

Swedes use biology to combat

A sea change looks to be underway in the anti-fouling world in the form of a new product from Gothenburg-based biotech innovator I-Tech that puts a stop to uninvited animal life sticking to hulls — a development that could save the industry billions amid push to boost vessel efficiency

Roderick Craig Oslo

Shipping and medicine? It is a surprising symbiosis but one that has generated a solution that combats two important issues.

Firstly, it could eliminate the need for the high levels of copper traditionally used in marine coatings, thus reducing their potential risk of poisoning the water.

Secondly, it could prevent the build-up of barnacles on vessel hulls, where increased friction reduces efficiency and increases fuel consumption as well as noxious emissions to the air.

It all started 16 years ago in what is no flash-in-the-pan story.

Academic researcher Lena Lindblad had just wrapped up her thesis in pharmacology at the University of Linköping, Sweden, and was about to start working at pharmaceutical company Astra Zeneca.

Then, she tells TradeWinds, an opportunity arose, through an academic contact, to study barnacles as part of an existing programme into anti-fouling substances.

"I had no idea what barnacles were but I soon learned that they attach to ships," she told a gathering of Swedish shipowners earlier in the summer.

"I work in biocide, which means to kill something. But doing that with chemicals isn't easy; they either have to be extremely toxic or in very high doses."

That is the case with antifouling systems today, with the copper content at between 40% and 60%.

"A much better idea is to avoid agglutination [clumping]. Barnacles shouldn't even make it to the hull," Lindblad said.

She tells TradeWinds that using pharmacology makes it "easier to manipulate, or persuade, something to do something different".

So she focused her post-doctoral research on the barnacle larva, to

learn its behaviour and what substances affect it.

The larva starts out about 0.25 millimetres long, then as it matures it sheds its shell numerous times. Those that attach to ships have shed their shells six times, explains Lindblad.

"They move around actually tasting the surface — is it good to attach to? If so, it stands on its antennae, produces adhesive and within 24 hours is attached and waggling its legs."

The breakthrough came with I-Tech's new active chemical compound Selektepe of which Lind-

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blad is co-inventor and a patent holder.

TradeWinds understands the product is derived from the synthetic drug medetomidine used as an anaesthetic and pain killer during surgery.

"While we are indeed talking biocides, we don't kill the barnacle," she said. The agent stimulates the octopamine receptor of the larva, which starts "to kick around like mad and can't move around on any surface. Instead it swims away". The flight mechanism being the point; the agent repels, or deters, the barnacles from attaching.

As an anti-fouling agent Selektepe is understood to be non-corrosive and can be used on all kinds of surfaces, including aluminium.



REVOLUTIONISING ANTI-FOULING: I-Tech research director and co-founder Lena Lindblad, and chief executive Philip Chaabane. PHOTO: I-Tech

I-Tech chief executive Philip Chaabane tells TradeWinds that coatings containing Selektepe have the same durability profile as those based on the chemistry of existing antifouling products.

He says sales of Selektepe have risen fourfold since last year, so things are obviously moving into the mainstream fast.

I-Tech has a contract with life sciences firm Cambrex Corp to manufacture on an industrial scale.

There is a lot at stake. Lindblad says the fouled-hull scourge is "about large sums of money. DNV GL has estimated the global cost at \$30bn".

The solution is "important both

from an economical and environmental perspective. You substitute 40% to 60% copper content with 0.1% if you know what you're doing with your biology".

An associate professor at the University of Gothenburg's science faculty, Lindblad is research director at I-Tech and a founder. She also leads the preclinical

barnacles scourge

PERFORMANCE ON STATIC VESSELS IS KEY ESPECIALLY IN WARM WATERS

Selektepe has been approved by regulators in China, Japan, South Korea and, last month, the European Union (EU).

I-Tech managing director Philip Chaabane earlier said that for other countries where no regulation is yet in place, it will likely follow the EU model.

He tells TradeWinds that an application is currently in preparation for the US, although the key difference there is that both Selektepe and the anti-fouling product(s) have to be submitted for approval together, so I-Tech is in talks with the Environmental Protection Agency (EPA) and working on a partner structure to that end.

But it is approvals in the main Far East shipbuilding countries that are key.

Asked in a Greek webcast about key factors that contributed to those approvals, Chaabane cites the use of Selektepe in very small concentrations, thus cutting the amount of biocides and active agents leeching into the ocean, as well as static performance.

Hulls remaining cleaner "translate obviously into lower fuel consumption and lower emissions to air".

He alludes to the eastwards paradigm shift of shipping, with an increasing concentration in warm-water regions, amid governmental efforts to "combat transfer of invasive aquatic species between ecosystems".

"Part of that problem is due to fouled hulls and the best way to handle that is with new technologies," he said.

Laurin Maritime technical manager Mikael Karlsson also highlights the operational takeaway. "Fouling is a problem, especially as we are operating in warm waters more than cold waters, also idling a lot at anchor. That's a lot of money to save and, of course, fuel and money go together. It's a big factor," he said.

Following a non-exclusive deal with Japan's Chugoku Marine Paints (CMP) struck last year, CMP last week announced the launch of its new-genera-

tion SeaFlo Neo range of anti-fouling coatings including Selektepe, with the SeaFlo Neo CF Premium brand "already applied in full coats to vessels owned by shipping companies in Sweden, Hong Kong, Korea and Japan".

Chaabane says it is the first five-year system containing Selektepe to go on the market. He cannot reveal how much the deal with CMP is worth.

CMP is first out but Chaabane tells TradeWinds that I-Tech is of course talking to "all" the other leading marine paint producers — the likes of Jotun, PPG, International Paints and Hempel.

"We're not being turned down by anyone," he said. "It's very promising." He says it is just "a question of time" depending on each company's development programme.

I-Tech's backers include lead shareholder Volvo Group Venture Capital, Vicore Pharma Holding (formerly Mintage Scientific), which represents the interests of the founders and other private investors, and Almi Invest Västverige.

Its 2015 annual report shows net turnover of SEK 5,124,000 (\$608,778) and earnings, after financial items, of SEK 8,598,000 (\$1.02m) in the red.

Chaabane confirms to TradeWinds the main priority now is to boost turnover, with the goal of "becoming profitable by the end of 2017" and giving investors a

return on their money. He says investors have been "very patient" and supportive.

As for a potential stock-listing down the road, Chaabane says that is one of the options but the main ambition right now is to "clearly associate" Selektepe with anti-fouling, as well as facilitating a corporate social responsibility boost for end-users in terms of the environmental benefits.

Chaabane says he will, unfortunately, not be present at the SMM international trade fair in Hamburg in September because, happily, he and his wife are expecting a baby that very week. But his team certainly will be.



FOULED: Ships are more prone to barnacle build-up in tropical waters, as on this anchor chain. PHOTO: SCANPIX

'GOOD FOR THE ENVIRONMENT, GOOD FOR ALL OF US'

I-Tech is a member of Astra Zeneca (AZ)'s pharmacology and biology innovation unit, BioVentureHub, housed in AZ's mega-complex in the Gothenburg suburb of Mölndal, where there is a strong emphasis on integrating value chains and "scaling up chemistry" in development.

"Having I-Tech in this environment makes sense, both for them and for us," said BioVentureHub director Magnus Björns in a video commentary.

"We sit on a lot of knowledge that could be applied to their development and vice-versa. It's about providing better means for innovation. It feels great to help I-Tech

and Selektepe because it's all about the environment," he added.

With regulators potentially getting much tougher on the use of biocidal copper in antifouling systems, the green factor is echoed by I-Tech's industry test partners.

ANTICIPATING COPPER BAN

Technical manager Mikael Karlsson of Laurin Maritime said of its Selektepe involvement: "We know that the use of copper will be banned in the future, so paint manufacturers have to select something else that can do the same thing.

"If that something happens to be good for

the environment, then it's good for all of us." In addition to new ship designs in the hunt to boost efficiency, I-Tech chief executive Philip Chaabane notes in a posting that "lots of work is being done to try to adapt to lower fuel consumption.

"But there are still some 100,000 vessels out there and there needs to be better maintenance programmes, better propellers, better equipment, better engines, retrofits of equipment, and most importantly for us, improved anti-fouling coatings that reduce friction with water. That has a large impact".

Shipmanagement director Fredrik

Stubner of products tanker owner Marininvest states his bottom-line case in another posting: "Our revenue is based on how well a vessel performs in water. We guarantee a certain consumption at a certain speed.

"The results of test panels on two ships have been very promising. It comes at a cost but having a poor hull with a lot of marine growth means 10 times that cost."

Chaabane tells TradeWinds that evidence in money saved is "the only story to tell" owners and operators, adding that products containing Selektepe can still be "cost-competitive depending on the mix".



I-TECH: Based in Astra Zeneca's pharmacology complex in Gothenburg. PHOTO: ASTRA ZENECA