Continuous upstream bioprocesses for new food

Technological milestone in the new food industry: GEA presents perfusion as key process at Anuga FoodTec

- Perfusion technology sets new standards in productivity and sustainability in the new food sector
- At Anuga FoodTec, GEA presents an entry-level perfusion platform comprising the GEA Axenic® P bioreactor and the GEA kytero® separator for the production of alternative proteins from microbial and cultured sources
- Promising significant cost savings, perfusion marks a milestone in leveling the price difference between conventional and new foods

Düsseldorf, March 20, 2024 – Advances in the alternative protein industry are placing an increasing premium on highly efficient production processes. Perfusion is a pioneering new technology that can enhance both the productivity and resource efficiency in cell cultivation and precision fermentation for new food. These improvements are crucial to achieving more scalable, cost-effective production of alternative proteins. GEA is presenting this innovative technology at the Anuga FoodTec trade show in Cologne, Germany. Embedded in a perfusion platform comprising the GEA Axenic P bioreactor and the GEA kytero single-use separator, this technology was specially developed for aseptic pilot projects.

Overcoming new food scalability hurdles

Perfusion technology separates cells from the depleted nutrient solution, increasing live cell density and productivity. “We see perfusion as one of the most promising technologies because it cuts the production cost of alternative proteins on several fronts,” says Tatjana Krampitz, Head of New Food Technology Management at GEA. “What the market currently needs are reliable pilot plants that are quick to set up and meet industrial standards. Our single-use separators enable start-ups in particular to work under sterile conditions, which helps them surmount a major challenge.” Looking ahead, the reprocessing of media separated by perfusion promises even more efficient and sustainable production.

Promoting cell growth

To stimulate healthy and rapid cell growth in bioreactors, it is necessary to remove growth-inhibiting metabolites such as ammonium and lactate from the culture medium. Perfusion technology allows for a portion of the depleted nutrient solution to be continuously separated in a sterile manner. The concentrated cell solution can then be returned to the bioreactor while the separated medium is replaced with fresh, nutrient-rich medium. This keeps the cultures in optimum growth conditions at all times and ensures reproducible product quality – a key criterion for the regulatory approval of new foods. Overall, perfusion significantly improves productivity and cell density compared to conventional batch and fed-batch processes.

GEA Group Aktiengesellschaft
Peter-Müller-Str. 12, 40468 Düsseldorf, Germany
GEA.com

Media Relations
Fanny Förster, +49 211 9136-1492
pr@gea.com

Single-use separator is the key to pilot processes

The GEA kytero single-use separator is a core component of the GEA perfusion platform. “For start-ups looking to validate their product ideas with cell lines of their own, kytero is a key to success,” adds Rüdiger Göhmann, Product Manager Pharma/Chemicals/New Food, Business Unit Separators at GEA. “These companies do not yet have the cleaning and sterilization facilities needed for a sophisticated process infrastructure. Yet they have to work in an aseptic environment in order to obtain reproducible results. Our single-use separator gets around this by doing without SIP and CIP processes.” Already established in the pharma industry, GEA kytero now bridges this gap in the development process.

Enhancing efficiency and sustainability in new food production

Tatjana Krampitz highlights the importance of perfusion technology for more sustainable production of alternative proteins: “If we were to transfer the production capacity requirements for new foods one-on-one onto conventional process lines, the resulting plants would be huge. Perfusion lets us grow cells in a much smaller space. In the long term, this technology will blaze a trail when it comes to shrinking bioreactors and hence reducing both the quantity of stainless steel needed and the nutrient and cleaning media required.” Experts estimate that perfusion could result in the process technologies being scaled down by some ten percent in terms of both bioreactor size and media and space requirements.

Innovation focus on bioreactor development and media preparation

For GEA, perfusion is a key innovation focus for the entire upstream and downstream process. As it enables both the bioreactors and the material flow to run continuously throughout the process chain, it also improves capacity utilization.

At the same time, the technology holds out major potential for media reprocessing – a significant cost factor in the production of new foods and, in turn, of the end products. Reusing and purifying media would mark a major milestone on the path to reaching price parity between conventional and new foods.

The GEA Axenic P bioreactor

- Versatile pilot-scale bioreactor for cell cultivation and precision fermentation in new food applications
- Pilot-scale process conditions comparable to commercial-scale bioreactors
- Virtually modeled as digital twin to track and optimize process conditions and cell behavior
- Configurable as stand-alone, self-contained unit with integrated CIP and dedicated additions through to full integration into entire production lines

The GEA kytero single-use separator

- Mobile “plug-and-produce” unit with a minimal footprint as entry-level solution for research and development as well as small-scale production
- Deploys sophisticated disc stack technology from GEA stainless steel separators for single-use cell harvesting
- Permits reliable scalability up to established mass-production stainless steel separators
- Product-contact parts replaced after use, preventing cross-contamination without cleaning or sterilization
- Simple and safe setup and changeover in a matter of minutes

Link to download high-resolution images:
https://assets.gea.com/gea/action/directLinkImage?assetId=316265

For the first time, new food experts will present their perfusion platform – a key technology for cutting-edge upstream bioprocesses that also enables continuous processing in cell cultivation and precision fermentation. The platform comprises the GEA Axenic-line bioreactors combined with the GEA kytero® single-use separator. Source: GEA

The versatile GEA Axenic P is a pilot-scale bioreactor for cell cultivation and precision fermentation in new food applications such as cultivated meat, precision-made dairy products and mushroom mycelium. Source: GEA

A mobile “plug-and-produce” unit with a minimal footprint, the GEA kytero single-use separator is an entry-level solution for research and development and small-scale production in the new food and pharma sectors. Source: GEA

GEA Group Aktiengesellschaft
Peter-Müller-Str. 12, 40468 Düsseldorf, Germany
GEA.com

Media Relations
Fanny Förster, +49 211 9136-1492
pr@gea.com

NOTE TO EDITORS

- GEA perfusion platform for piloting:
  - **GEA Axenic® P for Pilot Processes**
  - **GEA kytero single-use Separator for cell harvesting, without SIP/CIP (gea.com)**
- Information about GEA can be found **here**
- GEA images can be found **here**
- More information on this topic can be found **New Food | Technology for alternative protein production (gea.com)**
- Follow GEA on

Media Relations
GEA Group Aktiengesellschaft
Fanny Förster
Peter-Müller-Str. 12, 40468 Düsseldorf, Germany
Phone +49 211 9136-1501
fanny.foerster@gea.com

About GEA

GEA is one of the world's largest suppliers of systems and components to the food, beverage and pharmaceutical industries. The international technology group, founded in 1881, focuses on machinery and plants, as well as advanced process technology, components and comprehensive services. With more than 18,000 employees, the group generated revenues of about EUR 5.4 billion in more than 150 countries in the 2023 fiscal year. GEA plants, processes, components and services enhance the efficiency and sustainability of customer's production. They contribute significantly to the reduction of CO_2 emissions, plastic usage and food waste. In doing so, GEA makes a key contribution toward a sustainable future, in line with the company's purpose: "Engineering for a better world".

GEA is listed on the German MDAX the European STOXX® Europe 600 Index and is among the companies comprising the DAX 50 ESG, MSCI Global Sustainability as well as Dow Jones Sustainability World and Dow Jones Sustainability Europe Indices.

More information can be found online at **gea.com**.

If you do not want to receive any further information from GEA, please send an e-mail to **pr@gea.com**.