

Halieutica: Inside France's CRO in shrimp feed research



Guillaume Le Reste (left) and a part of the Halieutica team, Eva Rondeau, scientific manager (middle) and Jean Luc, quality management consultant.

From a small beginning eight years ago, the Centre for Experimentation on Aquafeeds in Crustacean or CEAC by Halieutica, in the quiet outskirts of Angers in France's Pays de la Loire region, has evolved into a distinctive contract research organisation (CRO). For founder Guillaume Le Reste, an aquafeed nutritionist, Halieutica was born not from long-term planning but from crisis.

"When COVID-19 shut down borders and halted international business, I lost most of my consulting work in Asia and South America." Instead of waiting for the world to reopen, he pivoted. "I had to find another business. Clients couldn't run trials anywhere. Everything was closed. So, I decided to build my own small-scale research station and offer trials to our main French customers so that they do not lose time and can restart marketing when the world reopens."

What began with 12 aquariums and a handful of vannamei shrimp has since grown into a purpose-built facility with three specialised research rooms, a team of dedicated scientists, and a growing global reputation.

From garage to research hub

Halieutica's early days were humble. The first R&D station operated out of Le Reste's garage, and the first employee worked from the family kitchen. But demand grew quickly. European feed additive companies—often focused first on salmon before turning to shrimp—needed reliable, affordable, and scientifically robust shrimp trials. Few facilities existed in Europe.

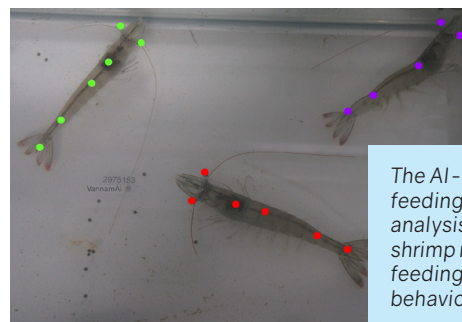
Halieutica filled a gap: a shrimp-only research platform focused on feed performance, digestibility, and behaviour, designed for ingredient suppliers, feed mills, and additive producers. Today, the facility includes:

- A growth trial room with 80 tanks for high-replication experimental designs
- A behavioural analysis room equipped with video-based AI tracking
- A digestibility room using innovative faeces-collection methods adapted for shrimp.

"We can test additives, ingredients and feeds from every angle," said Le Reste. "The idea is to provide customers with data on their products (enzymes, probiotics, pigments, insect meals, etc.), to substantiate their claims. In Europe, there are clear frameworks and companies must show proof of concepts using standard protocols."

A new frontier: AI-driven shrimp feeding behavioural analysis

The most groundbreaking development at Halieutica is led by Eva Rondeau, who heads the shrimp behaviour program. What began as hours of manual video observations has evolved into an AI-powered system capable of tracking individual shrimp movements, feeding responses, and behavioural patterns.



The AI-driven shrimp feeding behavioural analysis tracks individual shrimp movements, feeding responses, and behavioural patterns.

"We use AI (artificial intelligence) to analyse how shrimp interact with feed," Rondeau explained. "We can see whether an ingredient or formulation affects palatability or attractability."

The system works by:

- Recording 5-minute feeding videos
- Tracking each shrimp using machine learning
- Mapping movement patterns and time spent in feeding zones
- Measuring speed, frequency, and duration of feeding attempts
- Combining behavioural data with pellet weight loss to quantify consumption

"We adapted an open-source ethology software originally designed for mice and mosquitoes to shrimp with the team at Angers University. After more than 100 hours of human-annotated video, the AI can now reliably identify individual shrimp—even when multiple animals overlap," added Le Reste. "Most of the earlier work was carried out with Kera, a keratin hydrolysate produced by BCF Life Sciences, France. Marketed as a functional amino acid source, the company wanted data on its palatability in shrimp."

Rondeau said that to date, they can generate heat maps of shrimp activity around the pellets and have attractability metrics showing how fast shrimp locate feed. "While VannamAi software can show the palatability indicators, i.e. how long they stay and how much they eat, in contrast, there are also repellent detection for ingredients or drugs that deter feeding."

While the team has not yet consolidated these into a single key performance indicator (KPI), the dataset is already transforming how feed additives are evaluated. In a presentation at the recent Aquaculture Europe 2025 in September, the team studied the palatability and attractability potential of brewery spent yeast (BSY), well known for immunity properties. Recorded videos were analysed with the software to generate data on palatability and attractability based on data on prehension, speed, time spent in the feeding zone, shrimp activity and feed consumption.

Why behaviour matters: Attractants, repellents, and real-world feeding

Shrimp feeding behaviour is nuanced. An ingredient may attract shrimp quickly but fail to sustain feeding. Others may be palatable but slow to draw shrimp to the feeding area.

This distinction is critical for additives such as attractants (amino acids, hydrolysates, top-coated additives) and repellents (certain antibiotics or functional compounds). There are also effects of processing such as pellet coating, inclusion amounts and leaching.

Le Reste highlighted a practical example of antibiotics and additives used in trout and shrimp feeds.

"Fish farmers top-coat antibiotics and sometimes, to increase efficiency, they use high amounts such that the feed becomes unpalatable. However, there is a major health and safety issue involved in adhering to the prescribed doses. The coating plays a central role here. In shrimp feeds, if top-coating of the additive is uneven, shrimp receive inconsistent doses. In our centre, we worked on top-coating of feeds and with our system, we can see how the coating method affects attractability and palatability."

Therefore, with the AI platform, the team at Halieutica can advise additive producers on:

- Whether their product is a repellent or an attractant
- Whether it should be included in the pellet or top-coated
- How processing affects functionality
- How to optimise dosage and application

This objectivity replaces the old method of "your eyes versus my eyes," where two observers watching the same aquarium could reach different conclusions.

Digestibility: bringing science to local ingredients

A strength at Halieutica are digestibility trials—an essential step for ingredient evaluation. While fish digestibility trials are outsourced to partners like INRAE or Sparos, shrimp digestibility is performed in-house using methods adapted to standard tanks.

One notable project involved cowpea, a drought-resistant legume widely available in sub-Saharan Africa. Working with INRAE and local partners in Congo, Halieutica collected cowpea samples, produced small experimental feed batches with digestibility markers and conducted digestibility trials at an INRAE research facility. It then published results at French and Ugandan aquaculture research events.

"With feed formulation software, such as Allix3 and Bestmix, we incorporate local ingredients such as cowpea for fish feeds in Africa. The findings help African feed mills evaluate locally available raw materials—critical in regions where supply chains are fragile and imported ingredients are expensive. In Congo, the main advantage of an ingredient is [availability]. The only other local supplies of aquafeed ingredients from industrial plants are wheat bran from wheat milling and beer byproducts."

A growing footprint in Africa and beyond

Halieutica's expertise extends far beyond France. The team works extensively across Africa, supporting private feed millers and development agencies such as the World Bank, Food and Agriculture Organisation of the

United Nations (FAO) and Gesellschaft für Technische Zusammenarbeit (GTZ) and working on feeds for seabass, seabream and tilapia (Morocco and Egypt) and tilapia and catfish (Congo, Ivory Coast and Rwanda). From Morocco's emerging aquafeed factories to Egypt's poultry feed mills diversifying into aquaculture, Halieutica helps local players navigate the complexities of fish and shrimp nutrition. Their work included additive and ingredient evaluations, helping feed mills upgrade formulations, extruder operation training, on-farm troubleshooting, and technical workshops for distributors and feed producers to support smallholder aquaculture.

A clear strategy: Do one thing exceptionally well

Despite growing demand, Le Reste is firm about Halieutica's identity.

"We are not a startup so we don't burn cash. We are a classical business. We don't want to do everything. We want to do one thing—shrimp—and do it the best we can."

This focus has earned Halieutica strong relationships across the industry, including with competitors. By specialising in shrimp, they avoid overlapping with established fish research centres and maintain a unique position in Europe.

"We help companies already successfully marketing their feed additives into livestock production, bring these products into aquaculture with clear data on efficacy in fish and shrimp farming."

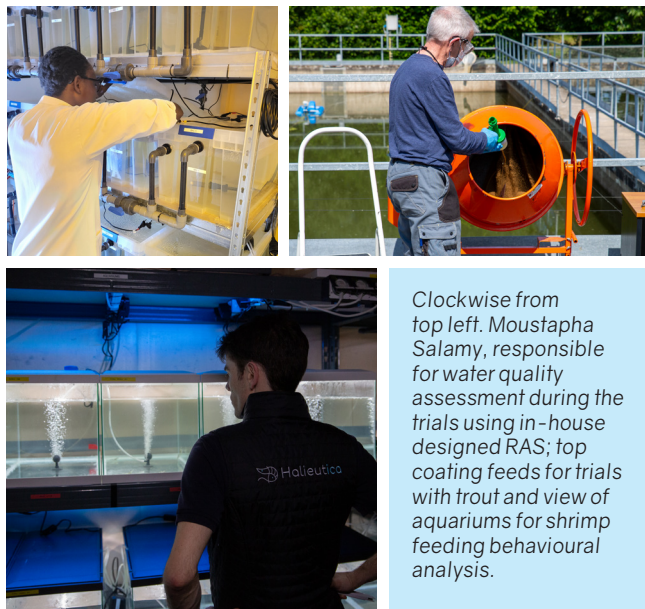
The road ahead

With six months of AI behaviour data already accumulated, Halieutica is now refining methodologies, expanding datasets, and exploring ways to standardise behavioural KPIs for the industry.

The goal is clear: to bring objectivity, repeatability, and scientific rigour to shrimp feed evaluation.

As Le Reste puts it: "We want to impose a standard that is no longer subjective. With AI, we can."

This specialised research hub in Angers is influencing feed strategies across continents. Halieutica's journey reflects resilience, innovation, and a deep commitment to advancing shrimp nutrition science.



Clockwise from top left. Moustapha Salamy, responsible for water quality assessment during the trials using in-house designed RAS; top coating feeds for trials with trout and view of aquariums for shrimp feeding behavioural analysis.