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CordenPharma Collaborates with PeptiSystems on Continuous Peptide Manufacturing & Green Chemistry

18 December 2022 – Luxembourg > Due to the promising, yet underutilized potential of Green Chemistry and continuous manufacturing synthesis approaches gaining traction in the wider pharmaceutical community, CordenPharma is pleased to announce a collaboration with PeptiSystems, a Swedish-based developer of instruments for peptide and oligonucleotide therapeutic process development and manufacturing based on flow through column technology. Because producing multi 100kgs of peptides per year using state-of-art-manufacturing technologies leads to an extensive amount of waste, the CordenPharma Peptide Centre of Excellence in Frankfurt, DE has introduced within their work stream PeptiSystems' innovative solution to reduce the footprint impact and improve the Process Mass Intensity (PMI) of peptide manufacturing processes.

PeptiSystems is using an innovative concept that allows manufacturing of peptides in continuous mode, which reduces solvent consumption and corresponding waste by at least 40% in all peptides produced by Solid-Phase Peptide Synthesis (SPPS). In addition to improving the carbon footprint in peptide manufacturing, PeptiSystems' continuous in-line monitoring also provides improved synthesis control and a more efficient manufacturing process. With this technology in place, the time taken for synthesis at large scale is expected to be reduced by as much as 50-90%, which will help to manage the growing demand for peptide-based pharmaceuticals.

"With the installation of PeptiSystems' first innovative equipment in our R&D Peptide Centre of Excellence in Germany, we are proud of this contribution towards reducing our Process Mass Intensity (PMI). This successful milestone represents one of our global initiatives to improve our footprint and reduce manufacturing costs," says Dr. Matthieu Giraud, Director, Global Peptide, Lipids & Carbohydrates Platforms, CordenPharma International.



Elongation monitoring using PeptiSystems' PeptiPilot during the synthesis of GLP-analogue at CordenPharma's Peptide Centre of Excellence (Frankfurt, DE).

CordenPharma's decision to collaborate in this space came from identifying a growing interest in therapeutic peptides within the pharmaceutical industry, as evidenced by the more than 80 peptide drugs on the market, of which ~150 are in clinical trials, and >400 in preclinical developmentⁱ. However, current peptide synthesis involves primarily legacy technologies that use large amounts of highly hazardous reagents and solvents, with little focus on green chemistry and engineering. Solvents represent the vast majority of the waste generated in chemical processes, and this is especially relevant for Solid-Phase Peptide Synthesis (SPPS). Hence, using greener solvents, or finding ways to reduce or recycle solvents, is of high interest. The waste cogeneration in peptide production has been reported to be in the multi-ton range for each kilogram of produced peptideⁱⁱ vs hundreds of kilograms for small-molecule synthesisⁱⁱⁱ.

Metrics are needed to quantify the impact of these new methodologies, be it within a pharmaceutical company or a Contract Development & Manufacturing Organization (CDMO). Which metric is best is more a question of organizational and personal preference. For CordenPharma, Process Mass Intensity (PMI) and E-Factor are currently the two most favorable^{iv}. The Green Chemistry Institute Pharmaceutical Roundtable (GCIPR) selected PMI as their preferred mass-based Green metric. When evaluating a process, solvents are usually the determining factor in the environmental impact, cost, and safety. Other reports have estimated that solvents can account for 50% of Greenhouse gas emissions from the production of pharmaceuticals.^v

About CordenPharma

CordenPharma, the global pharmaceutical service & manufacturing platform of International Chemical Investors Group (ICIG), is a full-service partner in the Contract Development & Manufacturing (CDMO) of APIs, Excipients, Drug Products, and associated Packaging Services. Through a growing network of cGMP facilities across Europe and the US organized under five Technology Platforms – Peptides, Lipids & Carbohydrates, Injectables, Highly Potent & Oncology, and Small Molecules – CordenPharma experts translate complex processes and projects at any stage of development into high-value products.

For more information about CordenPharma, [contact us](#) or visit cordenpharma.com.

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About PeptiSystems

PeptiSystems, based in Uppsala, Sweden, develops instruments for process development and manufacturing of peptide and oligonucleotide therapeutics based on flow through column technology. Utilizing the solid phase synthesis approach, the instruments are designed to reduce solvent consumption, improve synthesis control and reduce synthesis time while maintaining equal or higher purity and yield compared to what is obtained with current technologies. This new generation of synthesis instruments provide a higher degree of automation and a greener manufacturing process.

ⁱ Muttenthaler, M. *et al.* Trends in peptide drug discovery. *Nat Rev Drug Discov* **20**, 309–325 (2021).

ⁱⁱ Ritter, S. K. Five green chemistry success stories. *Chem. Eng. News*, **95**, 16 (2017).

ⁱⁱⁱ Roschangar, F. *et al.* Inspiring process innovation: Via an improved green manufacturing metric: IGAL. *Green Chem.* **20**, 2206 (2018).

^{iv} R. A. Sheldon, Metrics of Green Chemistry and Sustainability: Past, Present, and Future *ACS Sustainable Chem. Eng.*, **6**, 32–48 (2018)

^v C. Jiménez-González, *et al.* *Clean Technol. Environ. Policy*, **7**, 42–50 (2004).