

# At ID-Labor, Scientists Upgrade Rigorous Workflow with New DNA Extraction Kits

For a German service laboratory specializing in DNA profiling, a short-term fix to supply chain issues led to long-term reductions in costs and turnaround time



Angelika Lösch (left) and Kirsten Thelen Founders and Managing Directors of ID-Labor

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DNA profiling matters for more than catching criminals. This decades-old laboratory technique is essential for paternity and other kinship testing, ensuring quality management of patient samples, and validating cell lines used in academic and industrial research. For optimal results, the method requires high-quality DNA extracted from a variety of sample types.

In the 1980s, Angelika Lösch and Kirsten Thelen met as students in the master’s program at Goethe University in Frankfurt prior to earning their PhD degrees. They shared a passion for the emerging biotechnology field and an interest in establishing careers outside of the traditional venues in academia. Thelen learned about DNA profiling during her postdoctoral fellowship, and an idea was born.

In 1998, Lösch and Thelen were women on a mission. They founded ID-Labor, a company dedicated to providing robust, reliable DNA profiling services for a range of applications. It was an auspicious start: they competed against hundreds of other startup companies and ultimately won the cross-industry “Fit for Boss” award from German business magazine DM.

Twenty-five years later, ID-Labor stands as a premium laboratory for individualized DNA profiling services. Lösch, Thelen, and their team of scientists have served more than 15,000 customers with tests for cell line validation, patient sample management, kinship, and forensics. They routinely run projects for some

300 courts in Germany and Switzerland, and Lösch and Thelen are both publicly appointed experts for genetic kinship analysis for the Wiesbaden Chamber of Industry and Commerce. ID-Labor processes hundreds of samples per month.

Analyzing all of those samples – and maintaining their reputation for delivering excellent results – depends on meticulous laboratory processes, reliable reagents and a steady supply of consumables. In the COVID-19 pandemic, that carefully constructed workflow was suddenly threatened by supply chain issues.

But Lösch and Thelen didn’t achieve this much success with their company without learning to overcome challenges. They considered a number of vendors offering DNA extraction products and chose Extracta kits from Quantabio to alleviate their supply chain problems.

Quantabio was able to deliver kits quickly and the ID-Labor team soon discovered that the Extracta kits were more than simply a fix to their backorder issues. The two kits they evaluated – Extracta Plus DNA and Extracta DNA Prep for PCR – actually outperformed their original method, generating high-quality DNA faster and at lower cost. The column-based Extracta Plus DNA kit produces DNA in less than three hours and the Extracta DNA Prep for PCR kit does the same in just 30 minutes. Both represent significant time savings compared to the previous kit.

In addition, the PCR-based kit costs about one-third the price of its predecessor. Lösch and Thelen estimate that more than 90% of the samples they run can be processed using the Extracta DNA Prep for PCR kit. That's a huge cost savings for the entire company.

Of course, with a laboratory demanding peerless rigor and accountability, scientists can't simply swap in new products whenever they want. The Extracta kits had to go through extensive validation across a number of sample types to ensure that they produced the quality of DNA needed for the rest of the lab's workflows.

In the validation process, a battery of known samples was tested with each kit to determine performance and reproducibility. DNA extracted from the kits was then used to generate a profile to see if the end result matched what was expected. Sample types included deciduous teeth, FFPE tissue, whole blood, dried blood spots and hair follicle. Results demonstrated that the Extracta Plus DNA kit worked best for both blood types, while the Extracta DNA Prep for PCR kit worked best for all other sample types. With both kits, the ID-Labor team can process all of the sample types they typically receive. And thanks to the validation work, the laboratory is now certified to run these samples with the Extracta kits.

The new kits fit beautifully into the ID-Labor workflow, in part because they are open systems producing DNA that will work with any type of reagent in subsequent workflows. "The Extracta kits are reliable and compatible with every other kit we use," Thelen says. "The DNA they give us works with all of the downstream PCR applications we use." She notes that the kits require fewer processing steps, ensuring a robust process because there are fewer opportunities for error.

"It's a better system," Lösch says. "We are now using the Extracta kits for all of our samples."

## Key Applications at ID Labor

While ID-Labor can handle DNA profiling for virtually any application, there are three primary categories of projects for which the team is hired.

### Cell line analysis

Cell lines underpin an enormous amount of basic research and drug discovery and development. But studies performed in the past decade have revealed the alarming extent of identity errors in these resources. Whether it's due to genetic drift, mislabeling, or contamination, "about 40% of the cell lines used in research are not what they are meant to be," Thelen says. Frequent vetting, often performed with DNA profiling, can ensure that cell lines are reliable. "It's important to educate the research community about the need to work with validated cell lines," Loesch says. "That means ongoing testing once or twice a year, not just an initial analysis when you buy the cell line."

### Quality management for patient samples

With more and more molecular testing performed in clinical laboratories, there are more patient samples than ever awaiting DNA analysis. Unfortunately, that volume opens the door for errors. "Labels can fall off tumor samples, and sometimes physicians need to clarify if the tumor sample is from the right patient or not," Loesch says. Labs can hire ID-Labor to spot-check their patient samples and determine whether their quality management processes are functioning properly.

### Paternity and kinship testing

ID-Labor was a pioneer in DNA based paternity testing in Germany, bringing affordable and high-quality molecular testing to the general public. Today, this is one of their most popular services. It's also why they need to be certified to work with such a variety of sample types. For this kind of testing, it's not unusual for one of the parties being profiled to be deceased. The ID-Labor team has to be able to extract DNA from hairbrushes, handkerchiefs, deciduous teeth and other sources of DNA that remain available after death.