



## From plantation to complete, state-of-the-art palm oil complex

Suksomboon Palm Oil Co. Ltd., Nongyai, Chonburi, Thailand

Case story



The Suksomboon palm oil complex includes the whole value chain from milling and refining to biodiesel and fats modification.

Since 1999 Alfa Laval has been Suksomboon's chosen technical partner in their successful transition from plantation to downstream processing of palm oil products. Today, the complex includes milling, refining, dry fractionation and hydrogenation for edible oil, olein, hard stearin, margarine and biodiesel plus various processes related to energy management. The company was also the first to adopt a number of new Alfa Laval technologies.

Suksomboon Palm Oil Co. Ltd. has its origins in a family owned plantation in Nongyai in Thailand's Chonburi Province,

East of Bangkok. Today, the company is probably the fastest growing and diversifying oil producer in Thailand.

Alfa Laval has supported the company throughout its impressive, rapid ongoing journey from plantation to mill to 300 t/d refinery to 900 t/d refinery with fats modification.

"We see Alfa Laval as a partner, offering valuable competence in engineering and R&D which enables us to pick the right technology," say the owners Mr. Supachai and Mr. Chana.



### Own mill for better and cheaper crude palm oil

The enterprising farmers began their journey towards downstream industrial processing in 1984 when they were among the first in their region to switch from growing yams and sugar cane to oil palms.

For the first 10 years the fruit bunches were transported to a mill in South Thailand. Then, in 1999, to save transport costs and increase oil quality, the farmers established their own oil mill on site with Mr. Chairong joining the management team as technical manager, ensuring the necessary processing experience.

### Focus on total cost of ownership

When it came to choosing equipment to produce crude palm oil (CPO), the team's focus was on minimizing operating costs and total cost of ownership. Alfa Laval was chosen to supply desanders, high speed separators and decanters, products that had proven track records in similar mills in terms of reliability and efficiency.

It was possible to sell the crude palm oil to refineries close to Bangkok, an area with a high concentration of end consumers. In cooperation with Alfa Laval, the mill capacity was therefore

increased in several steps by adding extra lines. And efficiency was optimized by innovations within the mill process, such as modification of the oil room and settling process. The management team continued working with Alfa Laval "because they have convincing equipment performance, and they provided competent support".

### Physical refining and fractionation

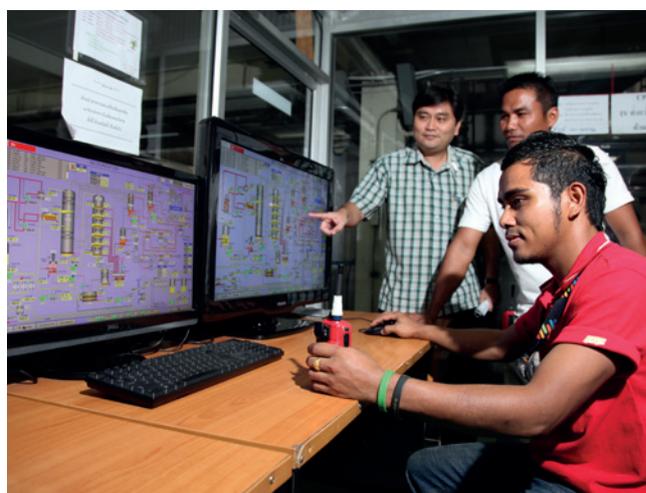
In 2007 Suksomboon moved further down the value chain and installed a conventional physical refining plant and a dry fractionation plant for edible oil, and to get a cheaper feedstock for its biodiesel plant. First step included a refinery capacity of 300 t/d to match the mill's production of CPO. According to Suksomboon's management Alfa Laval was again chosen "because we believed in their technology, and they showed flexibility in meeting our special requirements".

### Learning by doing – and creating new ideas

While gaining experience in refining operation, the creative management team soon began experimenting with new methods to further improve the process – not taking the well-established process for granted as best option. The continuous dialogue and close cooperation with Alfa Laval has led to several new innovative solutions.



In the oil mill Alfa Laval decanters clarify and purify the crude palm oil.



The entrepreneurial management team at Suksomboon has turned their plantation into a fast growing, advanced and diversified industrial palm oil complex in just one decade.



More than 10 Alfa Laval separators are used to recover crude oil, and to remove gum before the refinery's bleacher.

**Degumming and bleaching with less waste and oil loss**

One of the initiatives was to install a high-speed separator for removal of the gum from the oil before entering the bleacher, and addition of an extra filter to enable pre-filtration before bleaching. The main purpose is to reduce the consumption of bleaching earth – and hence the amount of spent bleaching earth containing non-recoverable oil.

**Own consumer brands established**

The team successfully identified a large domestic market for the attractive very light coloured palm olein (soybean look alike) and selected an appropriate refining process. They established their own consumer brands, Chaiyo and Tabtim, so successfully that there was a minimal need for traditional marketing activities.

The market success of Soksomboon's own consumer brands Chaiyo and Tabtim, of very light coloured edible palm oil sparked the rapid expansion of refining capacity from 300 to 900 t/d.



The dry fractionation plant delivers various fractions for edible purposes oil as well as cheap feedstock for Soksomboon's biodiesel plant.

**Tripled refining capacity in just 4 years**

With customers "queueing up", Soksomboon was ready to triple its refinery capacity just 4 years later with a new 600 tpd plant. Many aspects of the new state-of-the-art refinery are the result of close teamwork between Soksomboon and Alfa Laval. "We chose to continue the collaboration because Alfa Laval could adapt our ideas and integrate them into their offering."

The new refinery went into operation in 2011 and capacity was almost immediately fully utilized.

**New, innovative technologies for deodorization and fractionation**

Alfa Laval innovations in the refinery includes adding a pre-stripping, reheating after pre-stripping, and a post-stripping stage – a cost-effective continuous deodorization process (SoftColumn Dual-Strip) for high quality oil. The plant also includes a double scrubber with possible recovery of a tocotrienol-rich stream.



The refinery's latest deodorization process (SoftColumn Dual-Strip) includes both pre-stripping and post-stripping plus a double scrubber with possible recovery of the highly potent vitamin E antioxidant tocotrienol.

For the dry fractionation plant Alfa Laval supplied a test crystallizer equipped with various features. Among those are Iso-Mix rotary jet heads used to spray and melt solid deposits inside the crystallizer, and with pre-cooling in the filling line. Compared to the conventional energy-consuming crystallizer cleaning by filling up the crystallizer, this process saves chilling energy and time, thus increasing capacity.

### **Integrated, industrial complex**

Suksomboon's success in a competitive market is closely related to how they have managed to integrate and diversify their operation. The present industrial complex is an advanced example of how integration of efficient energy management across the whole complex leads to low overall operation costs.

Just a decade after they started milling the fruit bunches, the industrial complex now comprises full milling and refining lines, biodiesel production from palm oil and soon also from palm fatty acid distillate, biogas production and electricity net-generation, biomass steam boiler, production of chilled water by absorption chillers driven by excess steam. It also hosts full range packaging facilities with bottle manufacturing from plastic granules as well as margarine production with general aseptic packaging.

### **Next step: Hydrogenation**

Suksomboon continues to grow and diversify, and the owners still see a lot of unexplored business opportunities ahead. The next joint expansion project is a 200 t/d Alfa Laval hydrogenation plant for delivery end 2012, heralding the company's entry into the specialty fats market for both palm oil and palm kernel oil.



Alfa Laval heat exchangers contribute to the efficient energy management at the palm oil complex.

### **Social responsibility**

During the serious floods which hit large areas of Thailand in 2011, Suksomboon used its margarine plant for bottling mineral water, which was freely distributed. This humanitarian action is an example of Suksomboon's serious approach to social responsibility.

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### **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)