

# Purifying/Stripping Marine Oils Saving Money by Process Optimization

## Case Study

### KEY FACTS

- Reduction of losses by replacing chemical neutralization with short path distillation
- Both methods are designed to remove FFA
- Short path distillation is capable of additional removal of:
  - Pesticides & POPs
  - 3-MCPD & GE
  - MOSH & MOAH



## Application

Marine oils are extracted from fish and certain marine algae. Crude marine oils are purified because they contain contaminants such as phospholipids, free fatty acids, primary oxidation products, pigments, as well as pesticides, persistent organic pollutants (POPs), 3-monochloropropanediol (3-MCPD) and glycidyl fatty acid esters (GE). Mineral oil hydrocarbons (MOSH & MOAH) have become increasingly concerning as these are harmful contaminants which need to be removed during the refining process to meet current regulations.

**Refining crude oil can involve numerous steps like:**

- Degumming
- Bleaching
- Stripping
- Neutralization
- Winterization
- Deodorization
- Concentration of Omega-3

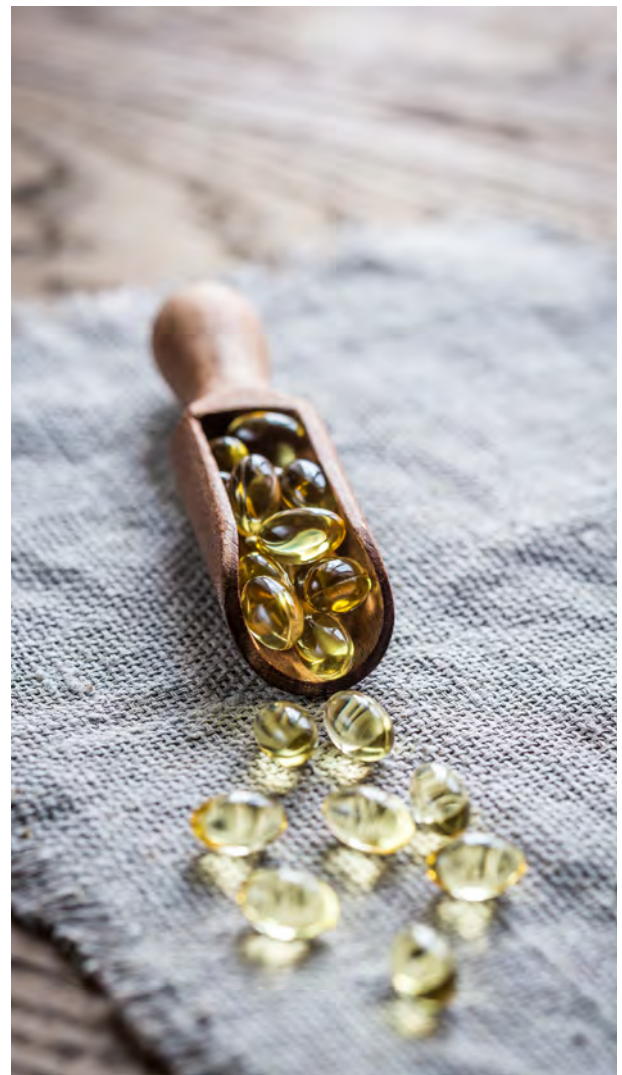


## Challenges

Those process steps are well established. Increasing costs and contamination of crude oils have forced fish oil producers worldwide to optimize their process steps.

**Traditional Chemical Neutralization:**

Oils are treated with an alkaline solution to react the free fatty acids into soap. A significant amount of the valuable product is emulsified and will be lost along with the soapstock.





## Solution

Replacing chemical neutralization with stripping offers the highest possible savings.

### Neutralization and Purification by Stripping:

Free fatty acids are removed by short path distillation (SPD), a fully continuous physical process in which no chemicals are added to the oil. No costly post-treatment is necessary since no soapstock is produced.

### Another advantage is the simultaneous removal of:

- Pesticides & POP's
- 3-MCPD & GE
- MOSH & MOAH

Stripping by short path distillation is a well known, established and economical process.

### Losses during chemical neutralization and stripping:

	Stripping	Chemical Neutralization
<b>General Formula</b>	$FFA^* + 1 (\%)$	$(2 \times FFA^*) + 1 (\%)$
<b>Example with an Oil Containing 4% FFA*</b>	$4\% + 1\% = 5\%$	$(2 \times 4\%) + 1\% = 9\%$

\*Initial free fatty acid concentration in the oil

**Practical example:** Assuming an annual production of **15,000 tons per year** replacing chemical neutralization by short path distillation saves **600 tons** of valuable product. Based on a value of **\$ 3,000 – \$ 4,000** per ton of crude oil, the total savings could be up to **\$ 2.4 million**.

**Practical example:** With an annual production volume of **5,000 tons**, this would still mean an immense saving of **200 tons** of valuable product and financial savings of up to **\$ 800,000**.

For over 20 years, VTA and UIC have been recognized as the unrivaled global leaders in providing state-of-the-art distillation equipment to the marine oil industry. With proven expertise and a track record of excellence from stripping to OMEGA-3 concentration, deodorization and fractionation, our solutions guarantee the highest quality and performance.

UIC and VTA experts draw on more than 70 years of experience to provide customized plants of all sizes for any distillation need. With two state-of-the-art technology centers we partner with our customers throughout the full process from determining the perfect distillation technology and parameters for each individual request to laboratory and pilot plant testing to the design, construction, and commissioning of industrial-scale distillation plants, to after sales support.

**Let us face your next distillation challenge together!**





# VTA Verfahrenstechnische Anlagen GmbH & Co. KG and UIC GmbH

VTA and UIC are the partners for demanding process solutions of high-end thermal separation tasks. The distillation specialists offer small, standardized laboratory units up to tailor-made, skid-mounted industrial size facilities. Testing, engineering and manufacturing is performed in-house at the headquarters in Germany. VTA and UIC offer contract distillation on different toll processing plants. VTA and UIC are offering wiped and short path distillation equipment and process development for various industrial sectors with high boiling and thermal sensitive products.

## Technologies

- Thin Film / Wiped Film Distillation
- Short Path Distillation
- Horizontal Thin Film Distillation
- Thin Film Drying
- Fractionation

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