



## Pre-Treatment of Oils and Fats for Biodiesel Production

# Together We Start the Engine of Progress

The pre-treatment of oils and fats is one of the most important criteria for the production of high-quality biodiesel. Westfalia Separator Food Tec offers you complete process lines for achieving optimum quality in your chemical or physical refining processes.

Biodiesel is one of the industrial products with the most significant potential prospects. However, a key criterion of success is combustion properties which can compete with conventional diesel. In order to realize these properties, oils and fats which are to be transesterified into biodiesel initially have to be subjected to a special refining process. Only such pre-treatment is able to remove the substances that are undesirable in the subsequent products biodiesel and glycerine.

## Maximum efficiency

Chemical and physical refining processes, in which separators play a key role, have now become established for this purpose. Westfalia Separator Food Tec offers you not only stand-alone machines but also complete process lines for maximum efficiency. These process lines set standards in terms of quality and efficiency, irrespective of the method which you use in your operation.

## Benefits of pre-treatment:

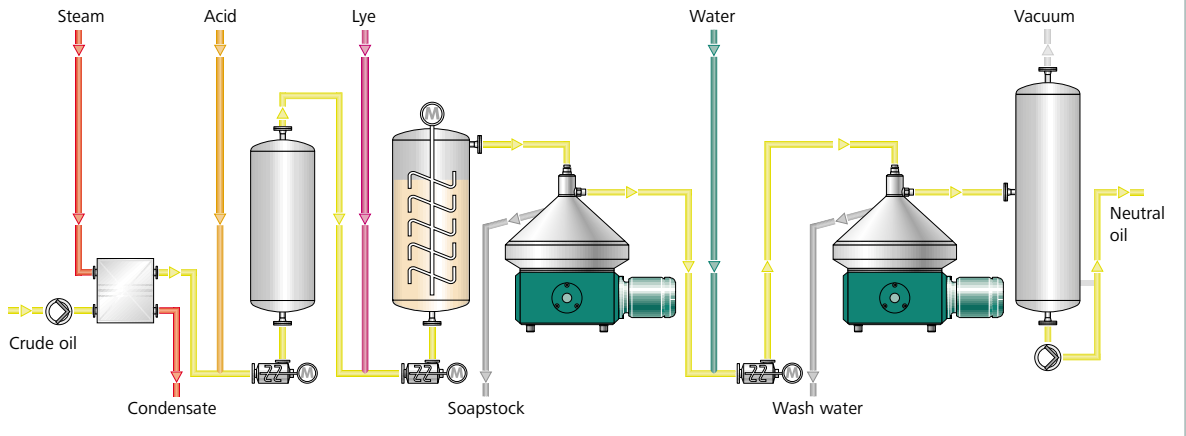
- No contamination – better glycerine quality
- No gums which might result in caking in the thermal glycerine process
- No phosphates in the waste water – reduced disposal costs
- No free fatty acids – reduction of the MONG content in glycerine (Matter Organic NotGlycerine)
- No waxes – higher cold stability of the biodiesel

## Advantages of complete process lines:

- Fully continuous operation
- Outputs of 50 to 1,200 tonnes per day
- Biodiesel of the highest quality
- Simple process management
- Low operating costs

Self-cleaning RSE separator in  
explosion-proof design in  
conformity with ATEX regulations





2-stage neutralisation

# Alkaline Refining: Traditional Process For All Kinds of Oils and Fats

Alkaline refining is a tried-and-tested method which yields a top-quality starting product for the production of biodiesel with very low upfront costs: even in the case of lower-grade oils and fats. The fatty acids in the so-called soapstock can be recovered using a soap splitting method.

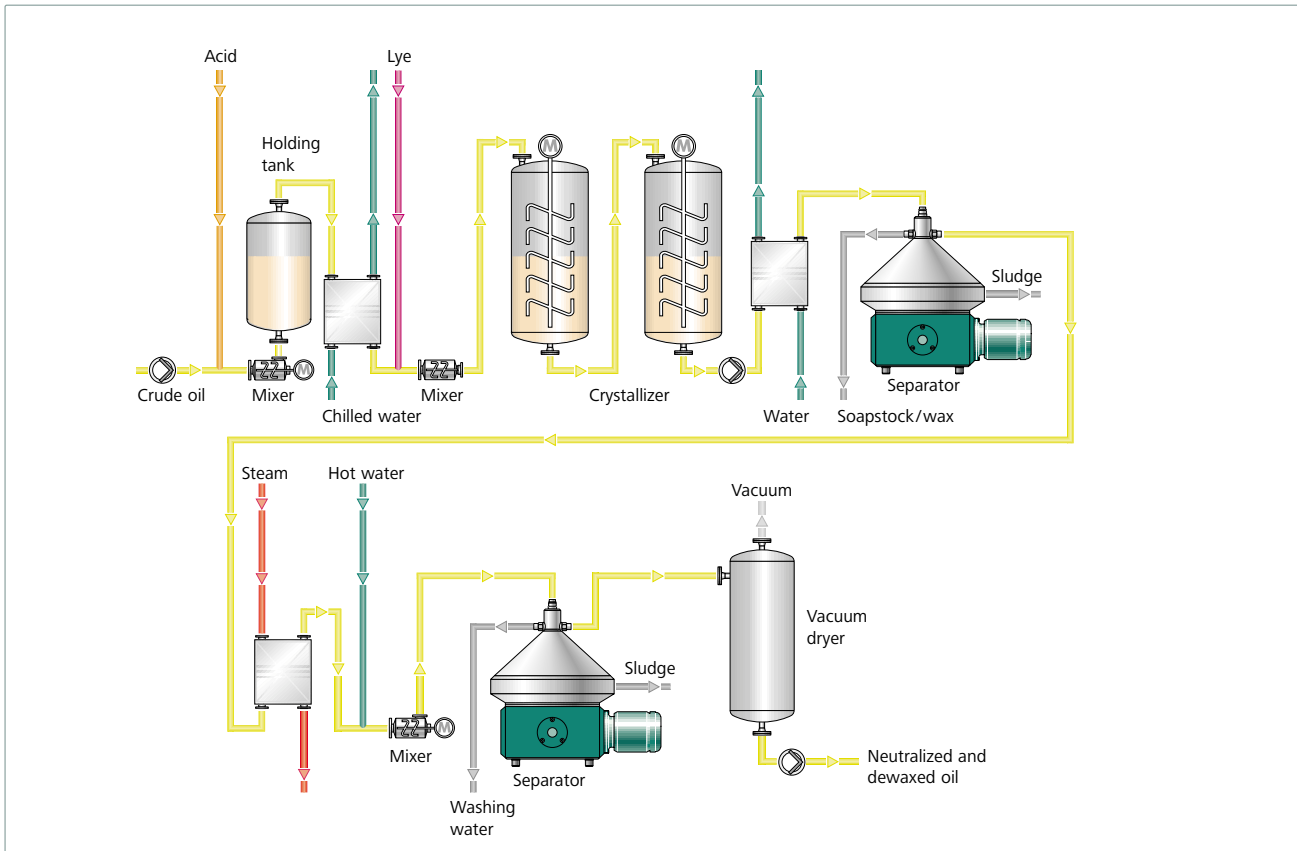
An operator who uses alkaline refining enjoys the advantages of a tried-and-tested method which removes free fatty acids, gums and impurities. Two different process alternatives have become established:

- Standard neutralisation with which virtually all oil and fat types can be treated, with the exception of castor oil
- Cold neutralisation with which oils containing wax (e.g. sunflower oil) can also be winterised at the same time as being neutralised. This process prevents precipitations in the biodiesel at low temperatures

be configured to handle every crude oil quality. Even if lower quality oil is processed, the installation is able to adapt to cope flexibly with any quality. Acid and lye treatment function reliably, even if lower quality oils and fats are processed.

However, soapstock cannot be avoided in this process; this is a by-product which has to be disposed of. Soap splitting enables the fatty acids in the soapstock to be recovered.

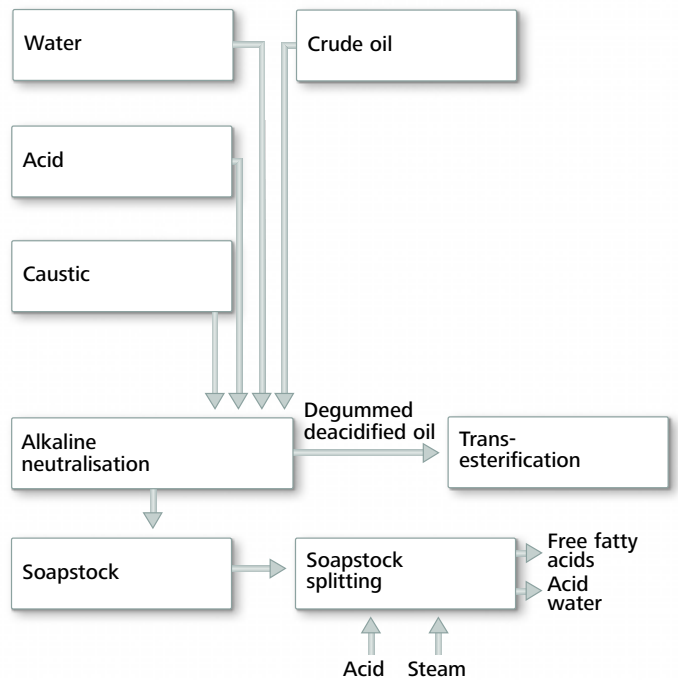
The process lines of Westfalia Separator Food Tec can



Cold refining

**The Process – An Overview:**

- High product quality
- Also processes lower quality oils and fats reliably (with the exception of castor oil)
- Low investment costs
- Ease of operation
- Can also be used for production of edible oil
- Disposal of soapstock is necessary





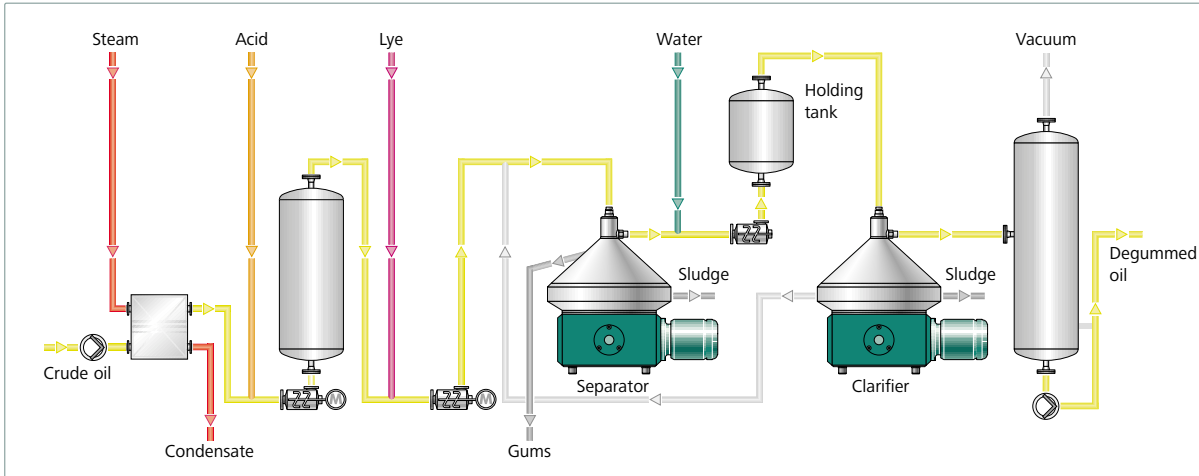
## Physical Refining: Proven Technology for High FFA Oils

With physical refining, the content of free fatty acids can be removed by distillation. The advantage is fewer losses and direct production of free fatty acid without an additional process stage (soapstock splitting). The basic requirement in this respect is prior optimum degumming. Westfalia Separator Food Tec offers process lines for such degumming, for every desired processing capacity.

With so-called "TOP degumming", Westfalia Separator Food Tec offers a special degumming process which provides significant advantages compared with conventional methods. The physical alternative however involves higher investment and energy costs.

### The advantages in general:

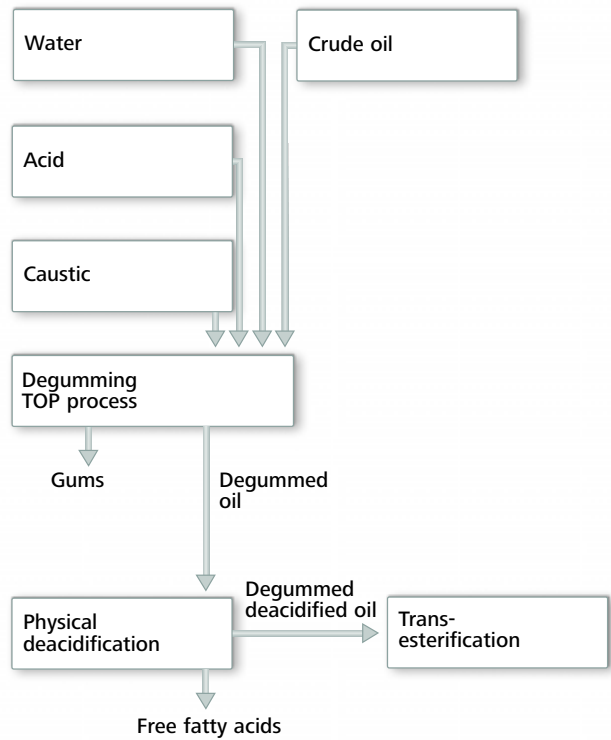
- Good quality of fatty acids
- Can also be used in conjunction with a high content of free fatty acids
- Low losses with a high content of free fatty acids
- The fatty acids can either be sold directly or esterified



Top degumming

**Advantages of the TOP method:**

- Low residual gum content (<10 ppm) and phosphatide content
- Short reaction time – simple change of product
- No additional wash water discharge
- Less emulsion in the transesterification process due to low P content





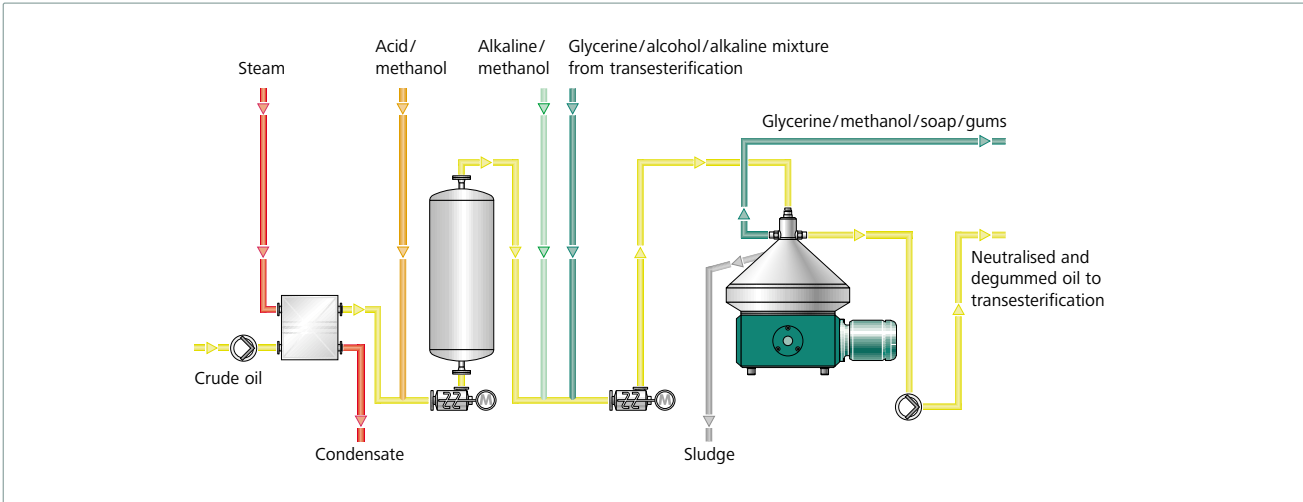
## Single-Stage Alcoholic Neutralisation: Consistent Process Integration

Alcoholic refining from Westfalia Separator Food Tec is an alternative which achieves even greater efficiency. The process line in biodiesel technology uses a secondary stream of the transesterification stages for pretreating the oils. Completely effluent- and waste-free.

The main characteristic of this process is its logical consistency. By-products from the transesterification process are used for pretreating the crude oils. In this way, the consumption of chemicals and steam can be reduced, with the additional advantage of simultaneous recovery of by-products. All of these advantages are available at low investment costs.

### **Direct integration in your biodiesel installation**

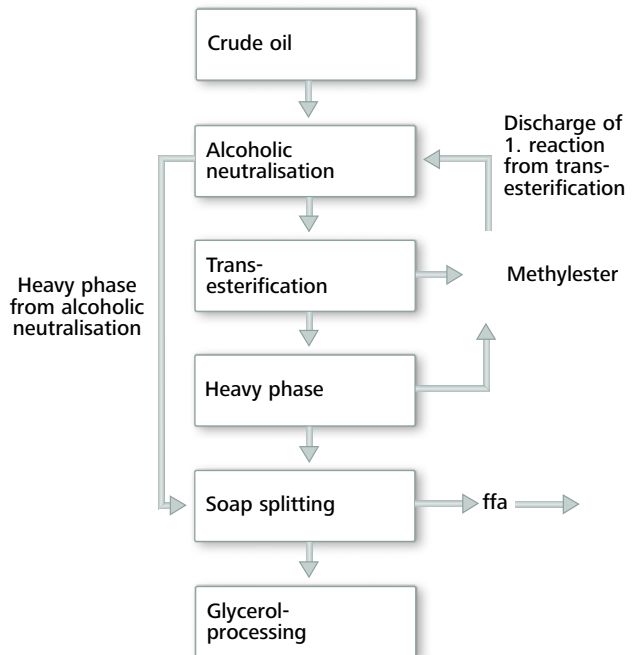
A further major advantage of alcoholic refining is that the process line is completely integrated in your biodiesel installation. All components have been designed perfectly to meet the requirements of the installation so that pre-treatment of the oils and fats is combined directly with the actual production of biodiesel.

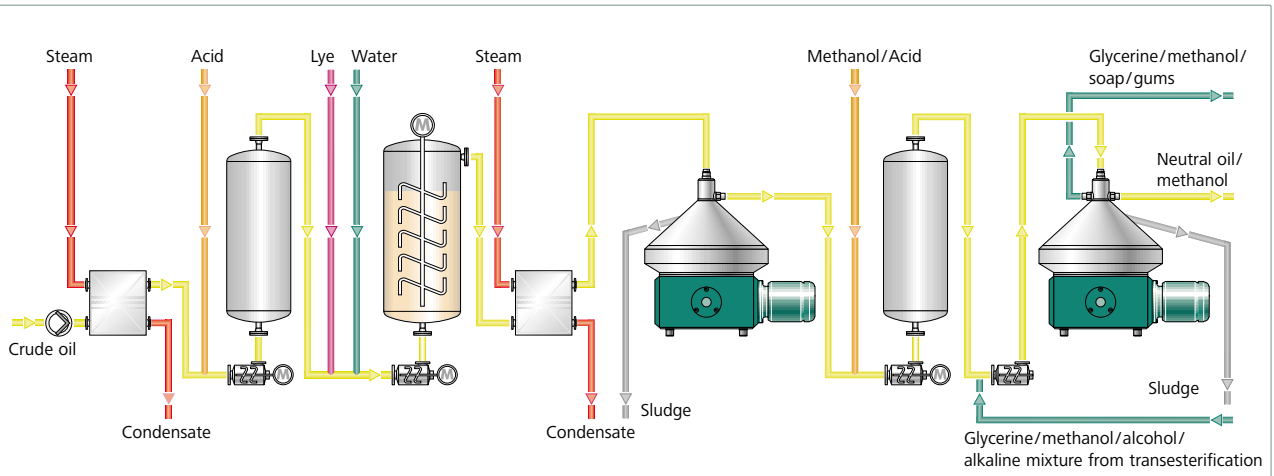


Alcoholic refining

**The advantages of this simple process:**

- Optimum neutralisation and degumming of oils and fats
- Extremely economic process
- Low investment costs due to single-stage process
- Recovery of free fatty acids (see second diagram)





Special degumming and alcoholic neutralisation

## Two-Stage Alcoholic Neutralisation: Maximum Yield and Product Quality with Minimum Cost

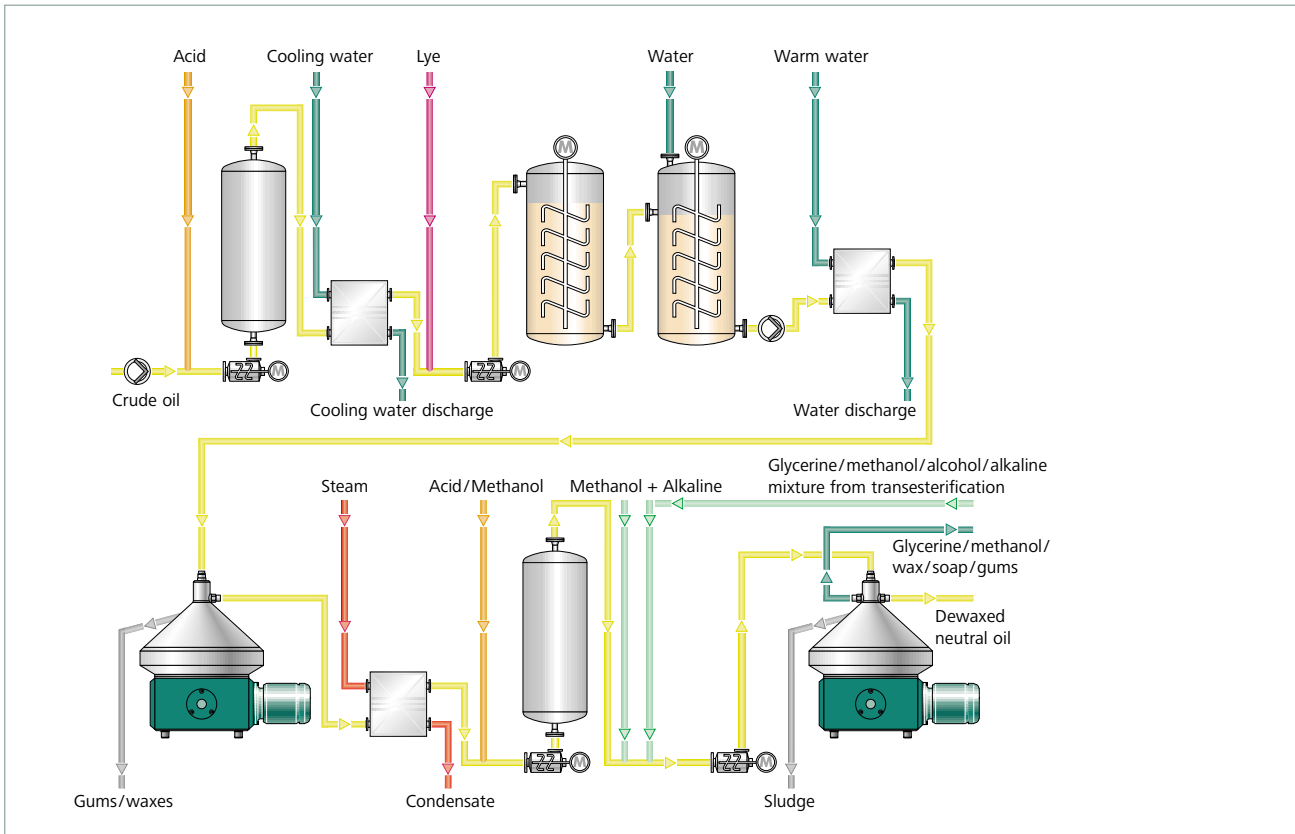
Alcoholic refining has even more advantages to offer in the two-stage version.

Crude oils with a higher gum content ought to be degummed before alcoholic refining. This avoids the phosphatides impairing the quality of the glycerine phase.

Some crude oils, e.g. sunflower oil, also have long-chain fatty alcohols (waxes) which have negative impact on the cold stability of biodiesel. The waxes can be removed by way of cold degumming.

### Advantages of the two-stage version combined with pre-degumming:

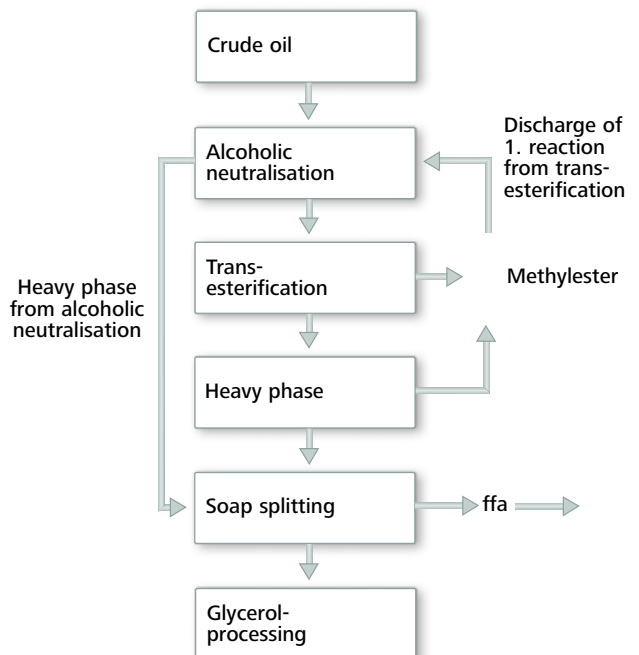
- Lower investment costs compared with traditional methods
- Lower steam consumption
- Good glycerine quality as the phosphatides are removed in pre-degumming
- No additional waste water and no additional soapstock splitting
- In combination with esterification, modification of all FFA into biodiesel
- Every tonne of biodiesel instead of free fatty acids translates into additional profit



Cold degumming plus alcoholic neutralisation

**Everything argues in favour of process lines from Westfalia Separator Food Tec:**

- Pre-treatment is necessary in order to avoid problems in transesterification and in the production of glycerine
- The processes can be adapted flexibly to meet the specific requirements of the customer
- Special adjustment to the specific requirements of biodiesel production





## Competent Service Even at the End of the World

For our company, system partnership in all matters concerning mechanical separation technology means that we accept responsibility in all phases of the life cycle of a machine. This begins with planning a new installation or defining performance parameters. Customers are advised competently on all aspects so that the decision for a centrifuge or a process line precisely meets the requirements. Specific training by Westfalia Separator enables staff to operate the machine correctly.

And the service goes even further: Under the motto WESERVE®, we have developed an efficient service programme which provides effective support to our customers. With appropriate service and maintenance contracts, you have all options to ensure trouble-free operation of your centrifuges.

Based on sales and service companies and further sales partners, we have established an extensive world-wide network in order to support our customers with appropriate maintenance and service.



Service anywhere in the world –  
round the clock

If assistance is required quickly despite all the precautions which have been taken, or if a Westfalia Separator original spare part is required, we are available for you: 24 hours a day, 365 days a year. If necessary, even at the end of the world!



TÜV certificates confirm the high quality standards of the centrifuges of Westfalia Separator Food Tec.



## For Good Cooperation: Claiming the Top!

If you wish to permanently improve your added value with Westfalia Separator Food Tec, please talk to us about the current process lines available and their possibilities. You can take the first step by completing the fax form.

We look forward to talking to you.



To TELEFAX +49 25 22/77-17 94

Westfalia Separator Food Tec

Company

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Post code / city

Telephone

Fax

Email

- Please call me to arrange a meeting concerning the subject of pre-treatment of oils and fats for biodiesel production

We are interested in the following:

- Alkaline refining
- Physical refining
- Alcoholic refining

- Beverage Technology
- Dairy Technology
- Oils and Fats Processing
- Chemicals, Pharmaceuticals and Biotechnology
- Oils and Fats Recovery
- Starch Technology and Industrial Biotechnology
- Environmental Technology
- Marine
- Energy
- Oilfield
- Industry
- Engineering
- Second Hand Machinery
- Service

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