

# Processing Technologies for Pre-treatment of HVO/HEFA Feedstocks

desmet ballestra

Science  
behind  
Technology



[www.desmetballestra.com](http://www.desmetballestra.com)

# Hydrotreated Vegetable Oil (HVO)

- **Hydrotreated Vegetable Oil (HVO)** commonly referred to as 'renewable diesel', is produced via catalytic hydroprocessing of oils and fats, consisting of paraffinic hydrocarbons.
- HVO is free of aromatics and oxygen, very low in sulfur, phosphorous, nitrogen, metals and other elements, and has a high cetane number. HVO offers a number of benefits over FAME (Fatty Acid Methyl Esters), such as reduced NOx emission, low particulate emission, better storage stability and better cold flow properties. **HVO can be used in all diesel engines and is approved as aviation fuel.**
- HVO can be produced from a **wide variety of raw materials containing triglycerides and fatty acids**. A wide range of waste and residue materials from oils and fats processing, like used cooking oils, fatty acid distillates, acid oils and animal fats, can be used to produce HVO.

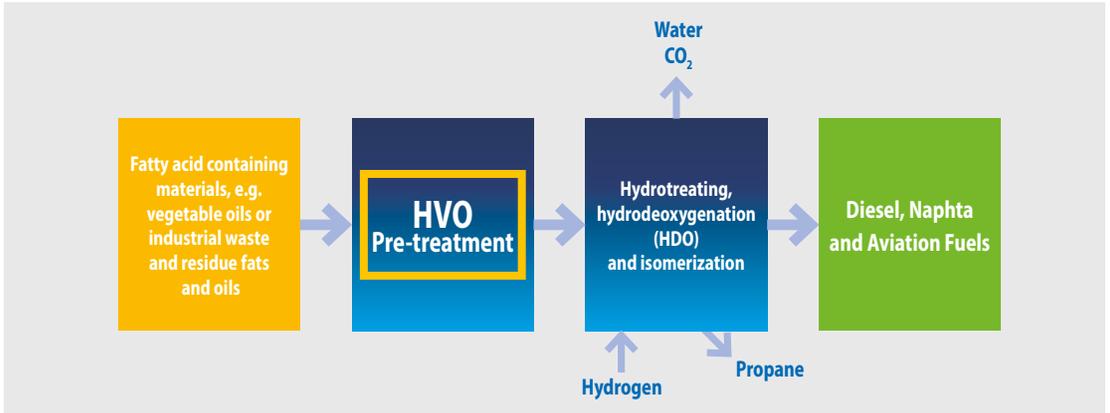


# HVO Production – Pre-treatment

## Definition

The different raw materials need to be 'cleaned' before going in the hydrotreating unit to ensure the lifetime of the catalyst and the proper functioning of the HVO unit

→ Need for a 'Pre-treatment unit' before the HVO unit



## HVO Feedstock

### Edible feedstocks



### Non-edible feedstocks



Legislation promoting use of non-edible feedstocks to discourage use of edible oils (**food vs fuel**) and eliminate waste oil streams in feed (**food/feed safety**)

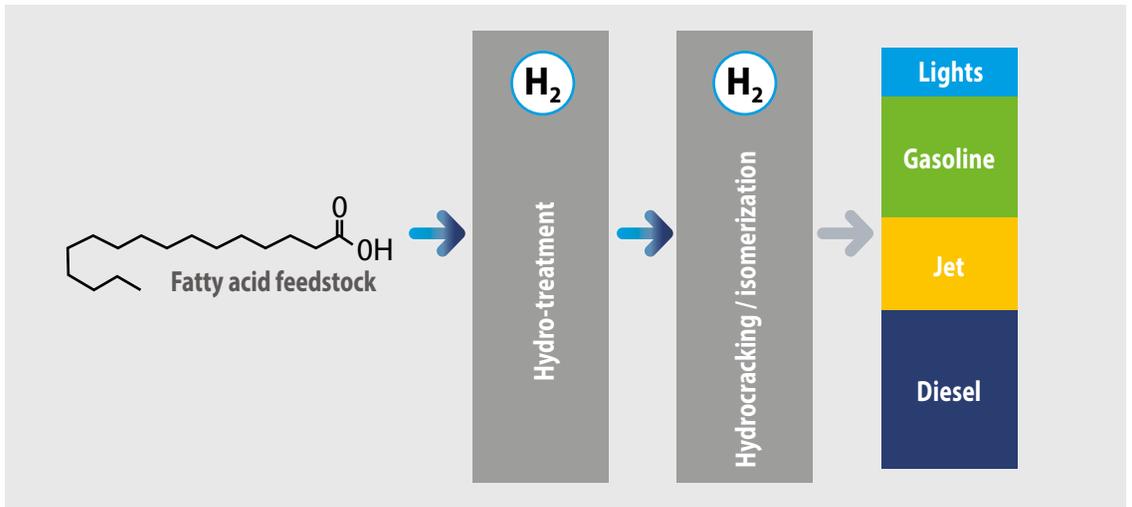
# HVO Technology Providers

## HVO Technology suppliers ( through license )

- Haldor Topsoe (Denmark): HydroFlex™ process
- UOP / ENI (US/Italy): Ecofining process
- Axens ( France ): Vegan process

## In-house HVO Technology users

- Neste ( Finland ): pioneer using in-house technology (NxtBTL)
- ConocoPhillips ( US )
- Petrobras ( Br )
- Nippon Oil ( Japan )
- Shell ( UK/Ndls )
- Etc.

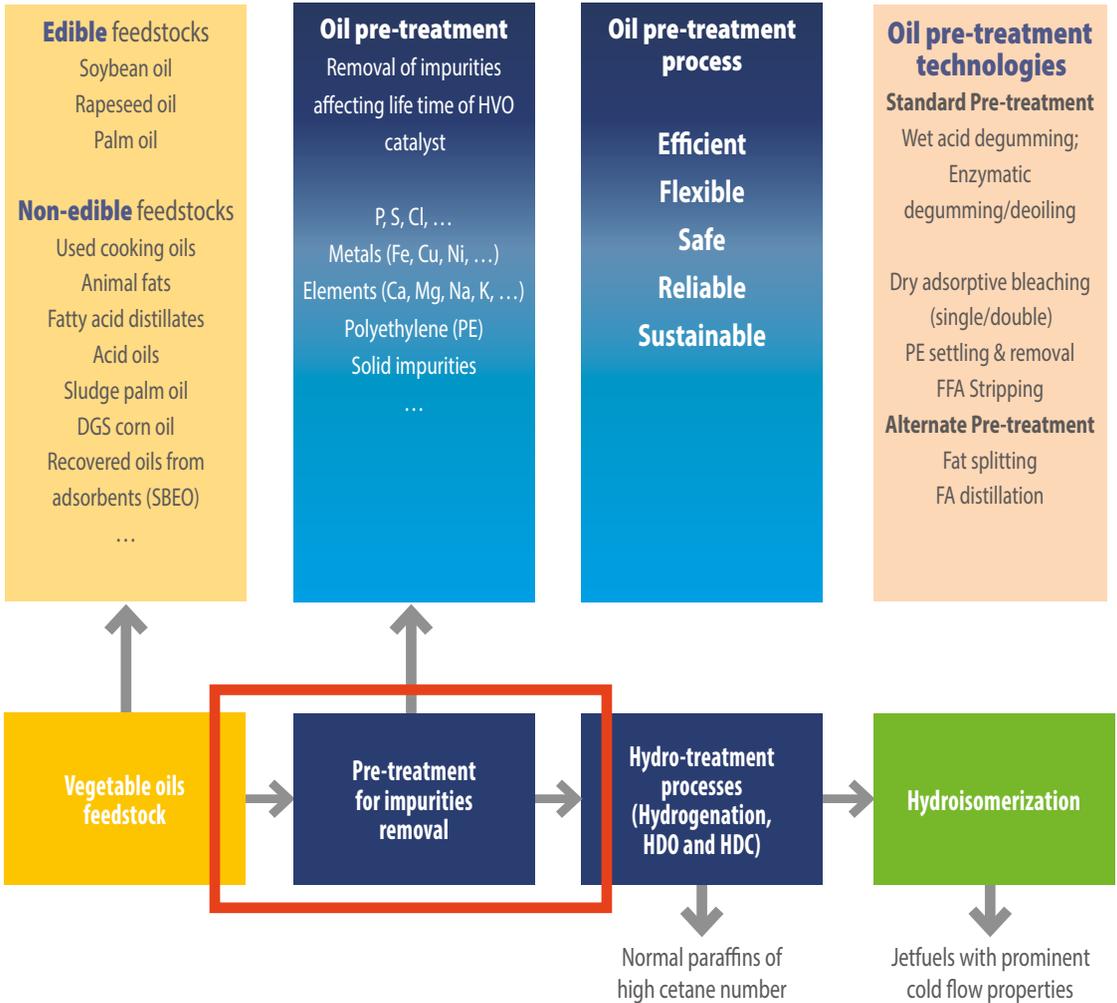


Desmet Ballestra is able to comply and supply HVO Pre-treatment plants meeting ANY specifications and processes required by ALL HVO licensors

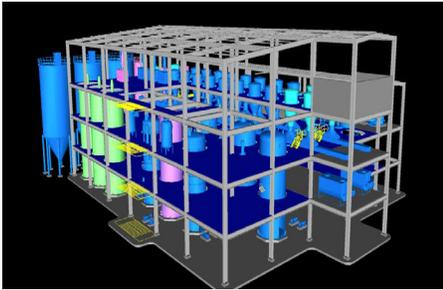
Desmet Ballestra can optimize the pre-treatment processes to match HVO licensors requirements on a case to case basis



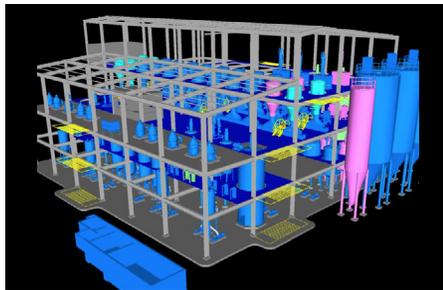
# Pre-treatment of HVO/HEFA Feedstocks: key to efficient Hydro-treatment



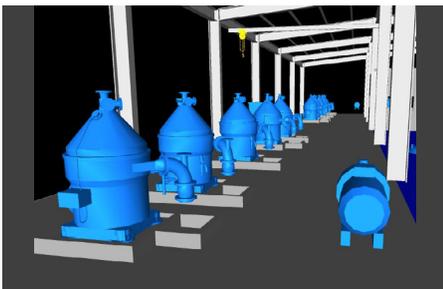
# Desmet Ballestra – 3D layout example



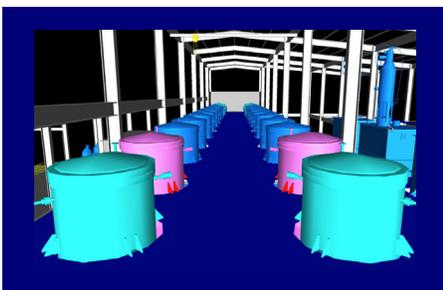
Desmet Ballestra designs the pre-treatment plants in an optimum way to allow easy access to all process equipments and to facilitate maintenance works.



Desmet Ballestra can supply also the storage of absorbents and the storage of chemicals needed for the plant.



Multiple degumming lines can be foreseen in function of the required plant capacities.



Required filtration area is carefully designed to allow processing of low quality waste fats. Filters can be aligned to allow evacuation of spent bleaching earth by redler transport system to central point. Spent cake cooler can be added for safety.



# Desmet Ballestra Purpose

## DB Preamble

- DB has an extensive portfolio of refining/pre-treatment technologies and many references in the field of vegetable Oils & Fats industry with more than 75 years of servicing this specific industry
- DB is World leader in 'classical' Biodiesel market installing over 125 plants or, in other words, over 20 million tons on a total world production capacity of about 50 million tons
- DB is active in this segment for the last decade and has engineered and commissioned several pre-treatment plants for major HVO producers that are today in full operation
- DB is continuously improving the efficiency, the yield, the reliability and the safety aspects of the pre-treatment plants thanks to the experience gained through the years

## DB Purpose

- DB supplies the pre-treatment front end of the HVO process (mostly as Engineering Procurement project)
- DB pre-treatment plants produce in-spec feedstock to feed the HVO process, especially with focus on low metals and phosphorous content
- DB pre-treatment plants are designed to reach the best Operational Expenses (OPEX) parameters
- DB pre-treatment plants meet the high capacity range required by this industry market (up to 5000 tpd/35000 bpd and more)



# Desmet Ballestra Advantages

**ADVANCED  
PROCESS  
TECHNOLOGY**

**REDUCED  
OPERATING &  
MAINTENANCE  
COST ( OPEX )**

**WITH  
MAXIMUM  
FEEDSTOCK  
FLEXIBILITY**

- Small overall dimensions of equipment and process units allowing short start-up and shutdown time and enabling easy feedstock changes
- Equipment of simple and proven mechanical design, high efficiency and negligible maintenance.
- Low utilities and chemicals consumptions due to the high efficiency in process design.
- Reduced water and gaseous effluents by recycling process water
- Normal stream factor of 8000h, but plant availability can be increased up to >8500h
- Flexible design allowing many different feedstocks and blends
- Design can be customized in function of feedstocks type and availability up to a capacity of 5000 TPD/35000 BPD or more







**Let's protect together our Planet, People and Plants**

