

## FAQ'S FOR LAYER ESTERIFICATION PROCESS TECHNOLOGY



### Q.1 What is meant by Layer Esterification process?

Converting Free Fatty Acids into glyceride without using Catalyst or Chemical in a layer form is called Layer Esterification process. MECPRO believes that to maintain a competitive technology edge, it is necessary to continue to improve and modify existing processes, as well as develop new applications.

### Q.2 What is the process technology?

Critical understanding of the chemistry of the process by MECPRO provided the potential to explore the technology. **Triglycerides** are esters of glycerol and three fatty acids. Fatty acids are in turn aliphatic compounds containing 4 to 24 Carbon atoms and having a terminal Carboxyl group. **Di-glycerides** are esters of glycerol and two fatty acids and **Mono glycerides** are esters of glycerol and one fatty acid. The characteristics of the triglycerides are influenced by the nature of fatty acid. Years of consistent development has generated this commercially viable process technology.

### Q.3 Does it require any Catalyst or Chemical?

The Layer Esterification process offered by Mecpro is based on Glycerolizes process on layer form and does not require any Catalyst or Chemical. It only requires Glycerin to re-bond the fatty acid molecules to convert into triglycerides in a condensation process.

### Q.4 What kind of oil can be Layer Esterified?

Any oil can be Layer Esterified, which could include Crude Palm Oil (CPO), Used Cooking Oil (UCO), Sludge Palm Oil (SPO), Palm Fatty Acid Distillates (PFAD), Rice Bran Oil (RBO), Rendered Animal Fat and Trap greases etc.

### Q.5 Is there a limit on the percentage of Free Fatty Acid in the feed stock?

There is no limit on the percentage of Free Fatty Acid and our technology can process from 2% FFA to 90% FFA oils, with great ease and bring down the FFA Level to less than 0.1 %.

### Q.6 Can it be integrated into the existing refinery?

With minimal disturbance to an existing plant, the Layer Esterification reaction column can be retrofitted into the exiting refinery. As the equipment does not require much space, it can be safely incorporated. Installation will be done in a such manner that you can run the plant in Layer Esterification mode or refining mode depending upon the cost of FFA in the market.

### Q.7 Is there any loss during process?

There is no oil loss in the process; however, it increases the weight by 42% of the glycerin quantity added to perform the layer esterification.

### Q.8 Does it affect the quality of the Finished Oil?

The unique method of Layer Esterification process technology developed by MECPRO does not have any adverse affect on the quality of the finished product up to 10% FFA. As a matter of fact, its specifications are comparable to the other products.

### Q.9 What is the composition of Mono, Di and Triglycerides after Layer Esterification?

After Layer Esterification, the composition of oil would be as follows:

- Mono Negligible.



- Di 40% of the FFA converted
- Tri 60%

For example, if we process CPO with 5% FFA, the FFA remaining in 1 MT CPO is 50 Kg. In this case we have to add 6.5Kg glycerin and after the process the FFA will be less than 0.1 weight the weight will increase by 2.6 Kg

**Q.10 How much glycerin is consumed and of what specifications?**

Glycerin to the extent of about 13% of the FFA as palmitic and 12% of the FFA as oleic acid in the oil is consumed; however, in order to have low utility consumption is advisable to use USP grade glycerin having 98% to 99% purity. In order to make a product fit for human consumption, the glycerin should be of above 99.5% purity.

**Q.11 Is Layer Esterified oil safe for human consumption?**

It is indeed a very safe process and oils up to 8 to 10% FFA can safely be used for human consumption after going through the Layer Esterification process. Since we are not using any catalyst, only modification of fat has been done. However, it totally depends upon the rules and regulations of the country as regards food safety.

**Q.12 What is the minimum economic Plant Capacity?**

Ideally, 50 TPD is a minimum economic capacity for a Layer Esterification plant, which can go up to any extent -- 500 TPD or 1000 TPD and even more.

**Q.13 What is the project implementation schedule?**

The retrofitting of the Layer Esterification plant in an existing Refinery can be done in four to six months. However, a new green field plant would take almost 12 to 18 months to commission, depending upon the place and soil conditions. The process can be easily integrated with existing refining facilities.

**Q.14 What is the payback period for Capex?**

The payback period for the project is between 1 to 3 years and hence it makes the project commercially viable. Today this process has an established reputation as a low cost, efficient, safe and reliable method that provides a high quality product which is well accepted by the industry. However, everything depends on the prevailing cost structure. If there is a difference of \$ 100 between the FFA and CPO price, the project will be commercially viable.

**Q.15 What is the Utility Consumption?**

There is no other utility consumption except Glycerin, 0.7 KW power and thermal heat 0.7 KW for 1% FFA, which would be the only utility in addition to that already used in the refining process.

**Q.16 Can we bypass the Layer Esterification Process?**

Certainly, by simply closing the input and output valves you can bypass or isolate the Layer Esterification system, if need be, from your refinery

**Q.17 Is the process technology Proven or Patented?**

The company has successfully introduced the Layer Esterification technology in over 35 units. This technology is now firmly established and a number of commercial scale plants have been successfully designed and installed, thus making them highly efficient processing plants with minimal environmental impact. It helps the usage of higher FFA oil as a feedstock for bio-diesel without acid-base inter-esterification.

**Q. 18 why should one buy MECPRO's Layer Esterification technology?**

The criteria for embarking on project that includes Layer Esterification technology may be summarized as:

**Operational Safety-** Simple and reliable process without using any Catalyst.

**Logical Progression-** Starting with low to high FFA as a feedstock.

**Product Flexibility-** Can produce products to suit market conditions

**Cost effectiveness-** Simplified flow sheets with recycle optimize conversion efficiency to give the lowest investment and operating costs,

**Low environmental impact-** Virtually eliminates effluent discharge.

**Market advantage-** Flexibility to use the most appropriate process route consistent with available low cost feedstock.

**Up-to-date- capability** to retrofit improvements as and when they become available.

**Q.19 How do we proceed further?**

MECPRO can arrange a detailed technical presentation for your core technical team, to clarify any doubts. Moreover, MECPRO can arrange a plant visit to demonstrate the process in an operating plant.