



# Solving the palm oil mill effluent (POME) challenge

## POMEVap installation, India

### Executive summary:

Palm oil production is on the increase, which brings with it major economic benefits, but also significant sustainability challenges in terms of the impacts it has on the environment with the generation of methane, water and land use, and waste management.

As a member of the Roundtable on Sustainable Palm Oil (RSPO) Alfa Laval is committed to making a major contribution to mitigating against these impacts and has developed an innovative technology called POMEVap that is being used in the treatment of palm oil mill effluent (POME), a by-product of the production process.

A case study in India shows how POMEVap makes a substantial difference by ensuring that no methane is generated, minimizing water consumption, recovering additional palm oil and concentrating for reuse, and taking up less space to release land for other purposes.



## Background and context:

One of the major challenges faced by palm oil millers is the treatment of palm oil mill effluent (POME), which is generated mainly from the palm fruit sterilization and palm oil clarification processes.

POME is a thick, brownish, colloidal mixture of water, oil, and fine suspended solids, and it is characterized by a very high biological oxygen demand (BOD).

Owing to the high pollution load (high BOD) in POME, an efficient POME treatment method has become a pre-requisite for the sustainable and successful operation of mills.

Traditional POME treatment involves pumping the wastewater into a system of huge ponds, each the size of a football pitch, where it is treated to the required local discharge standards.

This method has several disadvantages: it requires a large area of land; methane is produced and emitted to the atmosphere; and POME contains approximately 1% of the total extracted palm oil, which goes to waste.

Methane is the second most abundant greenhouse gas (GHG), with a global warming potential 28 times higher than carbon dioxide. Methane accounts for about 16% global GHG emissions (IEA, 2024).

## Sustainability goals and strategies

Alfa Laval participates in [the Roundtable on Sustainable Palm Oil \(RSPO\)](#), a global partnership to make palm oil sustainable, and remains committed to the development and implementation of solutions that can reduce the environmental impact of palm oil production.

## Environmental impact

To address these challenges faced by mills, Alfa Laval has developed POMEVap technology to effectively [manage the POME issue](#).

The system uses AlfaFlash evaporation technology to separate the effluent into clear water, recovered palm oil, and a concentrate of nutrient-rich solids, which can be further processed and sold as animal feed.

POMEVap offers several advantages: water consumption is minimized as the condensate can be reused; oil and concentrate can be recovered and sold; less space is needed for wastewater treatment as a



Based on AlfaFlash Technology, POMEVap efficiently separates effluent into:

- **Water** in the form of process condensate (~300-500 ppm BOD)
- **Solids** in the form of concentrate (sludge with ~40% solids)

typical POMEVap needs just 300 square meters in space; and no methane is produced resulting in next-to complete avoidance of GHG emissions.

After concentration, the sludge from the wastewater is dried and used either as feed for livestock or as a technical grade product for agricultural manure.

## Best practise

For one palm oil producer in India, investment in a POMEVap system from Alfa Laval will make it possible for the mill to achieve local environmental standards, facilitating the re-use of condensate in the mill process, which will significantly reduce freshwater consumption, while also dramatically reducing GHG emissions.

Overall profitability will also get a boost through the recovery of additional palm oil, which would otherwise have been lost in the POME.

The company is based in southern India, four hours' drive from the city of Hyderabad, and is an independently owned company.

"Efficient treatment of POME was a major concern for this customer because of the effect on the environment and the loss of valuable by-products," explains Prasanna Upadhyay, CPO Industry Manager, Alfa Laval BU Food Systems.

## 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)

100018523-1-EN 2408

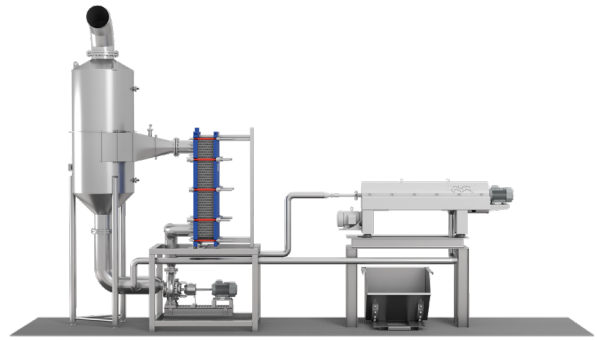
Following intensive product trials with Alfa Laval's evaporation test unit during the sales phase, the company was impressed with the performance of the POMEVap solution. The full-scale POMEVap system was installed and successfully commissioned at the plant at the end of 2023, with results meeting the customer's expectations.

**Economic considerations**

With an anticipated payback on investment of just four years thanks to the addition of a decanter step in the POMEVap system to facilitate palm oil recovery, the solution is a win-win.

"To give an idea of the oil recovery potential using POMEVap, a mill with a capacity of 45 tons/hour FFB generates approximately 162,000 tons of POME per year," says Amol Hukkerikar, Senior Global Sales, Alfa Laval BU Food Systems. "The raw POME contains approximately 1% oil and with the POMEVap system, it is possible to recover 50% of the oil, or 810 tonnes per year, which is significant!

"The recovered oil can be returned for oil clarification for further purification, or it can be also used as HVO feedstock allowed under the RED II framework in Europe. To conclude, the POMEVap solution not only assists in generating additional income to the mills but also completely solves the GHG emissions issue associated with the use of ponding system and helps palm oil mills to achieve their sustainability goals."



**Conclusions and call-to-action:**

POMEVap is a revolutionary technology from Alfa Laval that significantly reduces the environmental impacts of POME treatment at a time when palm oil production is set to increase massively.

This has the potential to have a major positive global impact, as seen by our customer case study in India. Contact us to find out more about the huge benefits that POMEVap can bring to you and your sustainability drive.

**Data points from best practice case.**

The data will vary from case to case in line with the capacity of the processing plant:



Water consumption is minimized as the condensate can be reused



Recovery of 810 tonnes of palm oil per year from wastewater



Methane emissions are reduced to next-to zero

Reduction in CO2-e emissions by means of Alfa Laval's POMEVap system:

Mill capacity tons/hr (FFB)	CPO <sup>3</sup> tons/hr	POME <sup>3</sup> tons/hr	GHG from POME <sup>1</sup> tons CO2eq/hr	GHG Reduction <sup>1</sup> tons CO2eq/year
30	5.9	18	5.6	33328
45	8.8	27	8.3	49992
60	11.8	36	11.1	66657
75	14.7	44.9	13.9	83321
90	17.7	53.9	16.7	99985

**References:**

- [Global Methane Report 2024](#)
- [Solution to Palm Oil Mill Effluent \(POME\)](#)
- [Palm oil mill effluent POME treatment](#)

**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)

100018523-1-EN 2408

Alfa Laval reserves the right to change specifications without prior notification.