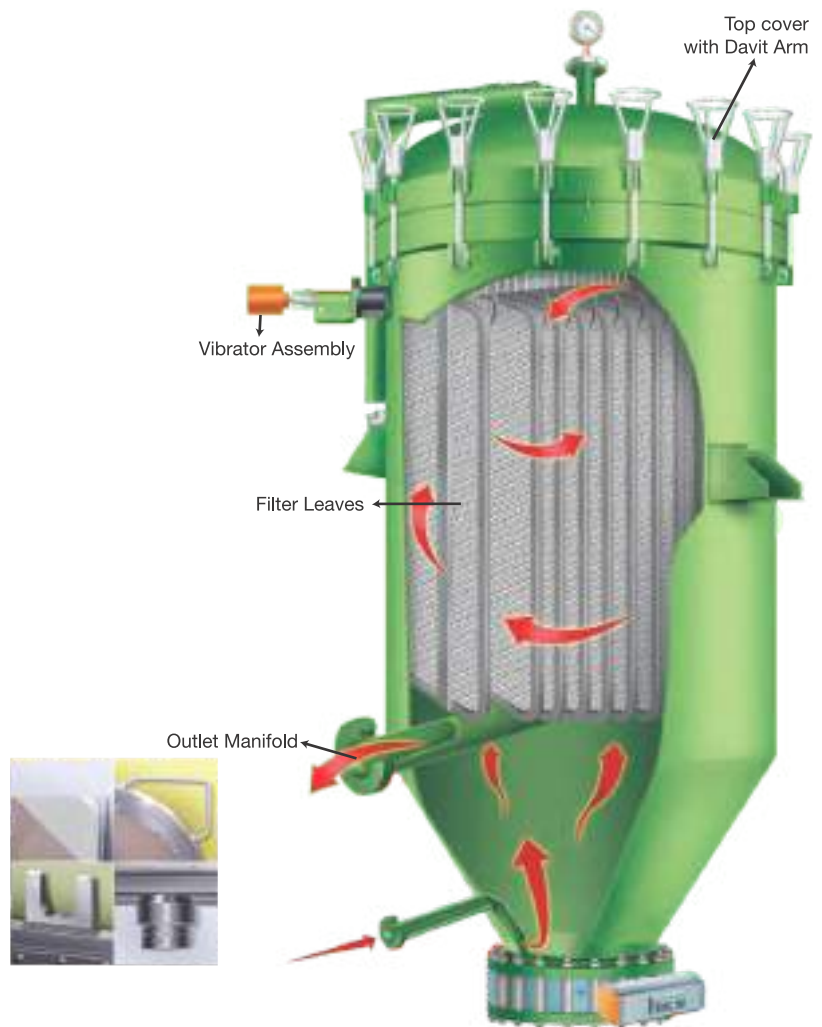
Vertical Pressure Leaf Filter

FEATURES

- Hermetically sealed
- Less space and more filtration rate.
- Designed for PLC automation
- Automated discharge of filtered cake
- Filtration areas up to 125 M2 in single housing
- Minimum pressure drops across the leaves

APPLICATIONS

- Edible Oils
- Pharmaceuticals
- Chemicals
- Bio Fuels
- Beverages
- Foods
- Pesticides
- Sulphur
- Brine solutions



MECTECH ADVANTAGE

- Less time consumption to start filtration
- Low maintenance cost
- CNC Machined Mouth and fitting parts
- Single O-ring Sealing arrangement
- High Temperature resistant O- rings and Sealing arrangement
- Automatic dislodging of filtered cake by pneumatic vibrator or oscillating sluice header
- Long Life of filtration Leaves

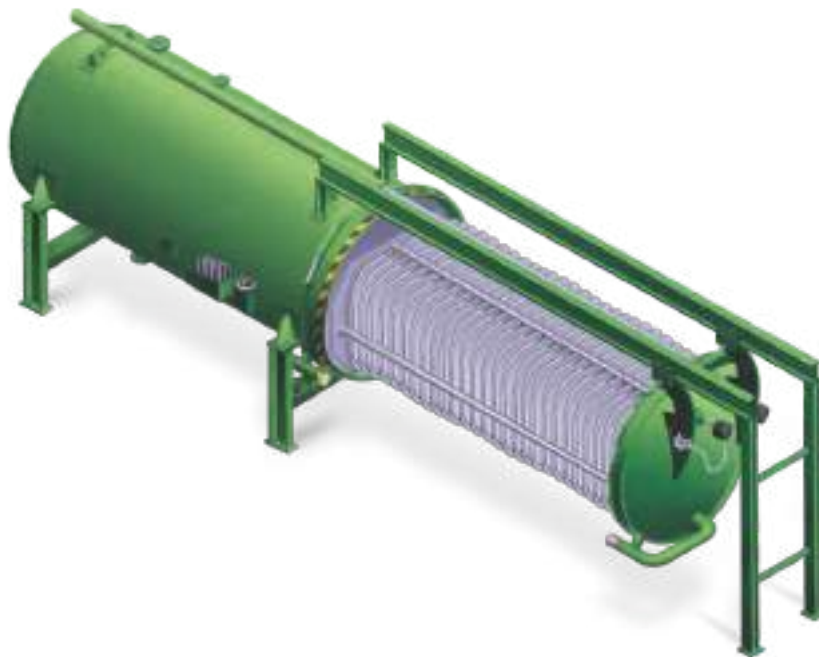
Horizontal Pressure Leaf Filter

FEATURES

- Movable bundle or movable shell
- Movement of bundle or shell by hydraulic power pack
- Designed for PLC automation
- Suitable for dry or wet cake discharge
- Filtration areas up to 200 m²

APPLICATIONS

- Edible Oils
- Pharmaceuticals
- Chemicals
- Petrochemicals
- Molten Sulphur



MECTECH ADVANTAGE

- Big filtration surface
- Easy to clean filter plates
- Heating jacket to prevent solidification
- The pressure leaf filter possesses no rotating parts, thus keeping maintenance to a minimum
- Less time consumption to start filtration
- Low maintenance cost
- CNC Machined Mouth and fitting parts
- Single O-ring Sealing arrangement

Shining Filter

FEATURES

- Plates in horizontal construction
- MOC of housing & plates in Stainless Steel construction
- No hassle opening and closing system
- Paper filters used in special application for shining products
- Commonly used in Edible Oils and Pharmaceuticals
- Capacity upto 50 tons/hr

APPLICATIONS

- Precious metal catalyst like Nickel and Palladium Carbon
- Pharmaceuticals
- Chemicals
- Oils and Foods
- Miscella
- Bio Fuels
- Beverages
- Foods
- Pesticides
- Sulphur



MECTECH ADVANTAGE

- Completely sealed machine
- Operates under inert conditions
- Zero movement of parts
- If required, fully PLC automation can be provided
- Large filter areas with low floor area
- By using right quality of replaceable filter cloth, particle free filtrate quality can be assured
- Cake discharge to suit the process requirement
- Heel filtration available

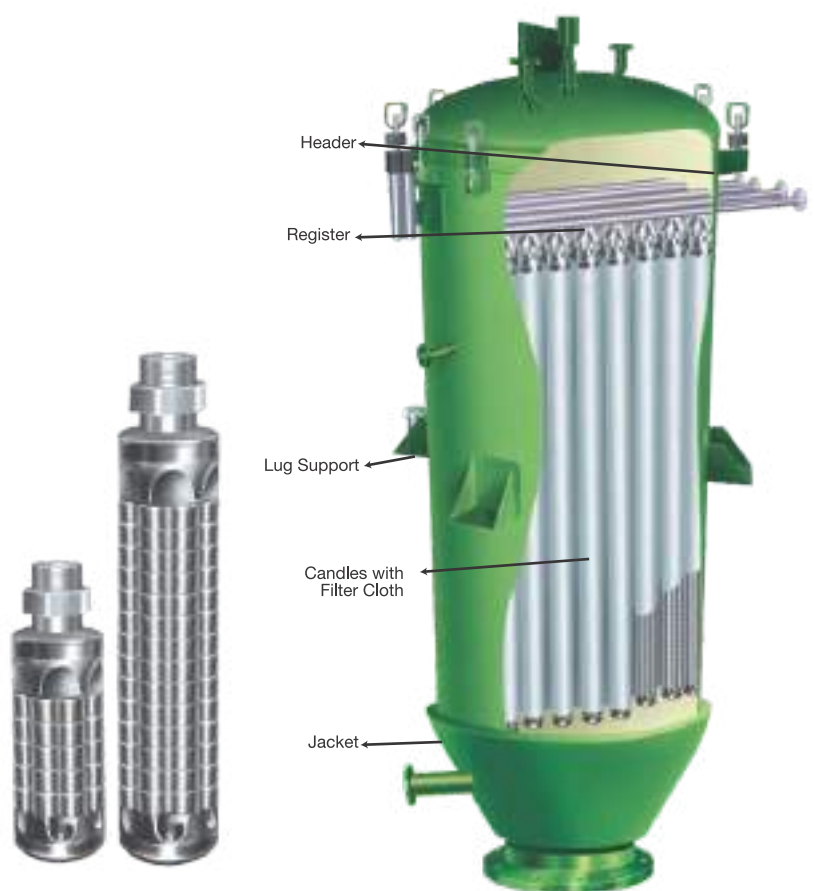
Candle Filter

FEATURES

- Filter elements in Stainless Steel construction
- Candle in Metal or Polypyrene construction
- Suit process requirement
- Body in Stainless Steel or Carbon Steel

APPLICATIONS

- Precious metal catalyst like Nickel and Palladium Carbon
- Pharmaceuticals
- Chemicals
- Oils and Foods
- Miscella
- Bio Fuels
- Beverages
- Foods
- Pesticides
- Sulphur



MECTECH ADVANTAGE

- Completely sealed machine
- Operates under inert conditions
- Zero movement of parts
- Auto cleaning with back wash under pressure
- Available up to 200 M2 filtration area
- If required, fully PLC automation can be provided
- Large filter areas with low floor area
- By using right quality of replaceable filter cloth particle, free filtrate quality can be assured
- Cake discharge to suit the process requirement
- Heel filtration available

Pulse Jet Candle Filter

FEATURES

- No frequent change of bags
- Filter cloth used is long lasting
- MOC Stainless Steel
- Designed for PLC automation
- Auto backwash for removal of solids

APPLICATIONS

- Edible Oil
- Biodiesel
- Food process
- Chemical Industry
- Catalyst Filtration
- Activated carbon filtration
- Polyols
- Pesticides



MECTECH ADVANTAGE

- No frequent change of bags
- Filter cloth used is long lasting
- MOC Stainless Steel
- Designed for PLC automation
- Auto backwash for removal of solids

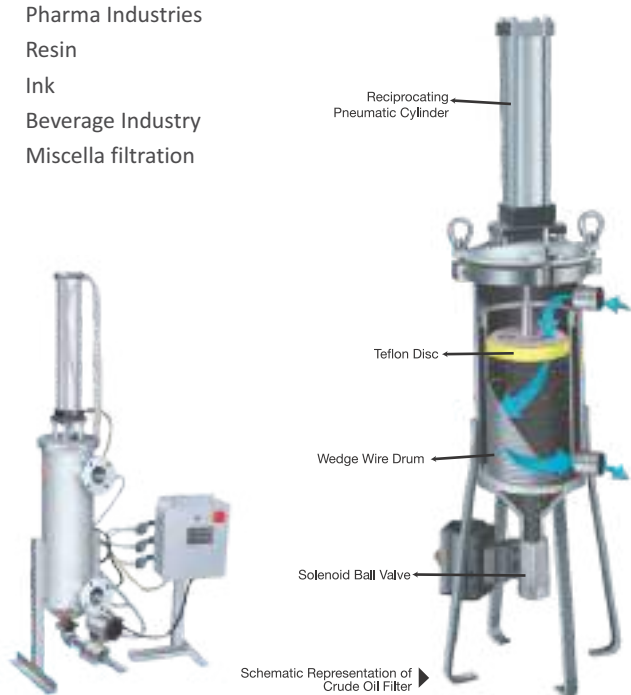
Self Cleaning Disk Filter

FEATURES

- Compact continuous automatic operation
- Permanent long-lasting filter media
- Total control of input, circulation of filter
- Liquid and outlet allow smart operation
- No labor required
- Very suitable for filtering high volume of low impurity suspended solids of the size 10 microns and larger

APPLICATIONS

- Chemical Industries
- Edible oil Industries
- Pharma Industries
- Resin
- Ink
- Beverage Industry
- Miscella filtration



MECTECH ADVANTAGE

- Low percentage of impurity removal from high volume duty
- To reduce load on centrifuges

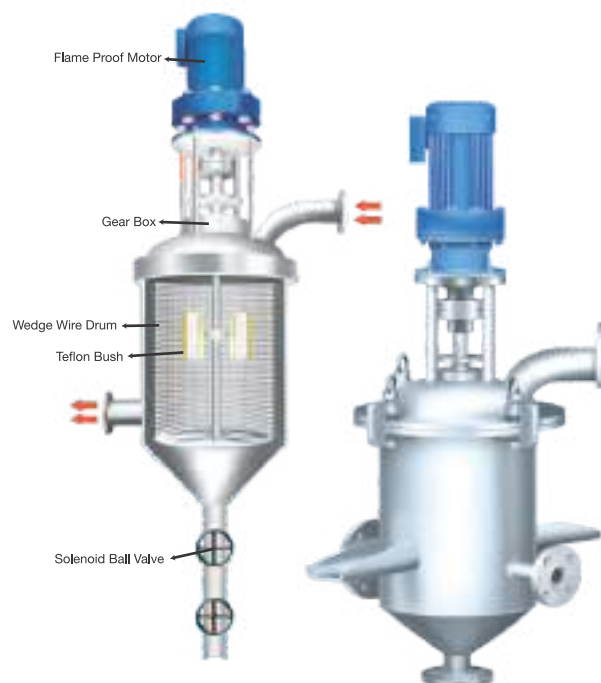
Automatic Brush Filter Strainer

FEATURES

- CS or Stainless-Steel Vessel
- Geared motor flame proof
- Wedge wire filter element in S.S.
- Rotating brushes in Teflon

APPLICATIONS

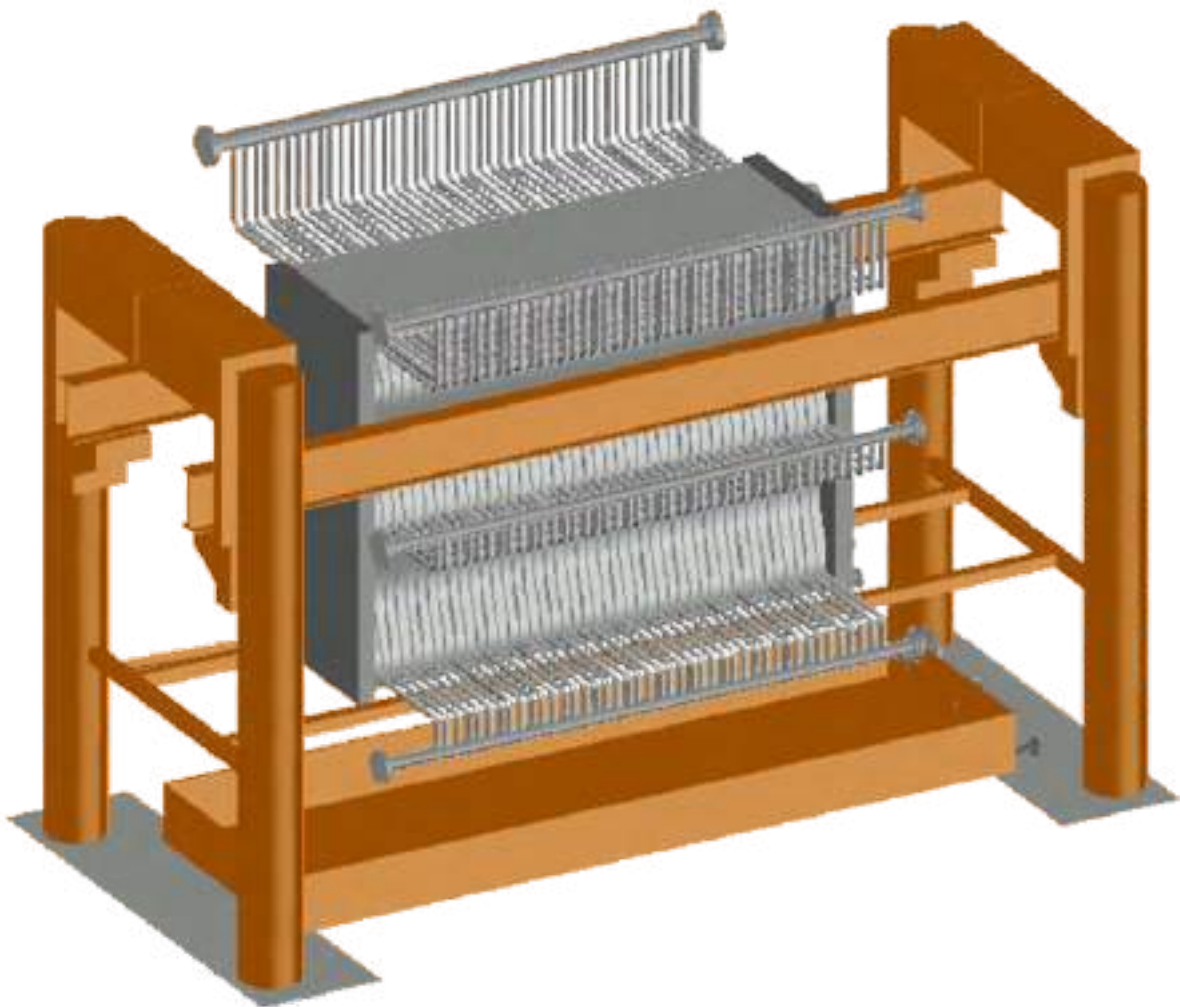
- Solvent Extraction and Related Fields



MECTECH ADVANTAGE

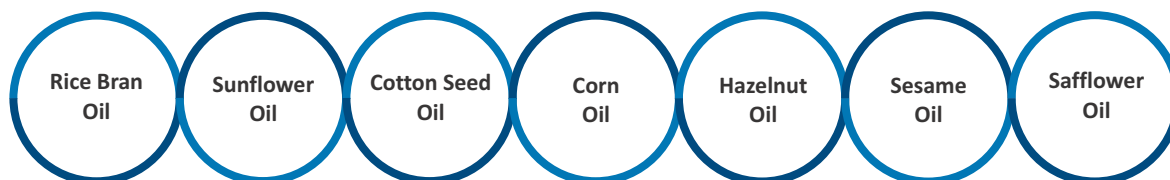
- Continuous operation with PLC/Timer panel and hence no manual attention is required
- Closed operation and hence no loss of Hexane
- Sediments are periodically de-sludged from bottom of vessel through bottom valve with actuator which is controlled by a timer and sent back to extractor

Mecklear Filter



Mecklear Filter is the latest innovation in filtration by Mectech. With this, the filtration process occurs at low pressures thereby restricting the passage of fine wax particles in the filtered oil. The clarified winterized oil after filtration through the Mecklear Filter is better as compared to the results obtained from high pressure filter. The Mecklear filter ensures removal of wax and stearin in a more scientific manner, while preventing oil spillage.

Mecklear Filter suitable for Dewaxing and Winterization



Technical Specifications

Mecklear Filters can be supplied with a filtration area varying from 100 M2 to 400 M2

| | |
|--|--|
| Utilities: | |
| Air | 0.5 bar pressure |
| Steam | 3 bar pressure |
| Water | Temperature will vary as per process requirement. |
| Range of Pressure | 0.1 to 0.6 bar pressure |
| Range of temperature | 2°C to 22°C |
| working pressure & temperature: | Shall vary as per process and technical specifications of oil. |

Salient features of Mecklear Filter

No Hiflow required for filtration, saving in cost of Hiflow and oil loss with it.

No manual operations ensures savings on manpower costs

All operations can be PLC controlled as per client demands

Enhanced Operational Convenience

Wax/stearin removal after filtration takes shorter time without the need for opening the filter

Prevents spillage due to closed system

Cooling of filter to desired operating conditions for next operating cycle achieved within short time

Saves on maintenance costs as absence of moving part precludes maintenance

Filter element replacement required after 1½ to 2 years of operation

Workshops

MECTECH PROCESS ENGINEERS PRIVATE LIMITED

is a proud participant in edible oil, Oleo chemical and filtration Process Equipment and Projects. We believe that the effective management of health, safety and well-being for those working for and with us is a measure of our success.

This safety philosophy underpins the entire business and we expect all workers (employees and contractors) that work with us to uphold this philosophy.

We value our employees and team in return, we expect that they will co-operate with our efforts as part of this vision upholding the following ideals:

- **To return home safely uninjured** at the end of each day's work.
- **A commitment to excellence** at all levels in all our workshop operations.
- Confront every situation with an **optimistic and positive approach**, maintain a sense of purpose at all times so that plans and strategies can be turned into realities.
- Meet problems and opportunities with **inventiveness and initiative**, and **react and adapt quickly** to new situations. No problem is insurmountable and no challenge should be too great.
- Don't sit back and wait for things to happen - **make things happen**.
- **Loyalty** is a core value. Maintain an **honest approach** at all times.
- **Always remain flexible** - **Constructive** advice and comments from anyone are welcomed here.

Aim for good communication between all staff members.
Effective communication is essential for safety, efficiency and goodwill between employees.



Manufacturing Strengths

3 Units with International Approvals

Only EPC Company to have In House
World Class Manufacturing Facilities in India

Certified by

ASME & National Board
 ISO Certified
 CCOE Approved
 PED Certified
 European Standards Approved



Certifications

Mectech fabrication facilities having following Certifications

ASME "U" Stamping
 National Board "R" stamping
 PED Approval
 ISO9001:2015
 OHSAS 18001:2007

Standard Using for Manufacturing Activities
 ASME Standards
 EN Standards





Nether



MEC



Argentina

Customer base
in 18+ Countries



40%
Of Exp



rlands

Romania

Turkey

Uzbekistan

Iran

Pakistan

Nepal

Bhutan

India

Bangladesh

Philippines

Malaysia

Indonesia

Sri Lanka

Kenya

Tanzania

Congo

ch
TECH



Years
Experience



400+ Projects
Completed



MECTECH PROCESS ENGINEERS PVT. LTD.

Corporate Office: 366, Phase – 2, Udyog Vihar, Gurgaon – 122 016, Haryana, India.

TEL: +91-(0124)-4700800 (30 lines) | FAX: +91-(0124)-4700801, 4700802

E-mail: info@mectech.co.in, sales@mectech.co.in