PCR is a promising approach to obtain fast and reliably quantitative results.«

Other areas where monitoring of microorganisms is required:

- drinking water
- wastewater
- swimming and bathing water
- bioreactors
- bioprocessing
- food and beverage
- pharmaceuticals
- chemicals, e.g. quality control of painting & coating products

Contact

Dr. Sisi Li
Head of Group Bioanalytics in Industrial Media
Phone +49 6131 990-396
Fax +49 6131 990-205
sisi.li@imm.fraunhofer.de

Fraunhofer Institute for Microengineering and Microsystems IMM
Carl-Zeiss-Str. 18-20, 55129 Mainz, Germany
www.imm.fraunhofer.de

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Fraunhofer IMM

PCR-based identification of microbial contamination

Advancing kerosene analysis

Increasing safety in aviation

Microbiological contamination of aircraft fuels is a significant problem in aviation that can lead to costly downtime and safety risks. Regular tank inspections and reliably rapid tests are essential.

Point-of-use fuel analysis

Fuel contamination testing methods vary in terms of time-to-result, cost, the need of personnel expertise and test facilities. Quantitative PCR (qPCR) is a relatively new approach for monitoring fuel contamination, though it has traditionally been an expensive lab-based method. However, recent advancements by Fraunhofer IMM have enabled on-site qPCR testing, eliminating the need for sample transport and specialized personnel.

The prototype system, **InBaDtec**, integrates miniaturized qPCR technology with automated liquid handling, sample filtration and purification. It concentrates target microorganisms while removing fuel components that inhibit qPCR. As a results, Fraunhofer IMM's solution delivers fast, affordable, and fully automated microbial contamination results within **one hour** – significantly reducing the time and cost of maintaining fuel tanks and fuel storage facilities.

Any open questions? We will consult you to find the tailor-made solution for your applications.«

Additionally, test accuracy-particularly the ability to distinguish between live and dead target organisms-is critical. Our enhanced PCR technology effectively eliminates false positives, reducing unnecessary maintenance and saving time and costs.

Application scenarios

- The system employs integrated miniaturized technology to perform direct microorganism detection after concentration, enabling real-time fuel analysis at point-of-use.
- All functional modules are designed for double usability – they can be operated in a system or used independently as standalone laboratory devices.
- For continuous monitoring, the concentration and detection unit can be directly integrated into fuel distribution networks.

	IMM qPCR	ATP	Immunoassay	Culture
Automatic liquid handling	✓	⊗	⊗	⊗
Automatic microorganism concentration	✓	⊗	⊗	⊗
Automatic cleaning	✓	⊗	⊗	⊗
Specific result	✓	⊗	✓	✓
Quantitat ve result	✓	✓	⊗	✓
Time to results	~1h	~1h	~1h	2-4 days