arxada

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Contract Development & Manufacturing Organization (CDMO)

Holiday highlights: A year-end review with Arxada CDMO

Vratislav Stovicek

As the year draws to a close, we take a moment to reflect on its highlights. In this year-end review, we share key insights from the white papers we published throughout the year, offering a look at the technologies, processes and views driving innovation in chemistry and biotechnology. Whether you are looking for guidance on your path to market, an overview of Arxada CDMO's (Contract Development and Manufacturing Organization) capabilities and expertise, or simply an engaging read for the long winter evenings, join us in exploring the world where tailor-made solutions scale to commercial success.

Holiday highlights: A year-end review with Arxada CDMO

Arxada CDMO brings together a unique combination of expertise in chemistry and biotechnology, delivering solutions from small-scale gram quantities to multi-ton production. Our teams are driven by quality, sustainability, and innovation, leveraging multipurpose manufacturing assets: integrated chemical network in Visp, Switzerland, and industrial biotechnology excellence in Kouřim, Czech Republic. This year, we dedicated time to explore topics that matter most to our partners and industry, ranging from sustainable chemistry to cutting-edge biotechnology. Experts from both sites have shared their perspective, showcasing how our know-how enables greener processes, advanced technologies, and tailored solutions for complex challenges. Together with our valued customers, we continue to push the boundaries of what is possible in chemistry and biotechnology.

Simple click on the title of each white paper below leads to a webpage with full read and hard copy download. If you prefer watching over reading check out video tours of both facilities (Figure 1).

Figure 1: Click on the image to launch the video tour of Arxada's facilities.
Top – Industrial biotechnology plant in Kouřim, Czech Republic.
Bottom – Chemical plant in Visp, Switzerland.

Towards net-zero production using a backward integrated chemical network

Philipp Kohler, Marjorie C. Linares and Vratislav Stovicek

This white paper outlines strategies for achieving net-zero production in the chemical industry through backward integration within Arxada's chemical network. It emphasizes reducing Product Carbon Footprint (PCF) across the value chain using three approaches: vertical integration of raw materials (Scope 1), adoption of low-carbon energy sources (Scope 2), and collaboration with sustainable suppliers (Scope 3). The paper details how biogenic feedstocks, green energy, and advanced PCF calculations enable significant emission reductions, supported by Arxada's Visp site capabilities and trusted supplier network. This integrated approach positions Arxada CDMO as a partner for companies seeking tailored solutions to minimize greenhouse gas emissions and meet sustainability targets.

Navigating diverse projects in industrial biotechnology: The critical role of project management in contract development and manufacturing organizations

Zdena Cermakova and Vratislav Stovicek

This white paper explores the critical role of project management in Contract Development and Manufacturing Organizations (CDMOs) within industrial biotechnology. It highlights the complexity of managing diverse technologies, regulatory requirements, and tight timelines under budget constraints. Effective project management ensures seamless coordination across technical, regulatory, and commercial functions, supported by a culture of transparency and proactive risk management. The paper outlines key team roles, essential competencies for project managers, and strategies for overcoming challenges such as scale-up discrepancies and dynamic change management. Arxada's approach emphasizes strong communication, stakeholder alignment, and operational excellence to deliver high-quality, timely, and cost-effective bioprocess solutions.

Innovations in battery energy storage: The role of ferrocyanides in advancing technology

Felix Götz, Ana Maria Montagut Perez and Vratislav Stovicek

This white paper examines the role of ferrocyanides, particularly Prussian blue analogues (PBAs), in advancing battery energy storage technologies. It highlights their potential as cost-effective, stable, and sustainable materials for sodium-ion batteries, redox-flow batteries, alternative metal-ion batteries, and supercapacitors. PBAs offer high theoretical capacity, structural stability, and tunable electrochemical properties, making them suitable for large-scale energy storage and high-power applications. The paper also discusses synthesis methods, performance optimization, and Arxada's backward-integrated cyanide operations enabling scalable production of battery-grade PBAs.

Vital role of quality in biotechnology CDMO: Ensuring excellence at every step

Jiri Sarkady and Vratislav Stovicek

This white paper emphasizes the strategic importance of robust Quality Management Systems (QMS) in biotechnology CDMO operations. It details how proactive, risk-based quality practices ensure regulatory compliance, product consistency, and operational efficiency across diverse markets such as food, feed, cosmetics, and medical devices. Key elements include comprehensive regulatory assessments, project-specific Quality Agreements, supplier qualification, change management, CAPA processes, and rigorous training programs. Supported by certifications like ISO 9001, FSSC 22000, EFfCI, and ISO 13485, Arxada's approach transforms quality from a compliance requirement into a competitive advantage, fostering trust and enabling safe, efficient commercialization of innovative products.

Boosting biotech efficiency: Key metrics and strategies for success

Pavel Havelka and Vratislav Stovicek

This white paper presents strategies for enhancing bioprocess efficiency in industrial biotechnology through targeted process optimization and continuous improvement. It introduces key performance indicators, cycle time (Ct), space-time yield (STY), throughput, and downstream processing (DSP) yield, as critical metrics for reducing unit costs without compromising quality. Practical approaches include bioprocess scale down, Design of Experiments (DoE)-driven optimization, debottlenecking, and fine-tuning of DSP operations. Case studies demonstrate significant gains in productivity and cost-effectiveness across diverse manufacturing campaigns. The paper underscores the importance of integrating technical improvements with economic evaluation, predictive tools, and cross-functional collaboration to achieve competitiveness in biotechnology CDMO operations.

From hazard to asset: The role of Hydrogen Cyanide in industrial fine chemical synthesis

Ana Maria Montagut Perez and Vratislav Stovicek

This white paper explores the industrial significance of hydrogen cyanide (HCN) as a versatile chemical building block despite its hazardous nature. HCN enables key transformations such as hydrocyanation, Strecker synthesis, and Sandmeyer-type cyanation, supporting the production of nitriles, cyanohydrins, α-amino acids, and specialty chemicals for pharmaceuticals, agrochemicals, and polymers. Arxada's Visp facility leverages backward-integrated HCN production for stringent quality control, supply continuity, and cost efficiency, offering both large-scale manufacturing and customized CDMO solutions. The paper underscores how integrated infrastructure and expertise in HCN chemistry mitigate safety and logistical challenges while accelerating innovation in fine chemical synthesis.

From process to product: Drying as the final transformative step in industrial biotechnology

Pavel Havelka and Vratislav Stovicek

This white paper examines drying as a critical final step in industrial biotechnology, ensuring product stability and shelf life. It reviews three primary technologies, spray drying, freeze drying and vacuum drying, highlighting their principles, applications, advantages, and limitations. Spray drying offers cost-effective, scalable solutions for proteins and microbial cultures but poses thermal stress risks; freeze drying excels in preserving sensitive biomolecules; vacuum drying provides gentle processing for heat-sensitive materials and solvent removal. Arxada's CDMO capabilities span lab, pilot, and production scales, enabling tailored drying solutions that maintain product integrity and support efficient commercialization.

From fermentation to final product: Small molecule manufacturing – a case study

Martin Venzhofer and Vratislav Stovicek

This white paper presents a case study on biotechnological manufacturing of small organic molecules, highlighting its advantages over chemical synthesis in terms of chirality, purity, and sustainability. It details the process flow from upstream fermentation using engineered microbial strains to downstream operations including cell lysis, filtration, concentration, crystallization, and vacuum drying. Operational challenges such as oxygen transfer limitations and membrane fouling were addressed through optimized feeding strategies, dynamic process control, and equipment upgrades, resulting in an 18% increase in volumetric productivity and a 10% improvement in overall yield. The paper underscores the importance of continuous improvement in industrial biotechnology.

Photochemistry: Driving sustainable innovation in modern chemistry

Britta Kübber, Philipp Kohler and Vratislav Stovicek
This white paper explores photochemistry as a sustainable innovation in modern synthetic chemistry. By using light as an energy source instead of heat, photochemical processes reduce greenhouse gas emissions and align with green chemistry principles. Advances such as LED-based irradiation and continuous-flow systems enhance scalability, energy efficiency, and safety, overcoming traditional limitations of mercury lamps and batch processes. Photochemistry enables unique transformations, including cycloadditions, isomerizations, and photoredox catalysis, providing access to molecules otherwise difficult to synthesize. With deep experience in scaling various chemistries, Arxada CDMO leverages state-of-the-art technical capabilities and renewable energy integration to deliver greener, high-performance solutions for its customers.

Summary

As the season ends, we look ahead to a new year filled with fresh opportunities, new customers, advanced processes, and exciting challenges. Our commitment to chemistry and biotechnology innovations, operational excellence, and continuous improvement remains steadfast. Leverage our expertise in both chemistry and biotechnology and join us on this journey toward transformative solutions at scale.

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Our offer

- **One-stop-shop CDMO services in chemistry and biotechnology**
- **Engagement at any stage of product/process development**
- **Long-lasting development and manufacturing experience with high quality, speed, and strong focus on continuous process improvement**
- *Focus on what matters to you*

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