

How the Eurofins Nutrition Lab in Nantes increased capacity by 180% and reduced runtimes by 60%

Optimizing efficiency, productivity and sensitivity through collaboration

The Eurofins Nutrition Lab in Nantes sought to increase the capacity of their equipment, improve turnaround times and maximize the sensitivity of their testing – without placing additional burden on their technicians.

The result? An upgraded workflow that has:

- Boosted capacity by 180%
- Reduced runtimes by 60%
- Improved and streamlined the global workflow for sugar profile analysis

With customers across the food, water, environmental, pharmaceutical and agricultural industries, Eurofins contributes to a safer, healthier world through its high-quality laboratory, research and advisory services – a mission supported by facilities like the network's state-of-the-art food testing laboratory in Nantes, France.

The Eurofins Nantes analytical campus hosts one of the largest nutritional analysis laboratories in Europe. To maintain their high testing standards, they sought a way to improve the efficiency, sensitivity, safety and capacity of their workflows, which rely upon advanced ion chromatography systems (IC/ICS). They opted to collaborate with Thermo Fisher Scientific and, in December 2017, deployed an optimized method of carbohydrate analysis, implemented eluent generation on their existing Thermo Scientific™ ICS-3000 and Thermo Scientific™ ICS-5000+ systems (which run on Thermo Scientific™ Chromeleon™ Chromatography

Data System (CDS) software), and installed a new IC column: the Thermo Scientific™ Dionex™ CarboPac™ SA10. The laboratory has continued this collaboration since, installing additional eluent generation in 2019 and a Thermo Scientific™ ICS-6000 in 2020.

In this case study, we expand upon the lessons learned and benefits experienced by the Eurofins team in Nantes from the collaboration and demonstrate how advanced analytical equipment can benefit not only nutritional analysis, but Good Manufacturing Practice workflows for any product.

Why upgrade?

The Eurofins Nutrition Lab in Nantes was facing a number of challenges in its carbohydrate analysis, a prominent one being productivity. “Sugar profile analysis



At a glance: Eurofins' Nantes analytical campus, France

The campus at Nantes is a significant part of the Eurofins network. The facility offers complete analysis for nutritional labelling of food and feed products, from raw material to finished product, for industry, retail and other group laboratories. The Eurofins Nutrition Lab in Nantes has a team of 100 people, including 80 technicians. This team manages more than 60,000 analyses, per month and completes up to 250 samples per day for sugar profile analysis. "Under standard conditions, our analyses have a turnaround time of six calendar days, but under rush conditions we can complete full nutritional labelling in just four days," says Romain Rivoallan, one of the production managers in the Nutrition Lab.



"My role is to ensure the laboratory performs at a consistently high level and guarantee the quality of all the analyses we perform. We strive to continuously improve our processes and analytical methods, and work closely with our R&D team to evaluate our ongoing needs and implement solutions to fulfil them," Rivoallan says. "We were keen to optimize our global workflow for sugar profile analysis in terms of efficiency, capacity, manual requirements, operator safety and more – so we reinforced our collaboration with Thermo Fisher Scientific."

is one of the major analytical methods employed by our chromatography sub-unit," explains Rivoallan. "This sub-unit uses gas, liquid and ion chromatography (GC, HPLC and IC, respectively) to perform sugar profiles, trace lactose analysis, fatty acids profiles, cholesterol and histamin analysis or quantify additives commonly used in food, like organic acids or artificial dyes. We needed to enhance the capacity of our equipment to meet our fast-paced conditions, by reducing the per-analysis runtime and optimizing the efficiency of our testing."

Low turnaround times set by the laboratory and unanticipated rush orders led to a runtime reduction workshop. Alongside increased productivity, the Nutrition Lab wanted to maximize the sensitivity and comprehensiveness of its testing, in line with regulations specifying the maximum sugar content for 'sugar-free' or 'lactose-free' samples (CE N°1924/2006) – important

for safeguarding consumer safety. They also needed to introduce galactose into their sugar profiling of dairy samples, a parameter previously omitted from testing workflows, to increase the comprehensiveness of their testing services and create new business opportunities. Efficiency, sensitivity and compliance are critical for testing that impacts consumer health, whether for pharmaceutical products, food, water, agriculture, environment or genetics.

The Eurofins Nutrition Lab team in Nantes sought an advanced, sensitive workflow that optimized analysis efficiency and productivity, while reducing the manual burden placed on their technicians. By automating and streamlining its nutritional analysis operations, the Nantes team hoped to not only improve sample turnaround, but also reduce the need for personnel to handle solvents and reagents, thereby increasing operator safety.

The Eurofins Nutrition Lab in Nantes needed...



Reduced per-analysis run time to **enhance equipment capacity**



Minimal need for manual input to **increase operator safety and improve accuracy**



Optimized workflow efficiency to increase laboratory productivity



A **comprehensive workflow** to aid food safety compliance and increase analytical capabilities

“Thermo Fisher Scientific is one of our major suppliers for laboratory equipment and materials, and provides innovative, market-leading chromatography technologies. We’ve had very positive experiences with them, and so chose Thermo Fisher Scientific equipment over other options available in the market.”

Implementing eluent generation and Chromeleon CDS software

To overcome these challenges, the Eurofins Nutrition Lab team in Nantes opted to upgrade their analytical setup. However, the equipment offered by many suppliers required too much maintenance, experienced detection problems and was not easy to use, hampering analysis. However, this was not the case with Thermo Fisher Scientific, says Rivoallan, who truly trusted Thermo Fisher Scientific’s systems, software, services and support. “Thermo Fisher Scientific is one of our major suppliers for laboratory equipment and materials, and provides innovative, market-leading chromatography technologies. We’ve had very positive experiences with them, and so chose Thermo Fisher Scientific equipment over other options available in the market.”

The Eurofins Nutrition Lab in Nantes implemented eluent generation on their existing Thermo Scientific Ion Chromatography Systems in December 2017, and again in 2019. They upgraded one ICS-3000 and three ICS-5000+ systems as part of the 2017 collaboration, and installed a new ICS-6000 and IC column (a Dionex CarboPac SA10). This column is able to separate simple sugars quickly, at better resolution and with easier peak identification and integration: it can analyze six common sugars in food samples in just 10 minutes. Today, the laboratory has two ICS-3000, three ICS-5000+, and one ICS-6000, all of which run on Chromeleon CDS software and are dedicated to analyzing trace sugars and lactose, and profiling sugars and organic acids.

The eluent generator cartridges removed the need to manually prepare eluent, instead electrolytically producing high-purity eluents for isocratic and gradient runs in reagent-free IC systems (RFIC). This resulted in a faster, safer workflow for operators, with high reproducibility and analytical consistency, and precise

gradients. When used with pulsed amperometric detection systems, such as Eurofins Nantes’ ICS-3000 and -5000+ systems, this setup is able to directly quantify non-derivatized carbohydrates with minimal sample preparation. Additionally, the CDS software offers an integrated, scalable, full enterprise solution, providing compliance and QA/QC tools, instrument control, automation and data processing capabilities, networking functionality, and more to enable improved productivity and more ‘right-first-time’ results.

The Eurofins team in Nantes was continually supported by Thermo Fisher Scientific in developing and implementing their new analytical method. Rather than demonstrating a ‘throwing things over the fence’ mindset, where instruments or upgrades are sent without subsequent support from the provider, technical, logistical and troubleshooting support was available throughout the planning and implementation of the project – and beyond. “We were able to first use demo equipment to complete internal tests and develop the right method before implementing on our routine systems, which put our minds at ease that we were making the right choice for our facility,” explains Rivoallan. “Thermo Fisher Scientific helped us to choose and implement the solutions we needed to reach our objective: a widely optimized workflow with enhanced efficiency and increased capacity.”

Improved turnaround time, capacity and sensitivity

After implementing the upgrades, the Eurofins team in Nantes saw a vastly improved experimental workflow. “The runtimes for our sugar profiles have reduced by 60%” says Rivoallan. “This means that, despite our test volumes actually increasing, our equipment capacity has improved by 180%! We’ve also reduced the amount of time needed to prepare samples and equipment, and the time spent managing and treating all of our data.”

The Eurofins Nutrition Lab in Nantes achieved...



Increased **productivity and equipment capacity** – capacity boosted by 180%



Improved **operator safety and workflow accuracy** due to minimal need for manual eluent generation



Quicker sugar profiling – **runtimes reduced** by 60%



Guaranteed six- and four-day turnarounds for standard and rush samples



An improved, **streamlined global workflow** for sugar profile analysis (including **galactose** for dairy samples)

By reducing the need for manual eluent generation, the Eurofins Nutrition Lab in Nantes has also improved the safety of its workflows for laboratory personnel. This has created an improved working environment for the facility's scientists, who now only perform minimal solvent handling as part of routine sugar profile analysis. "We also reduced turnaround times: results can now be obtained in the same day for rush samples, as opposed to the day after with our previous workflow," adds Rivoallan. As a result of their upgraded testing procedure, the Eurofins Nutrition Lab in Nantes is able to guarantee customers a six-day turnaround for standard complete nutritional packages, and a four-day turnaround for rush samples. Testing workflows are also able to include galactose in the sugar profiling of dairy products, improving the analytical capabilities of the laboratory.

"All of our upgraded equipment is ergonomic and easy to use with few maintenance needs," adds Rivoallan. "It performs well, is robust and efficient, and brings a valuable degree of interoperability. This is also true of the software – the Chromeleon CDS – which was easy to connect to our other systems and has made a meaningful difference for our laboratory."

Training included in every installation

When used in conjunction with the Eurofins team's advanced IC equipment, the Chromeleon CDS software enabled a truly streamlined, customizable way of working. This workflow required less manual time for verification and validation of quantification, optimized data integration and treatment, and was readily integrated with existing laboratory information management systems (LIMS).

"We found the Chromeleon CDS software simple and convenient to learn, set up and use; it has a simple interface that proposes parameters automatically

according to the chromatographic system components," says Rivoallan. "Our technicians were able to easily make changes if needed, and training was included in every installation to improve our use of the software and account for any changes between versions. We were already using Chromeleon CDS software on our workstations, but this project added the ability to optimize data integration and treatment to reduce manual activity in verification. This has resulted in a truly streamlined workflow where users can review chromatograms very quickly and only rarely need to make manual changes to the analysis."

Such integration has numerous benefits in a large, client-servicing organization: data can be transferred quickly and easily between different laboratories and customers, giving facilities a new level of locational independence and improving the efficiency of and opportunities for collaboration. This is especially important within a widespread network such as Eurofins, within which all constituent laboratories and competence centers work together and learn from one another to enhance their capabilities. In fact, based on their Thermo Fisher Scientific-enabled workflow, the Eurofins Nutrition Lab in Nantes was chosen to co-author the reference method for sugar profiling for Eurofins (together with Wolverhampton, UK). This method now forms part of the organization's Global Standard Operating Procedures for recommended equipment and consumables, and guides any new or existing Eurofins laboratory in implementing or optimizing sugar profile analysis.

The Eurofins team in Nantes greatly valued the collaborative nature of their partnership with Thermo Fisher Scientific, and were offered ongoing training for all of their chosen upgrades to support the laboratory's development of a new analytical method and use of eluent generation. "The Thermo Fisher Scientific service



engineers and commercial team were very involved in the whole project,” says Rivoallan. “They were supportive, responsive, and easy to contact throughout the process. We still interact with them for after-sales technical support and training, and have a great deal of confidence in their support.”

Looking to the future

The Eurofins Nutrition Lab in Nantes has seen significant benefits from their upgraded workflow, and the support provided by Thermo Fisher Scientific has helped them to create a safer and more productive working environment for their staff. “We set out to achieve specific goals from this project, and Thermo Fisher Scientific helped us achieve them,” says Rivoallan. “Thermo Fisher Scientific are already highly recommended as a supplier for equipment for chromatography, inorganic analysis, colorimetric and enzymatic analysis, sample preparation, and more – and we would recommend them to any Eurofins laboratories looking to improve their performance.”

Eurofins Nutrition Lab in Nantes has further goals for future optimization, and a second collaboration is

underway with Thermo Fisher Scientific. “We want to harmonize all of our other analysis workflows as we did for our sugar profiling,” says Rivoallan. “We also want to further automate sample preparation for our sugar profile analysis to reduce the labor time involved and allow our equipment to work overnight when needed.”

As a result of their upgrades, the Eurofins’ scientists in Nantes were able to improve their analysis and reach their goals: optimized runtime, more efficient analysis, expanded analytical capacity, inclusion of galactose in dairy sugar profiles, and improved sensitivity and staff safety. These benefits can be experienced by any Eurofins laboratory, regardless of testing specifics. Whether workflows concern pharmaceutical products, food, water, agriculture, environment, product or genetics testing, advanced analytical systems and collaboration with an experienced partner can bring speed, sensitivity and safety to laboratories across the Eurofins network – as experienced by the Eurofins Nutrition Lab in Nantes.

Find out more at
www.thermofisher.com/powerofpartnership

ThermoFisher
SCIENTIFIC