WACKER

CREATING TOMORROW'S SOLUTIONS

INFO SHEET I LIVE MICROBIAL PRODUCTS I LIBATEC®

LIBATEC® – THE TECHNOLOGY FOR LIVE MICROBIAL PRODUCTS (LMPs)

LIBATEC® is Wacker Biotech's Live Bacterial Technology, which is an efficient, comprehensive production platform carried out under GMP and ICH quality guidelines and is suitable for a wide variety of live microbial strains. It is designed to support customers' growing demands for Live Microbial Products (LMPs) for clinical or market supply.

The market for LMPs is an emerging field consisting of products that contain living microbials used in medical treatments and regulated by public health agencies. Wacker Biotech is uniquely placed in the live microbial market due to its early involvement in this new segment. Already in 2006, the company started providing contract development and manufacturing services for LMPs containing living bacteria or yeasts with an intended therapeutic or prophylactic effect in humans, for several routes of administration, including parenteral. To date, Wacker Biotech has manufactured a wide variety of LMPs (see figure on the right), including wild type strains and genetically modified strains in the form of live biotherapeutics, vaccines, immunotherapies and delivery systems for therapeutics for both clinical and commercial supply.

Portfolio

LMPs consist of living microorganisms, so viability is key. The LMP manufacturing process poses certain challenges, e.g., the product cannot be sterile filtered and specialized analytical testing is required.

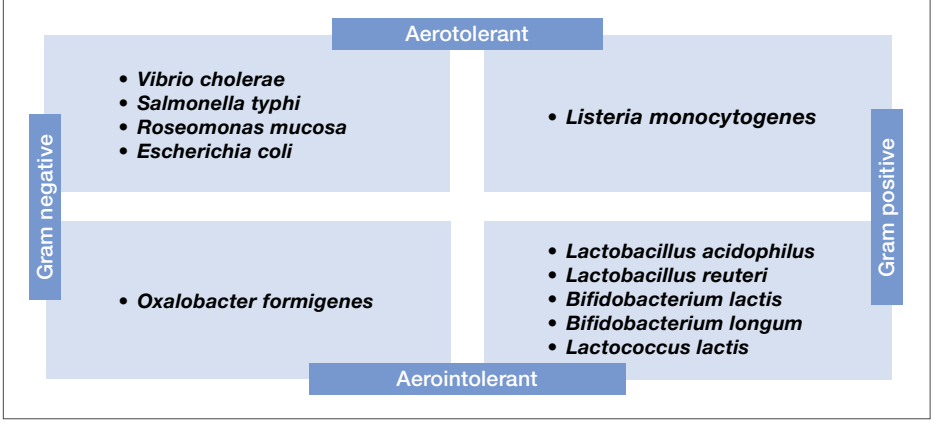
Customers using the LIBATEC® platform benefit from more than a decade of experience in LMP process development, optimization and large-scale GMP manufacturing, including process characterization, process validation and commercial manufacturing.

Process development includes activities such as removing animal component-containing media and developing new lyophilization cycles to maintain cell viability. LMPs are typically grown in a single-use bioreactor, as this approach eliminates the need for cleaning (validation studies) and has been shown to be well-suited to strains where high oxygen levels and associated aeration are not required. The LIBATEC® production process (see figure on the reverse side) is perfectly suited to manufacture products without hold steps and maintain cell viability during the entire production process. Seamless scalability up to 1,500 L fermentation volumes allows products to move through various clinical phases towards commercial launch. In addition to process development and manufacturing, Wacker Biotech's scientists also develop suitable analytical methods for in-process and batch-release testing, such as viable cell count (VCC), total cell count (TCC) and detection of potential contaminants (Purity/USP61/USP62).

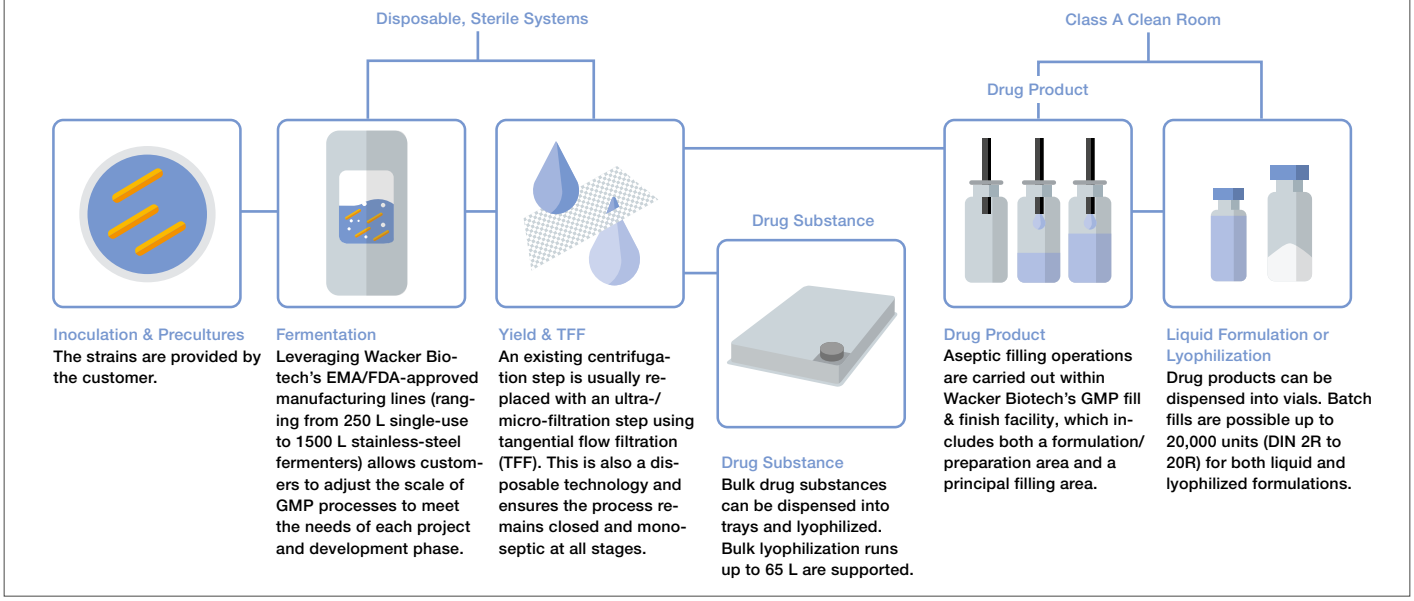
Key Benefits of LIBATEC®

- Over 10 years of progressive experience with LMP development and manufacturing processes
- Fermentation regimes for both aerobic and certain anaerobic organisms
- Optimization services for both upstream and downstream processes, depending on the specific customer strain
- GMP-compliant drug substance manufacturing on various fermentation scales up to 1,500 liters, with integrated drug product production, including lyophilization
- Closed production systems (monoseptic processing) in order to maintain culture purity, crucial to meeting customers' and regulators' quality requirements

A Selection of Strains that Wacker Biotech Has Used for Producing LMPs



LIBATEC® Production Process



As the final product is a living organism that cannot be sterile filtered, preparing microbiological products is much more sophisticated than releasing a conventional biopharmaceutical. Rather than a single sterility test, analytical testing at Wacker Biotech ensures a monoseptic product by performing multiple purity tests and verifying the absence of specific organisms (as defined in the pharmacopeia).

Case Study

Aurealis Therapeutics AG approached Wacker Biotech for process development, scale-up and GMP manufacturing of AUP1602-C, their lead development candidate for chronic wound applications. These genetically modified lactic acid bacteria are administered topically to promote tissue regeneration in patients suffering from non-healing chronic wounds. Manufacturing under monoseptic conditions was required because the product will be in direct contact with tissue.

The process was successfully transferred, adapted for monoseptic manufacturing under GMP conditions and scaled up. Subsequent manufacturing was performed under monoseptic GMP conditions using Wacker Biotech's 250 L single-use bioreactor, followed by aseptic filling into ~4,000 vials per batch. The process developed was shown to be highly robust, yielding cells that are resistant to processing, hold times and storage at low temperatures. Cell viability of the resulting drug product met the defined criteria (10^{10} – 10^{11} colony forming units/mL). Wacker Biotech also performed setup, development and validation of the required analytical assays for product testing. The drug product was successfully released for use in phase I clinical trials.

"*We are very pleased with the high technical competence, reliability and support of the Wacker team to bring our lead candidate into the clinic as planned – Wacker is a true partner in this project*" notes Juha Yrjänheikki, CEO of Aurealis Therapeutics.

LIBATEC®

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