

# Processing Plant



### General

Excellent experience gained over the last years on Edible oil refining and oleochemical plants further reinforces our commitment to offer innovative and eco sustainable solutions for both edible and inedible oil processing plants.

Our ability to design in this field is represented in the following pages which show our concepts of single unit or multi purpose unit.

Our specific solutions for specific projects are the activities that are carried out in close collaboration with the customer in order to identify the best applicable technology and optimize investment profitability. This is our best and innovative proposal to our partner. We are actively investing in upgrading and expanding our knowledge, while enhancing our design capabilities.



### We can develop your idea.



We assist customers in the project development and realization process – from the preliminary research, feasibility study, conceptual design, technology selection, assignment of tasks specification to the detailed engineering design, procurement, construction, commissioning & start-up, maintenance & optimization and personnel training.

This unique focus allow us to develop services to trigger process improvement, providing a range of " Services to Compete". In this manner, with market conditions ever changing, we offering the engineering services at an extremely affordable price.

# Oil & Fat Processing



## General

Biodiesel is produced from animal fats, vegetable oils, soy, rapeseed, jatropha, palm oil, algae and so on using trans esterification process.

Pure biodiesel (B100) is a liquid similar in composition to fossil/mineral diesel. it is a renewable energy source, is sulfur free, no toxic, biodegradable, safe to handle and it is less polluting.

Today, biodiesel as any biofuel should be produced from only sustainable raw materials in compliance to regional energy policy.

For this purpose, IPS can assist the customer to carry out environmental impact evaluation and prepare complete report for local authority.

Our ability to design in this field based on excellent experience in design of power plants from renewable sources, such as biomass, biogas and biofuels in the past decade plus the experience gained over the last three years in Edible oil refining and oleochemical plants.



### Process

The refined triglycerides are transesterified under mild conditions , 50 - 70 °C, atmospheric pressure and excess methanol to yield Fatty Acid Metil Esters. (FAME). The reaction is carried out continuously with alkaline catalysts. The transesterification is an equilibrium reaction and is shifted toward the desired ester by excess methanol or removal of glycerol:



METHANOL

TRIGLYCERIDE

GLYCEROL FATTY ACID METHYLESTER

In order to obtain fuel in accordance to the specific performances, improving yields and avoid undesired reactions, in most of the cases is necessary to treat the feedstock.

For example if the feed acidic is higher than 0.1%, then it is possible soap formation in the reaction as by product, therefore it is recommended that feedstock has the following specifications:

FFA content	0.1 % max
Moisture	0.1 % max
Phosphorus	10 ÷ 15 ppm
Cold test (AOCS)	5,5 h@0°C

#### Capability & Performance

We can supply continuous or semicontinuous deodorizers in a wide range of capacities, from 20 to 800 t/d to obtain a high quality FAME in complying with the required international standard.

Technically, the product unit can be added to a mineral fuel at any requested ratio. It can also be used directly in most diesel engines without requiring extensive engine modifications.

Regarding the yield, based on 1000 kg pretreated rapeseed oil is as follows:

Biodiesel	1000 kg
Crude Glycerin	128 kg
or Pharm\ tech. Grade	93\5 kg

# Transesterification



Biodiesel production unit block diagram

The approximate utility consumption per ton of FAME is as follows:

Satu. Steam @4 bar and 12 bar	290 kg
Electric energy	15 kW
Cooling water	35 m3
Methanol @ 99,85% wt	110 kg
Sodium methylate 100 % wt@ 30% conc. in alcohol solution	5÷6 kg
Phosphoric acid	2 kg
Process water	0.1 m3
Caustic Soda (50% solution)	2 kg
Hydrocloric Acid (35% solution)	5 kg

# Sulfur reduction

IPS has developed a process solutions for the reduction of the sulfur content based on analytical examination of all unit processes that will be implemented on case by case, according to sets of criteria and chemical-physical properties of the substances involved in process.

Sulfur content in a biodiesel produced via transesterification can be minimized (less than 10 ppm) by optimization of the process parameters or by a small modification of existing plant.

In fact, if it is true that the sulfur content of biodiesel depends on its original content in different feedstock, it is also true that the significant sulfur reductions must be achieved logically during the pretreatment, transesterification, separation and distillation steps.



# Separation of Mong

The purification of crude glycerol from methyl esters can be done with different techniques. It may carry out with chemical treatments, filtration, distillation, and other. The choice of technique to be applied depends on a good understanding of the physical as well as the chemical properties of each of the substances involved in process and it must be studied case by case.

IPS has developed a new chemical treatment in order to separation of Mong content of glycerol jointly with the bleaching effect.

The application of this treatment in an existing plant requires its implementation according to chemical-physical properties of the substances content in glycerol.



IPS Chemical treatment for separation of Mong from Crude Glycerol

### Contact

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