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Products made from alternative proteins and automated cleaning processes - the Fraunhofer IVV at the IFFA

From May 3-8, 2025, the leading international trade fair IFFA in Frankfurt am Main will revolve around the topic "Technology for Meat and Alternative Proteins". In line with this, the Fraunhofer Institute for Process Engineering and Packaging IVV will be showing how alternative ingredients and textured proteins can be used to create meat substitute products with the typical meat structure. Technologies for automated cleaning will be presented for resource-saving and efficient production. The Fraunhofer IVV will be exhibiting at the VDMA stand C31 in Hall 11.

With its expertise in the field of alternative proteins, the Fraunhofer IVV offers food and ingredient manufacturers comprehensive support. This ranges from the selection of raw materials and process development to market-ready foods. At the IFFA, the Fraunhofer IVV will be providing information on how newly developed extraction processes can be used to obtain high-quality proteins and dietary fibres as functional ingredients from a wide variety of plant-based raw materials such as legumes, oilseeds and by-products from the food industry. A special extrusion technology gives proteins such as pea, lupin, wheat or bean a fibrous and meat-like texture for use in tasty and protein-rich meat alternatives. Many years of expertise in the field of extraction and extrusion processes enable the development of highly functional and sensory-neutral food ingredients that are suitable for clean label products.



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The Fraunhofer IVV's special extrusion technology is used to produce meat alternatives from peas, lupins, wheat or beans, for example, with a fibrous and meat-like texture.

Starting on a pilot scale: production of ingredients and product samples

The ingredients and food pilot plant available at the Fraunhofer IVV offers the food industry a wide range of possibilities. All process steps can be carried out for the production of food ingredients and product samples. This ranges from the development or reformulation of products to sample production from the smallest to the pilot plant scale. State-of-the-art analytical methods are available for the selection of raw materials to evaluate individual raw materials with regard to their composition, functional properties and sensory characteristics. Changes in the products during storage can also be checked directly on site at the Fraunhofer IVV in storage tests and by a specially trained sensory panel. In addition, the institute develops a customized packaging concept for each food product.



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In the Fraunhofer IVV's food pilot plant, all process steps are carried out, from the development of meat alternatives to sample production.

Rethink Cleaning - innovative sensor technology and digital applications for efficient cleaning processes despite staff shortages

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Constantly increasing quality requirements, cost pressure and the increasing shortage of skilled workers have a direct impact on cleaning tasks. The Fraunhofer IVV supports companies in overcoming these challenges and is breaking new ground in the development of manufacturer-independent and requirement-oriented cleaning technologies and processes. The focus here is on adaptive systems, autonomous robots, the use of AI and virtual reality as well as innovative sensor solutions.

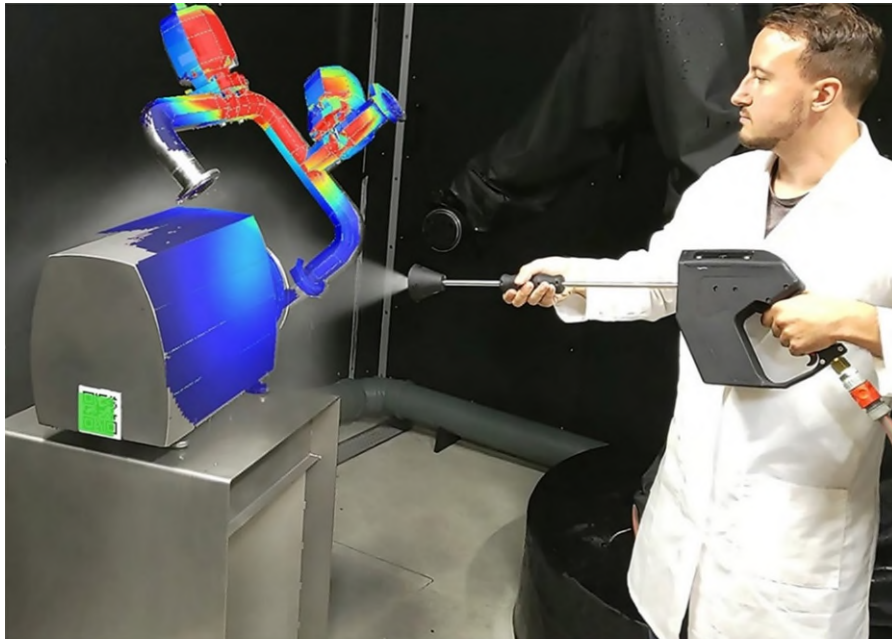
Digital assistance for manual cleaning

With the "CleanAssist" technology development, the Fraunhofer IVV combines the use of virtual assistance, digital twins and innovative sensor technology and thus also provides a practical outlook on the digital support options for manual, jet-based cleaning. The advantages: Under-cleaned or even over-cleaned areas are a thing of the past. Cleaning can be documented completely and fully automatically and the qualification of cleaning personnel can be carried out quickly and with little effort.

The tracking sensors integrated in the cleaning lance permanently record the position of the lance in the room, enabling the cleaning process to be documented. Cleaning is continuously tracked and synchronized with a digital twin. The actual cleaning progress is thus transferred to the cleaning environment and displayed on digital end devices such as screens, tablets or smartphones after cleaning. This prevents errors that reduce product quality due to incorrect cleaning. At the same time, staff can be trained in a targeted manner using special practice runs.

As part of a number of optimizations, the cleaning lance has been equipped with new software and tracking algorithms, resulting in significantly greater precision in position detection. At the same time, it has been made even easier to integrate, as no recurring reference markers need to be implemented in production.

The "CleanAssist" is now ready for practical use - industrial pilot users are being sought.



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"CleanAssist": The combination of highly integrated tracking sensors, spray cleaning simulation and a digital twin enables reliable quality assurance and consistent documentation for manual cleaning processes.

Mobile cleaning robot for automated cleaning of hygiene-critical systems and production environments

The Fraunhofer IVV is presenting the "Exo-MCD" demonstrator for the first time in Germany at IFFA 2025. This is a cleaning robot with an integrated sensor-based jet cleaning system. As an autonomously moving device, it automatically detects soiling in hygiene-critical areas, cleans reproducibly and continuously records the cleaning process. Cleaning is carried out using an innovative jet cleaning system (AJC) that rotates around three axes. The cleaning robot is currently undergoing intensive testing as part of a pilot project in a meat processing plant.



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"Exo-MCD": Intelligent cleaning robot for automated and reproducible cleaning of systems and production environments.

Quality assurance thanks to powerful, easy-to-integrate inline contamination sensors

Powerful sensor solutions for real-time inline monitoring of the contamination status are indispensable for designing cleaning processes completely in line with demand and thus significantly saving production time and cleaning resources. With the "CoControl-LumiHD", the Fraunhofer IVV is presenting the latest technology development from the "CoControl" series at IFFA.

The ultra-compact yet extremely powerful optical contamination sensor reliably detects both filmic and particulate contamination and can be easily integrated into the processing and cleaning process using a universal, hygienic connection. The housing of the "LumiHD" is designed according to hygienic design rules and can therefore also be used in highly sensitive hygienic areas.

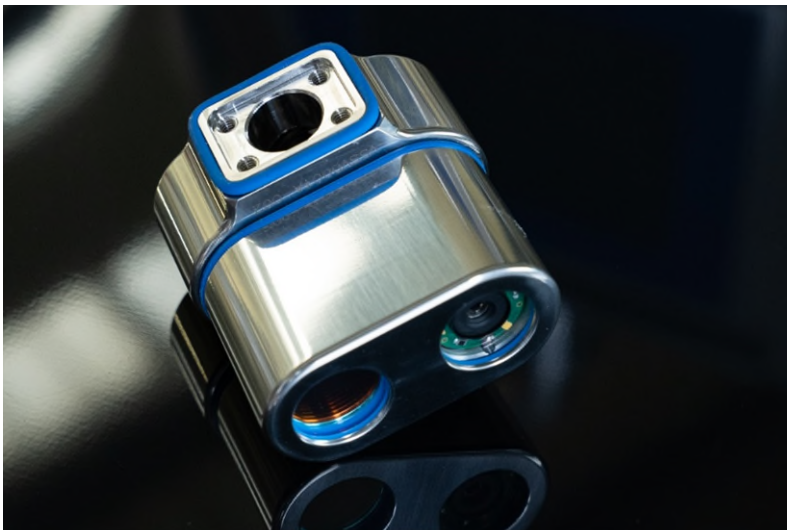
The hybrid sensor system evaluates information under both UV and white light excitation and thus enables the contactless and large-area detection of a previously unattainable range of different types and conditions of soiling. Even almost invisible grease films can be made visible.

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The continuous, automated inline inspection and documentation of cleaning and the contamination status make a significant contribution to quality assurance and food safety. The "LumiHD" can be flexibly tested for new or specific areas of application as part of pilot trials.

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"CoControl-LumiHD": Ultra-compact inline contamination sensor for filmic and particulate contamination in hygienic design.

The Fraunhofer-Gesellschaft, based in Germany, is one of the world's leading applied research organizations. It plays a crucial role in the innovation process by prioritizing research in key future technologies and transferring its research findings to industry in order to strengthen Germany as a hub of industrial activity as well as for the benefit of society. Founded in 1949, the Fraunhofer-Gesellschaft currently operates 76 institutes and research units throughout Germany. Its nearly 32,000 employees, predominantly scientists and engineers, work with an annual business volume of 3.4 billion euros; 3.0 billion euros of this stems from contract research, which is divided into three funding pillars. Fraunhofer generates a share of this from industry and license-fee revenue, totaling 836 million euros. This high proportion of industrial revenue is Fraunhofer's unique selling point in the German research landscape. Another share of contract research revenue comes from publicly funded research projects. The final share is base funding supplied by the German federal and state governments and enables our institutes to develop solutions now that will become relevant to the private sector and society in a few years.