



**MVR EVAPORATION
OF BIOMARINE PRODUCTS**





“As a Norwegian supplier, EPCON Evaporation Technology AS has the know how for high quality, energy efficient evaporation of bio marine products”



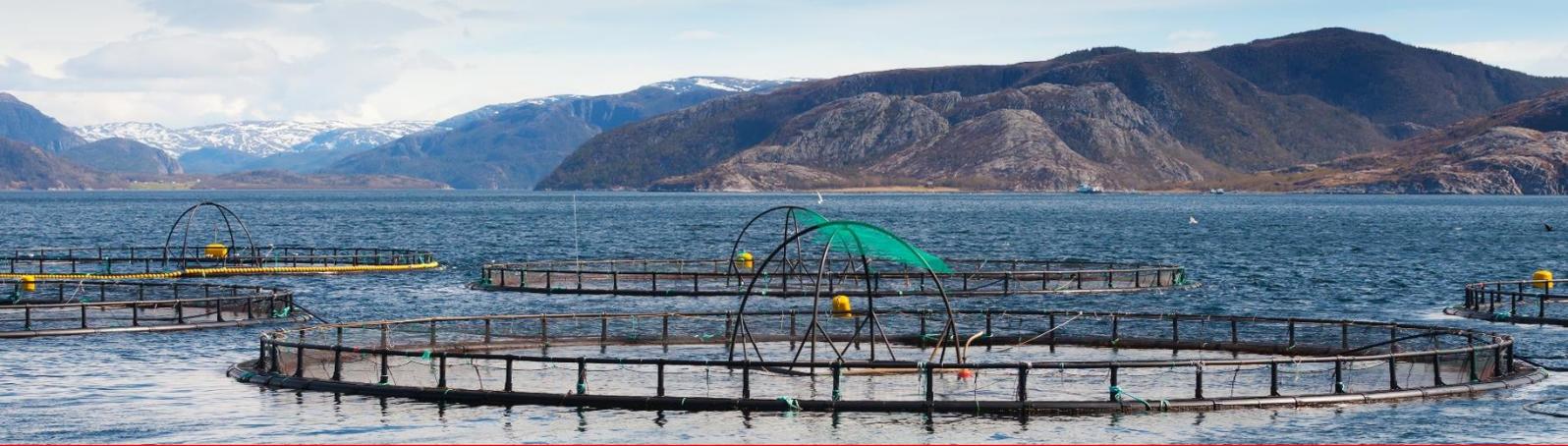
A long history in biomarine industry

EPCON Evaporation Technology AS is a Norwegian engineering company. The initial industrial operations started in the year 1900 by the company Eriksens Mek. Verksted (mechanical industry). Bergs Maskin A/S acquired this company in 1928 initiating a period as a dominant supplier of technology for the dairy, food and fishmeal & oil industry with substantial international activity. Bergs Maskin delivered a great number of stick water evaporators to the international fishmeal & oil industry in the late sixties and the early seventies with deliveries of more than 20 plants only to Peru.

Landteknikk A/L acquired Bergs Maskin in 1979. From a branch in Landteknikk, the founder in 1986 established EPCON under the Norwegian name Energi & Proseskontroll AS. He had worked as a senior engineer in Bergs Maskin responsible for the marine sector before the acquisition.

Since then EPCON has delivered many evaporators within different segments of the biomarine industry.





Concentration of hydrolyzed protein extracts

There is a growing demand for high quality bio marine proteins in a wide range of applications such as additives in food, growth media for bacteria in pharmaceutical industry, feed for juvenile fish in fish farming, pet food and FPC (fish protein concentrate) as a nutritional supplement.

Common for all these applications are that there are high quality demands for the entire production line. EPCON has experience in delivering MVR evaporators for concentration of high value bio marine products.

During hydrolyzation, often water needs to be added for the best result. This makes it even more important to have an energy efficient dewatering. For this application the EPCON MVR evaporator is a well proven solution since the energy consumption normally is as low as 15-25kWh/t removed water.





Evaporation of algae extracts



There is an increasing focus on the potential of using algae as a source for making fuel. Algae is also a valuable resource for food, cosmetics and as a fertilizer.

Common for all these applications are that there are high quality demands for the entire production line. EPCON has experience in delivering MVR evaporators for concentration of high value bio marine products.

In many of these applications the nutrients are extracted from the algae and concentrated afterwards. During extraction, often water is added for the best result. This makes it even more important to have an energy efficient dewatering. For this application the EPCON MVR evaporator is a well proven solution.





Stick water evaporation

Fish products unfit for human consumption is often used in the production of fish meal. Fish meal often goes as an ingredients in fish feed and animal feed.

After initial processing, the oil is separated and the stick-water is evaporated.

As there are large quantities of water that needs to be evaporated, a low energy consumption is important for a profitable business.

This makes it even more important to have an energy efficient dewatering. For this application the EPCON MVR evaporator is a well proven solution since the energy consumption normally is as low as 15-30kWh/t removed water.

The evaporator needs to handle the high viscosity of the stick water without losing too much capacity between cleaning.

EPCON deliver evaporators for stick-water from different fish species.





Evaporation of fish silage

Depending on the quality and use of incoming raw material, it is sometimes beneficial to make fish silage adding acid to the raw material.

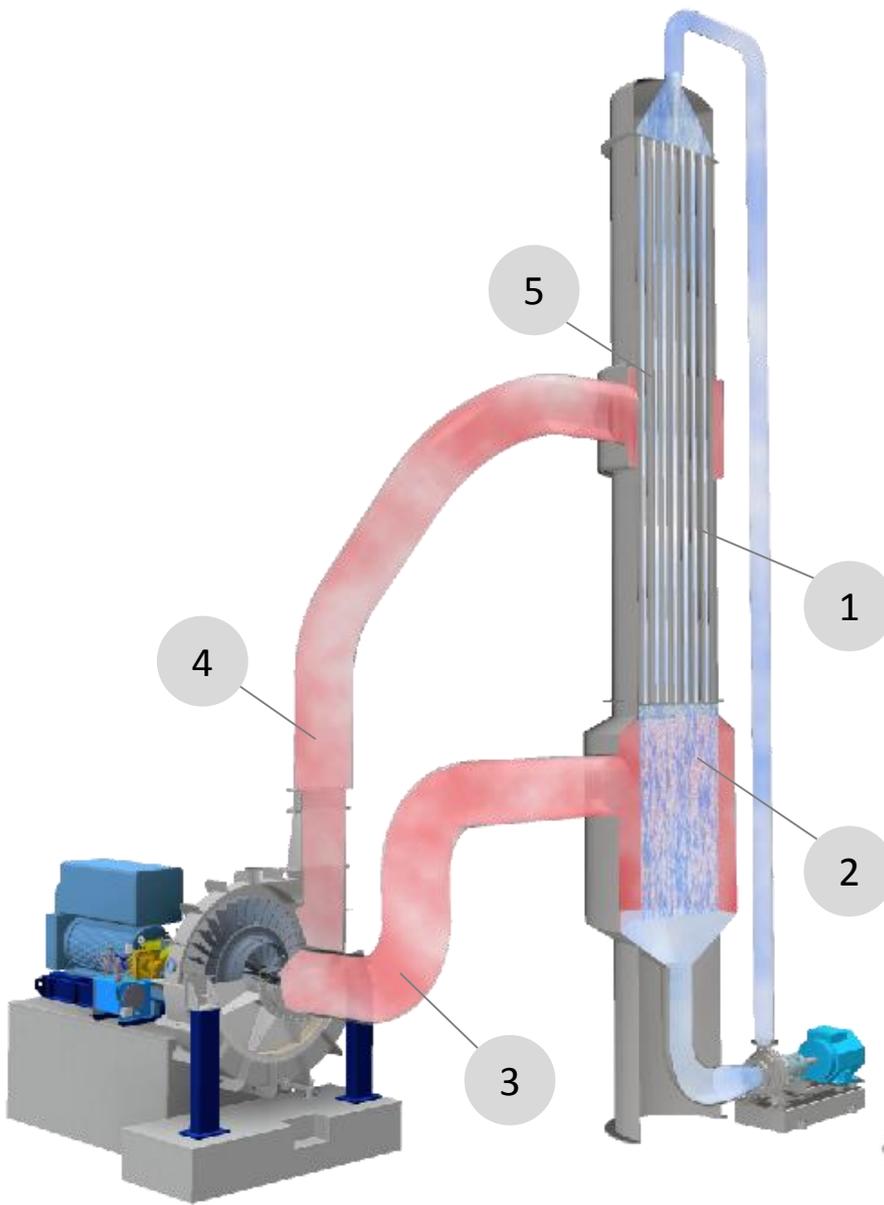
As there are large quantities of water that needs to be evaporated, a low energy consumption is important for a profitable business.

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The evaporator needs to handle the high viscosity and undissolved material in the silage without losing too much capacity between cleaning. Since also the bones are dissolved, calcium precipitation can be a challenge.

EPCON has the know-how and experience in evaporation of fish silage in a cost efficient way.





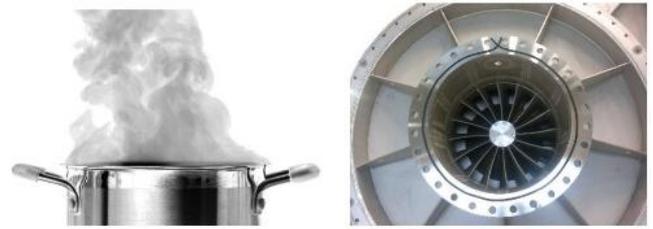
The EPCON MVR evaporator only uses 8-40 kWh per ton evaporated water.

This is a reduction of up to 99% compared to a 1 effect steam driven evaporator.

MVR or Mechanical Vapor Re-compression (also known as MVC) is a technology where the vapor is compressed in a fan or a compressor to a higher temperature and pressure.

This compressed vapor is then used as energy source instead of boiler steam. Most of the products delivered by EPCON are based on MVR technology.

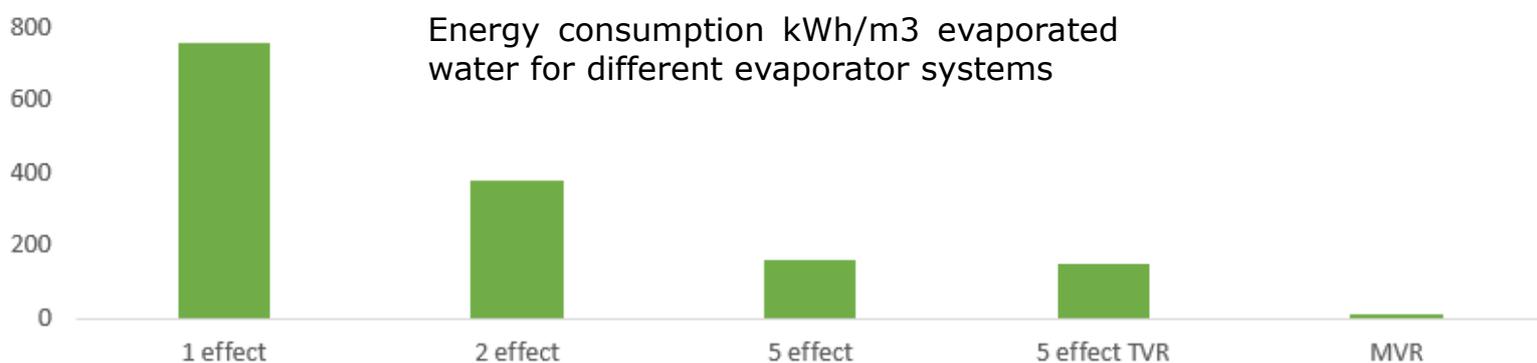
EPCON has 30 years experience with MVR technology.



1. The liquid evaporates in the tubes
2. The liquid is separated from the vapor to give a clean condensate
3. The vapor goes to the MVR fan at 80°C
4. The MVR fan compresses the vapor to higher pressure and temperature (85°C, sat)
5. As the vapor at 85°C is heat exchanged with the evaporating liquid, it condenses into a clean condensate.

The temperatures used here are examples only. EPCON always select the optimum evaporation temperature and temperature rise in the MVR fan. This selection is done based on the liquid properties.

EPCON MVR technology





EPCON lab evaporation test

A first step is often a lab evaporation test. This test confirms the main liquid properties and suitability for evaporation. Normally 2 litres of liquid for testing is enough. Condensate quality can be analysed after evaporation. A test report is issued.

«Our pilot evaporators can be a valuable resource for our clients when making test production»

For EPCON and our customers it is essential to ensure that we choose the correct technical solution for each and every project.

EPCON pilot evaporators



EPCON has a wide range of pilot evaporation plants including a mobile 20 ft container for pilot testing of wastewaters at the customers site. This MVR pilot unit can operate in a wide range of conditions.



”The EPCON MVR evaporator is built to last for decades. Our After Sales services is your guarantee and is an important part of our concept.”



EPCON offers all customers the possibility for a 24-hours after sales service that includes trouble-shooting, spare parts, preventive and corrective maintenance, as well as inspection of installations.

EPCON has 30 years of experience in servicing evaporators and MVR vapor fans. Hence, EPCON can offer a direct service for vapor fans to our customers. This may also include a favourable spare parts agreement.

EPCON also offers a remote diagnostic service. Functional control and fault detection can be implemented by use of modern telecommunications, minimizing the need for external service personnel.

Our service department can give a separate proposal for a Service Agreement with the customer.

After sales services:

- Supply of spare parts.
- Remote diagnosis.
- Education of local service personnel.
- Visits by our service personnel for preventive maintenance.
- Regular revisions and maintenance of installation.

Evaporator for hydrolyzed fish protein

Falling film evaporator:

- Food grade
- FF-MVR-3S-55
- Feed: 5.5t/h
- DS in/out: 10/60 %
- Electric energy cons.: 130 kW



Evaporator for stick water

Falling film evaporator:

- FF-MVR-3S-300
- Evaporationd: 30 t/h
- DS in/out: 10/35 %
- Electric energy cons.: 850 kW



Some selected examples

Evaporator for algae extract

- EPCOVAP-MVR-25
- Evaporationd: 2.5 t/h
- DS in/out: 10/35 %
- Electric energy cons.: 40 kW





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