



## Recovering palm oil from empty fruit bunch (EFB) liquor

A profitable venture using Alfa Laval PANX decanter centrifuges



# The process today

## Valuable oil absorbed by the fruit bunches

If you own or operate a crude palm oil plant you know that during the crude palm oil extraction process, particularly during the sterilization cycles, considerable amounts of water and valuable oil are absorbed into the fruit bunches...and that this oil is difficult to recover.



### Oil recovery from the liquor can be profitable

Naturally you want to extract as much oil as possible to improve your profit level, while at the same time maintaining a high quality end-product.

To increase the oil yield, many plants use empty bunch crushers to squeeze out oil and water trapped in the stalks and fibres. The oil present in this "liquor" can be up to 0.5% of the total oil contained in the fresh fruit bunches (FFB). Efficient recovery of this substantial amount of oil can be a profitable venture.

### Only small quantities recovered today

Today, the recovered liquor from the empty fruit bunches is sent back to the clarification room, assuming that the oil will somehow be recovered. However, the liquor contains a high amount of impurities and phosphatides, or "gums" which have an emulsifying property that can inhibit the separation of free oil.

Also, as you know, it is very difficult to ascertain how much additional oil is actually recovered from the liquor.

However, Alfa Laval has a solution.

### Oil recovery with a decanter centrifuge

The presence of a large amount of water in the liquor makes it possible to "wash" and separate the oil with a decanter centrifuge. A laboratory scale test shows that the quantity of recovered oil is equivalent to performing an acid degumming with phosphoric acid.

### Process and quality benefits

Using a decanter to recover oil from empty fruit bunches separately, instead of mixing it with the freshly pressed oil, offers clear benefits for your operation.

Where the quality of the oil recovered separately using a decanter is good, which is generally the case, you can

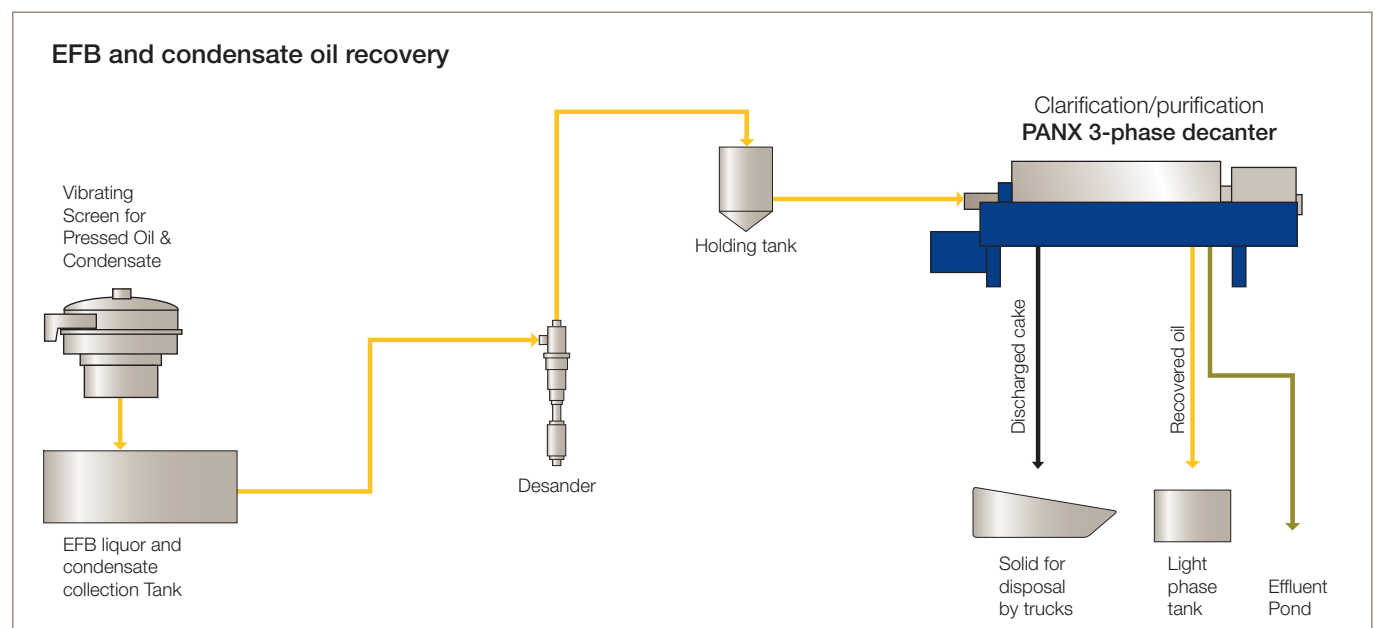
freely mix it back into the production oil. The gum, fibrous material and impurities from the EFB liquor have been separated in the solids or the water phase by processing in the decanter and, thus, will not be mixed into the freshly pressed high quality oil.

Some oil will have undergone oxidation and quality deterioration due to the free fatty acids (FFA) and low DOBI\* values of the empty fruit bunch liquor. This oil can be separated and sold separately as sludge oil for low value products, such as detergents, etc.

### Efficient, reliable separation

High performance Alfa Laval PANX three-phase decanters are purpose designed for processing crude palm oil. They recover the oil from the empty fruit bunches as well as separating the water and solids from the liquor. When developing the PANX range Alfa Laval focused on efficient, reliable separation

\*Deterioration Of Bleachability Index





## Alfa Laval PANX decanters – specially designed for palm oil

of liquid, dry solids (cake), and oil for maximum oil recovery with minimum oil losses.

The PANX range includes low, medium and high capacity three-phase decanters suitable for every size of palm oil mill, from 30 to approximately 90 tons of FFB per hour.

### An Alfa Laval PANX decanter pays for itself

The value of the oil continuously recovered from the EFB liquor will quickly return your investment in an Alfa Laval PANX decanter. Payback time for a palm oil mill processing about 90 tons of FFB per hour is typically within a year.

### Advantages of using a three-phase decanter

Using a three-phase decanter to recover palm oil from empty fruit bunch liquor makes it possible to separate the outlets into solids, oil and water. The water can subsequently be disposed of safely as effluent. Most other separation techniques, such as belt or filter presses, will only result in 2-phases.

### Alfa Laval PANX decanters – features

- Critical parts made from wear-resistant material
- Basic Core Controller\* system that makes it easy to upscale and down-scale production capacity
- Automatic back drive system equipped with variable frequency inverter (VFD) to optimize the differential speed to suit the process
- Compact, modular design.

### Alfa Laval PANX decanters – benefits

- High performance combined with low energy consumption
- Improved separation of palm oil in a cost-efficient way

### Cost Benefits

Quantity of Crop Processed (FFB) Per Annum:	250,000 mt
Oil Recoverable in Empty Fruit Bunches:	0.20% per tonne FFB
Total Quantity of Oil Recovered:	500 mt
Price of Crude Oil:	USD 1,000 per tonne
Additional Mill's Income:	USD 500,000

- Low power consumption thanks to an innovative liquid outlet design (up to 30% lower than with conventional outlet design)
- Improved solids dryness, leading to lower costs for drying or disposal
- Increased capacity with same or less space requirement, for a smaller investment
- Simple installation, easy maintenance.

### Contributing to RSPO certification

The palm oil industry is generally looking for good processing practices and sustainability. The aim is for the products to be accepted by the international Round Table on Responsible Palm Oil (RSPO) certification scheme.

### Alfa Laval – leading the way

With palm oil know-how and experience gained since the 1960's, Alfa Laval takes care of your processing needs – from milling and refining to fats modification, from by-products and related processes through to end-products.

As specialists in centrifugal separation, heat transfer and fluid handling, we lead the way with innovative solutions to your challenges that offer sustainable alternatives to traditional technology. The solutions have one thing in common – they add value.

### Solutions that add value

- Alfa Laval D3 PRO all-in-one clarification/purification system maximizes yield in a sustainable process.
- Sludge dewatering using Alfa Laval decanters improves the performance of the effluent system.
- Polishing effluent with an Alfa Laval Membrane Bioreactor (MBR) ensures final effluent discharge parameters are met.
- Gum removal with an Alfa Laval separator and pre-filtration reduces use of bleaching earth, oil loss, waste and MCPD.
- Alfa Laval VHE Economizer ensures maximum heat recovery.
- Alfa Laval Packed Column and SoftColumn technology ensures cost-effective continuous deacidification/deodorization.

The list goes on...

\* as an option available for most models

## **Alfa Laval in brief**

Alfa Laval is a leading global provider of specialized products and engineered solutions.

Our equipment, systems and services are dedicated to helping customers to optimize the performance of their processes. Time and time again.

We help our customers to heat, cool, separate and transport products such as oil, water, chemicals, beverages, foodstuffs, starch and pharmaceuticals.

Our worldwide organization works closely with customers in almost 100 countries to help them stay ahead.

## **How to contact Alfa Laval**

Up-to-date Alfa Laval contact details for all countries are always available on our website at [www.alfalaval.com](http://www.alfalaval.com)

