

Sustainability Meets Scientific Rigor in Biobased Safe-Lock Tubes

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Introduction

A 2025 European Customer Evaluation by Eppendorf SE

In the world of modern life-science, innovation is only as valuable as the evidence that supports it. New ideas must earn their place through methodical testing, hard data, and repeatable results. Few materials are more ingrained – or more difficult to replace – than the fossil-sourced plastics found in nearly every lab consumable.

That's why, when Eppendorf introduced its Safe-Lock Tubes BioBased in early 2025 – crafted from 100 % renewable polypropylene according to mass-balance approach* – we knew the challenge extended beyond sustainability. The real test was whether these tubes could match the same standards of performance, reliability, and durability that generations of scientists had come to expect: The Eppi® itself!

To find out, Eppendorf turned to the scientific community: across Germany, the UK, Belgium, and Poland, researchers were invited to scrutinize the biobased tubes with no restrictions, no modifications, and no shortcuts. Just rigorous, real-world science. Because in research, a promise only matters if it can be proven.



Figure 1: The Eppi® is highly valued by scientists worldwide

* The mass balance approach for products from renewable resources is a method in which renewable and conventional raw materials are processed together, and the share of renewable resources is mathematically allocated to specific products along the value chain. More Information available at eppendorf.link/BioBased



Figure 2: The Eppendorf portfolio of biobased consumables continuously grows.

The challenge: Match the gold standard

Eighteen scientists from leading academic, governmental, and pharmaceutical institutions took up the challenge. The biobased Safe-Lock Tubes were used in demanding applications ranging from PCR and biomolecule purification to GC-MS, proteomics, bacterial culture, and long-term storage.

At Namur University, the tubes endured 30,000 × *g* centrifugation (g-max), high temperature incubations, and cloning protocols. At the Francis Crick Institute in London, they were autoclaved and integrated into LEAF [1]-scored sustainability workflows. In Hamburg, proteomics experts together with Eppendorf application specialists conducted mass spectrometry (MALDI-TOF-MS) and peptide binding tests with over 8,800 peptides using the APS-TEST [2], where even trace differences in performance would raise concerns.

Finally, a major pharmaceutical company in Poland directly compared the biobased tubes to long-used fossil-sourced VWR alternatives in their biologics compound discovery workflows and following validation. The verdict across all locations was consistent and clear: no measurable difference in performance. In some cases, the biobased tubes even received higher overall ratings – thanks to their sustainability benefits.

"Handling was seamless, even better than what we usually use. Tight lids, robust design, no difference in usability – and it's sustainable? We're ready to switch."

Biologics Pharma Company, Poland

Performance under pressure: Proven across real-life applications

In detail, the evaluation spanned over a dozen application areas – ranging from routine molecular workflows to demanding proteomics protocols – and returned consistent, data-driven results.

- > **Performance Rating:** Key functional parameters such as lid tightness, freezing resilience, centrifugation stability, and overall usability were overwhelmingly rated excellent or good.

> **Autoclaving:** Tubes retained full structural and chemical integrity after autoclaving, with no signs of degradation or deformation.
- > **Chemical Compatibility:** Mass spectrometry analyses revealed no increase in leachables, nor any impact on peptide binding or sample purity.

> **Durability:** In all test scenarios, biobased tubes matched or surpassed the robustness of fossil-sourced alternatives.

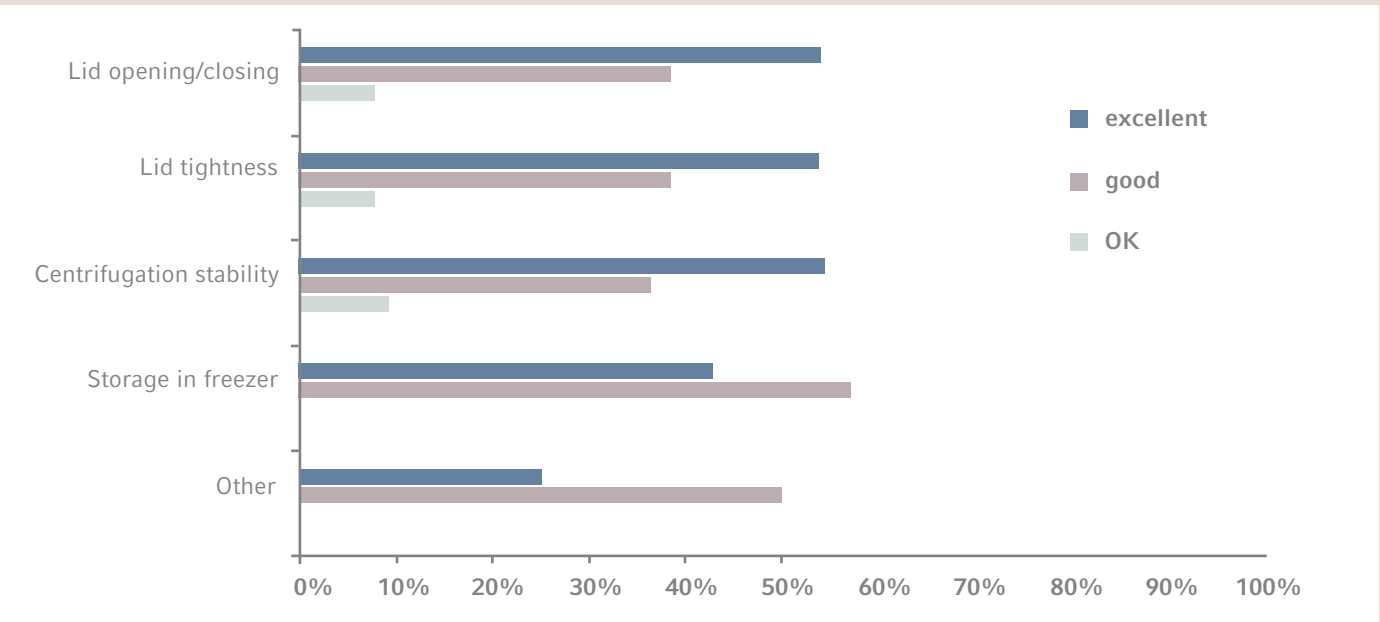


Table 1: Performance Comparison – biobased vs. fossil-sourced: Across all criteria relevant to user safety and sample integrity, most testers rated the biobased tubes on par with – if not slightly better than – their conventional counterparts.

When performance was proven, priorities shifted

One of the most revealing outcomes of the evaluation wasn't in the technical data – but in the shift it triggered in researcher mindset. Once it was clear that the biobased tubes delivered the same performance as traditional ones, the question changed. It was no longer “Does it work?” but “Why aren't we already using this?”

“The biobased material matches fossil-sourced polypropylene in both physical and chemical properties, making it a reliable choice for everyday lab work.”

José Pedro Soares Maio, University of Namur



Figure 3: Biobased polymers used for Eppendorf tubes

Suddenly, sustainability wasn't a secondary benefit – it became a decisive factor. In labs where technical specs once reigned supreme, ecological impact emerged as a new measure of excellence.

This shift was especially visible at institutions like the Francis Crick Institute, where sustainability practices influence funding through the LEAF program. Across the board, labs rated sustainability's importance at an average of 88 out of 100, and many teams indicated not just interest – but readiness – to adopt the biobased tubes.



And perhaps most importantly: switching didn't require any changes to protocols, equipment, or workflows. Just a shift in material source – from fossil-sourced to renewable.

“With Eppendorf biobased Tubes, we've reduced our environmental impact while maintaining the reliability we trust.”

José Pedro Soares Maio, University of Namur

Conclusion

It was a collective experiment – carried out across some of Europe’s most trusted laboratories. And the outcome was definitive. Eppendorf’s Safe-Lock Tubes BioBased perform to the same high standards as conventional tubes – delivering scientific reliability with a lower environmental footprint. What began as a product trial ended as a quiet paradigm

shift. A reminder that progress in science doesn’t just come from what we discover, but also from how we choose to do the work. Responsible, data-driven, and forward-looking. Is sustainable science possible without compromise? It already is. And it’s happening – one tube at a time.

References

- [1] LEAF (Laboratory Efficiency Assessment Framework) is an internationally recognized certification program developed by University College London (UCL) that helps labs assess and improve environmental performance through structured, science-based actions. More info: www.ucl.ac.uk/sustainable/take-action/staff-action/leaf-laboratory-efficiency-assessment-framework
- [2] Siebels, B., Moritz, M., Hübler, D., Gocke, A., Riedner, M., Voß, H., & Schlüter, H. (2024). Assay for Characterizing Adsorption-Properties of Surfaces (APS). Chemistry – A European Journal. <https://doi.org/10.1002/chem.202403000>

About Eppendorf

Eppendorf is a leading life science company that develops and sells instruments, consumables, and services for liquid-, sample-, and cell handling in laboratories worldwide. Its product range includes pipettes and automated pipetting systems, dispensers, centrifuges, mixers and DNA amplification equipment as well as ultra-low temperature freezers, fermentors, bioreactors, CO₂ incubators, and shakers. Associated consumables like pipette tips, test tubes, microtiter plates, and disposable bioreactors complement the instruments for our highest quality workflow solutions. Eppendorf was founded in Hamburg, Germany in 1945.

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