





Alfa Laval

Low Fat Fish Meal

EU Fish meal organisation

13 – 16 September 2017



Bent Ludvigsen
Global Sales & Technology

The company



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



Alfa Laval milestones



1883

Swedish engineer and inventor Gustaf de Laval and his business partner Oscar Lamm establish the company AB Separator to manufacture and sell their centrifugal separator, which separates milk from cream.



1901

AB Separator becomes a listed company on the Stockholm Stock Exchange.



1913

Gustaf de Laval dies, aged 67, with 92 Swedish patents to his name. "The man of high speed" is engraved on his memorial.



1930s

The first heat exchanger is introduced. Development and production of heat exchangers is moved to Lund, where the company is headquartered today.



1963

The name of the company is changed from AB Separator to Alfa Laval. Alfa comes from the alfa discs which increase the separator's capacity.



1971

Alfa Laval enters the fluid handling business when it acquires a majority interest in the Danish company Lavrids Knudsens Maskinfabrik (LKM).



1991

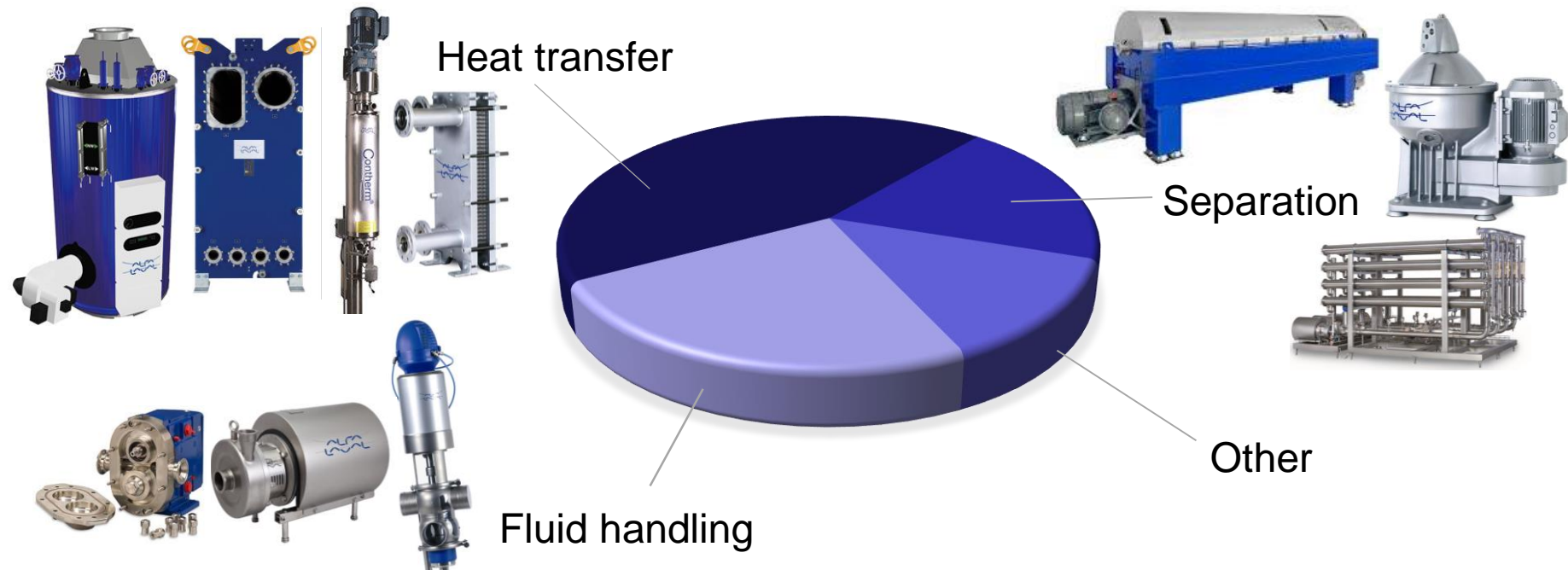
Alfa Laval is acquired by Tetra Pak, which owns the company until 2000, when it is sold to Industri Kapital and then relisted on the stock exchange in 2002.



2011-

Alfa Laval acquires Aalborg Industries and two years later the Norwegian company Frank Mohn, which further strengthens Alfa Laval's presence within the marine and offshore markets.

Our products



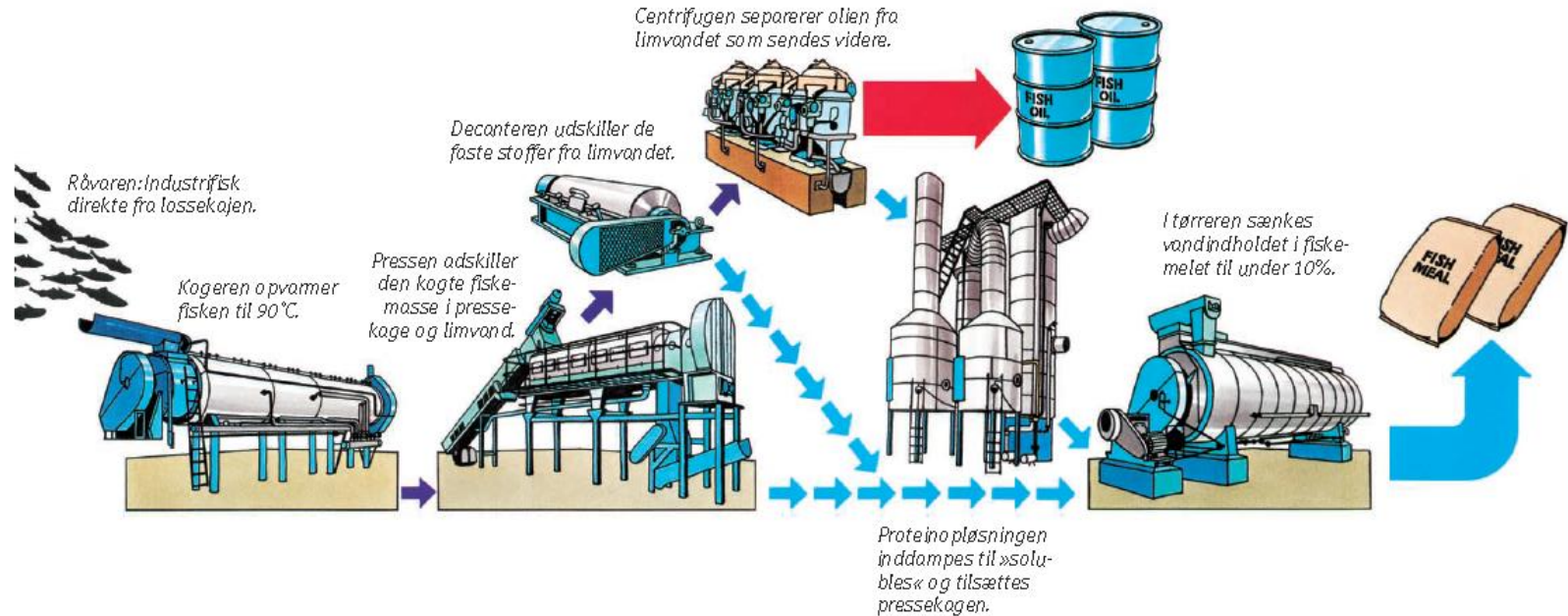
Alfa Laval Systems Scope



Based on our key technologies :

- * Decanter based fish oil and meal plants
- * Evaporators
- * Sterilizers
- * Stick water desalination concepts
- * Sanitary CIP systems

Conventional fish meal process



Kilde: Foreningen for Danmarks Fiskeemel og Fiskeolieindustri.

Low fat fish meal process

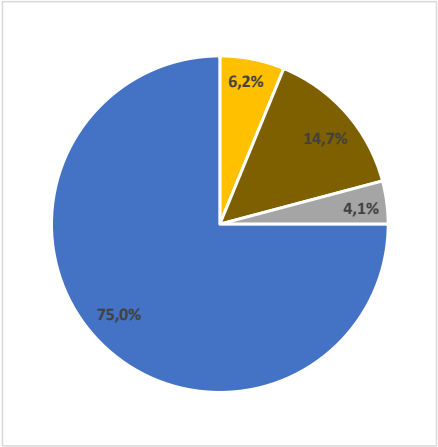


	Standard	Low fat
Temperature	Medium to high	Low
Temperature control	Poor	Precise
Holding time	Medium to long	Short
Crude fish oil	Standard grade	High grade

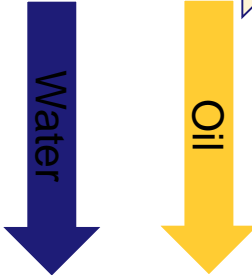
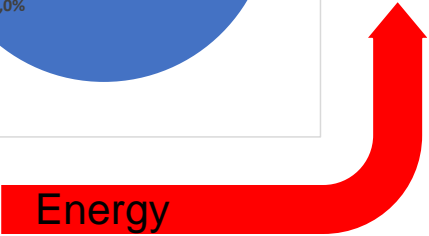
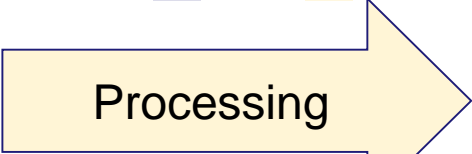
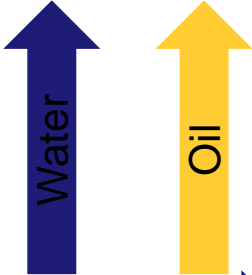


Mass balance

1000 ton anchovy

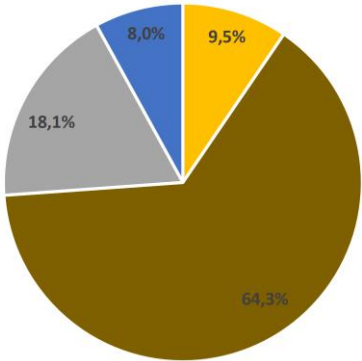


732 ton water
40 ton oil



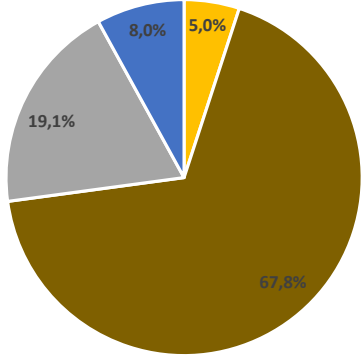
733 ton water
51 ton oil

228 ton fish meal



Conventional

216 ton fish meal



Low fat

■ OIL ■ Protein ■ Mineral ■ WATER

Quality factors

- * Raw material species
- * Freshness
- * Process temperature
- * Process time



Fish oil – what we can:



The 3 old secrets of
the Danish Fisheries
Research:

1. Ice
2. Ice
3. Ice

Our experience for fresh material:

* FFA in oil < 0,2%

* PV & AV values below
detection level

Keep it cold & little storage – this is
similar to edible meat – Our hint :

- If you will not eat the fish, quality
has been lost already
- No way of turning poor oil into good
oil



Alfa Laval Centriflow Systems



- * High quality fish protein and oil processing systems
- * Shortest possible heating times eliminating FFA development and oxidation during heating
- * Minimum thermal impact
- * Minimum oxidation and degradation of product
- * Designed hygienic with full sanitary CIP options available
- * CR Heater for steam injection heating and Contherm for indirect heating
- * Low fat separation system
- * *Available in single line capacities from 1 to 30 t/h*



Pretreatment - Fresh



Raw material



1. Mincing



Ground material



Pretreatment - Frozen



Frozen blocks



1. Mincing



Ground material

Stick water return
(95 °C)



To heater

Defrosting/Frozen products:

! FFA Increase > 3 %

Centriflow – Heating

Purpose :

- * Denature protein to release water & oil
- * In activate enzyme systems
- * Pasteurize product

Considerations

- * Enzyme optimum is 55 – 60 °C
- * Above 70 – 75 °C bacteria & enzymes are destroyed/inactivated
- * Oxidation speed increases

Consequences for optimum heater design

- * Start up on water pasteurizing plant first
- * Fast heating from storage to 75 °C.
- * Heating in airless systems.
- * Fast separation of oil



Centriflow – Heating



Alfa Laval offers two solutions

Steam injection:

- * Fastest way to transfer energy
- * Closed airless unit
- * Static mixer – no moving parts
- * Accepted by EU veterinarian inspection

Scraped surface heat exchanger

- * Surface scraped 10 - 12 times per second
- * Sealed air less unit
- * Heating from 10 – 90 °C in approx. 60 second.
- * Cleanable using CIP only – (1,5 m/sec flow velocity)
- * Available in sanitary standards up to a 3A level



Heating – Retention Tank

- The retention tank will secure a homogeneous heating of the product.
- The retention time can be adjusted and in this way, compensate for the variation in raw material composition or to fulfill veterinarian requirements



Centriflow – Heating



Ground material



Decanter solids



~12,5 % Injection steam added



2. Heating (95 °C)

~2,5 % Injection steam added



3. Solids separation



Centriflow – Heating



Ground material



Decanter solids



~12,5 % Injection steam added



2. Heating (95 °C)

~2,5 % Injection steam added



3. Solids separation



Direct versus indirect



Both

- Fast heating securing quality
- Designed for food applications
- Airless processing

Steam injection

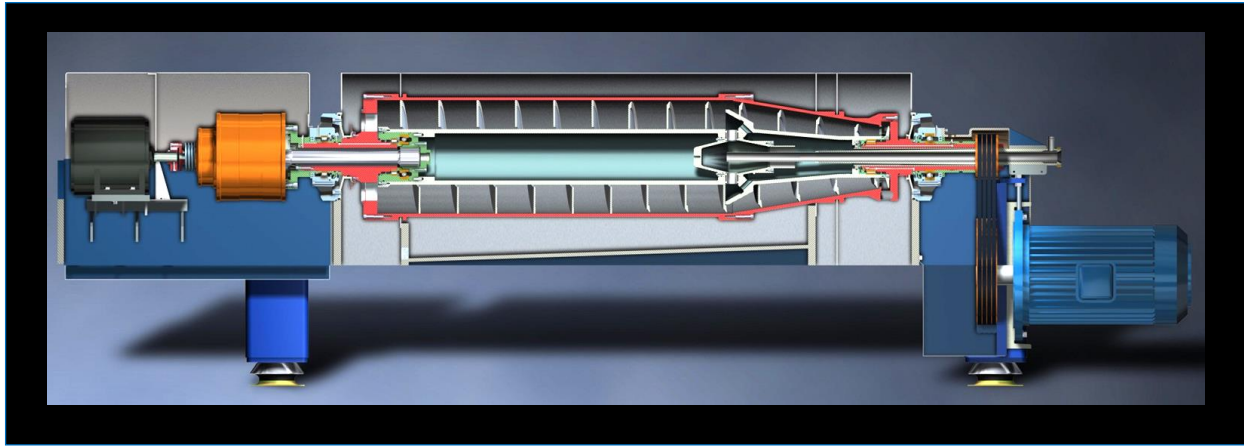
- High capacity – up to 30 t/h per line
- No moving parts - virtually maintenance free
- Does not foul – no functional CIP required
- Adds 12,5 % water to product

Scraped surface heater

- Up to 9 t/h per module
- No water added
- No contamination possible via steam
- High sanitary level – full food grade CIP possible
- 3A approved versions available



Decanter based process



Decanter offers :

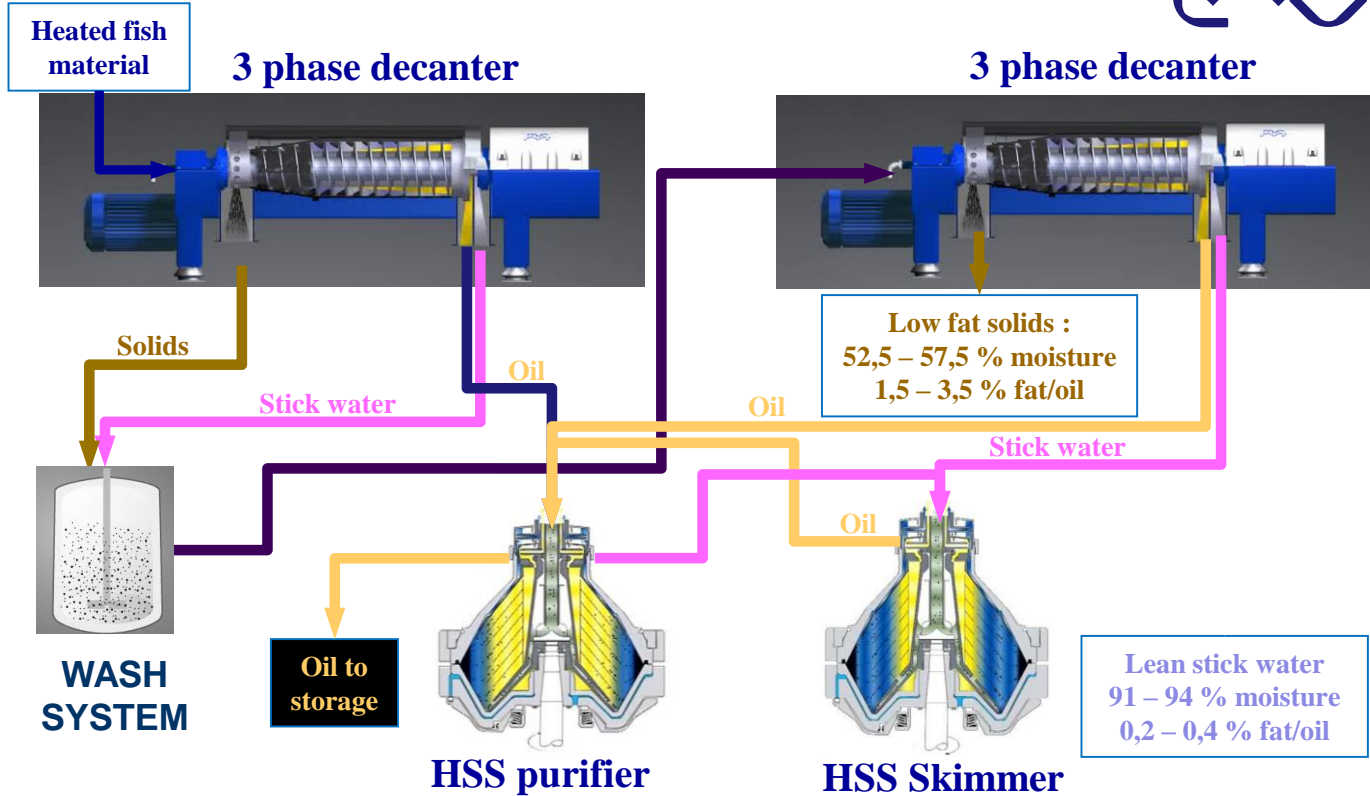
Reliable recovery of the solid independent of consistency and structure

Improved extraction of oil on difficult to de-oil fish species.

Core decanter controls offers “press action” reducing moisture content to a minimum before drying

Sanitary design with full internal bowl CIP available

Low fat separation



Centriflow – Evaporation



Stick water



5. Evaporation



**Alfa Vap WHE/TVR
1 - 30 t/h stick water**



Condensate



Concentrate

Drying by others

Decanter solids



6. Drying



Concentrate

Steam (160 °C)

7. Cooling



Room air



Fish meal

Production gains



- * Increased fish oil recovery
- * 40% reduction of POP
- * Fish meal protein content increase by roughly 3.5% point
- * Fish meal oil content decrease by roughly 4.5% – to 5.0% points
- * Storage stability and flowability improves



For more information

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