

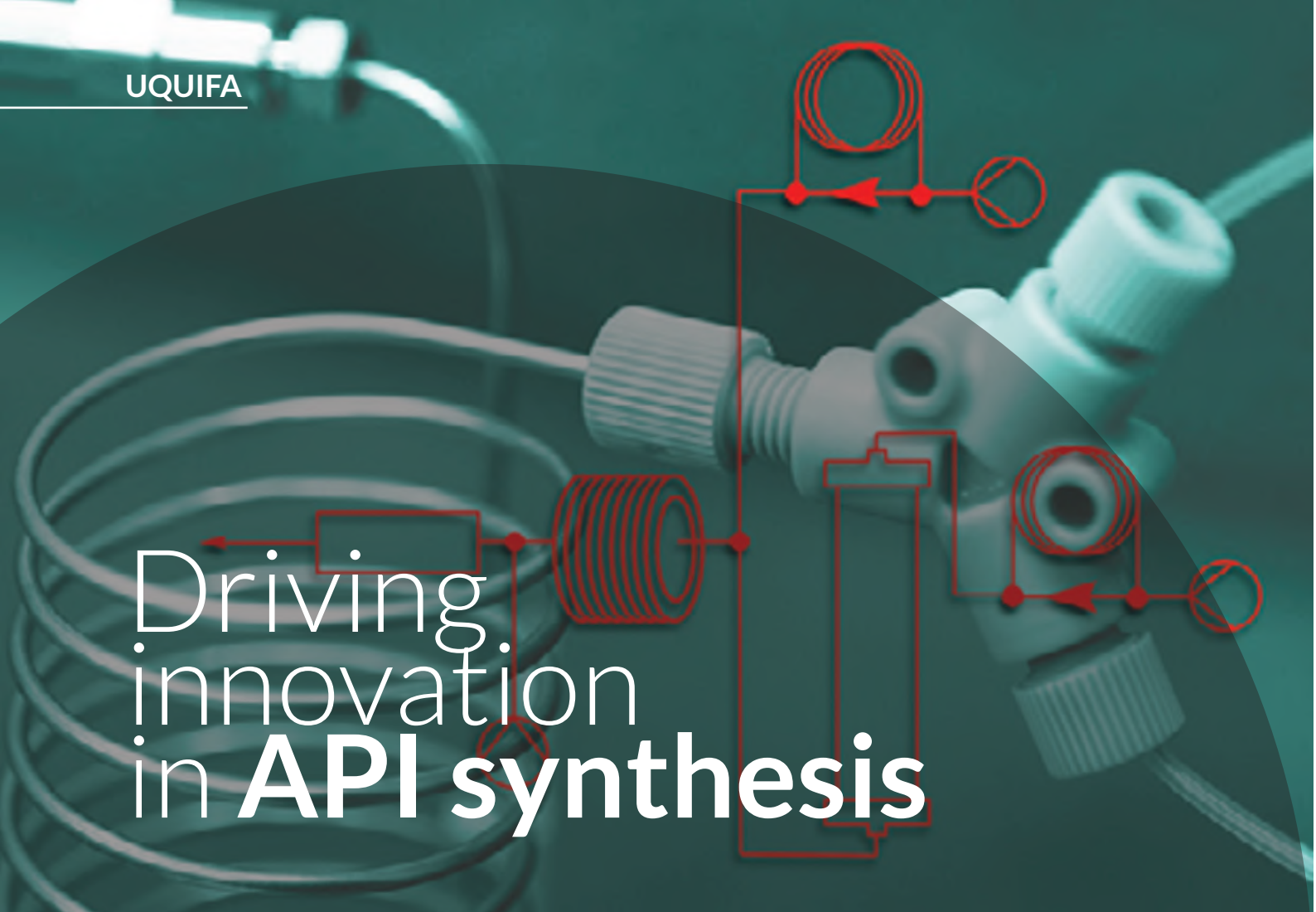


TWENTYFOURSEVENBIOPHARMA

Uquifa
Chemistry for a better life

Driving innovation in
API Synthesis

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Driving innovation in API synthesis

The UQUIFA Group, a CDMO with over 88 years of legacy, is a trusted one-stop shop for RSM & API development and manufacturing, operating from Europe and Mexico.

In the ever-evolving pharmaceutical industry, innovation in chemical synthesis is critical to meeting increasing demands for efficiency, scalability, and cost-effectiveness. UQUIFA Groups' CDMO site Soneas Chemicals Ltd. is leading the way by employing cutting-edge metathesis and flow chemistry technologies. These approaches allow for greater efficiency, precision, and scalability, setting new standards in the production of Active Pharmaceutical Ingredients (APIs). By adopting these advanced processes, Soneas is staying ahead in the competitive world of pharmaceutical manufacturing.

Metathesis is a powerful catalytic reaction that forms carbon-carbon bonds by breaking and reforming carbon-carbon double bonds, making it invaluable for the synthesis of complex organic molecules. This process allows for a range of chemical transformations, such as ring-closing, ring-opening, and polymerization reactions, which are fundamental to creating small, medium, and

large-ring carbo- and heterocycles. Catalysts play a crucial role in the metathesis process, with molybdenum (Mo) and tungsten (W) catalysts being among the most effective. These catalysts, developed from the research of Nobel Prize winners Amir H. Hoveyda and Richard R. Schrock, enable precise and selective reactions, including regio-, stereo-, and enantioselective transformations.

Soneas has mastered the application of metathesis in pharmaceutical manufacturing, offering capabilities that span from laboratory-scale research to full-scale industrial production. The company's ability to scale up metathesis reactions is supported by its state-of-the-art equipment, including reactors and distillation/rectification columns, which provide precise control over reaction conditions. This equipment allows Soneas to efficiently perform metathesis on both small and large scales.

The used reactors range in capacity from 2500 to 6300 liters, with materials of construction including glass-lined and stainless steel, ensuring the flexibility needed for different chemical processes. Similarly, the company's distillation and rectification columns, with diameters from 150 mm to 500 mm, are made from

materials like glass-lined steel and graphite. These columns are essential for purifying products and optimizing yields, making Soneas a leader in efficient chemical production using metathesis.

While metathesis plays a crucial role in UQUIFA Group's chemical synthesis capabilities, flow chemistry is another innovative process that is transforming how the company approaches API production. Unlike traditional batch processing, which can be time-consuming and less efficient, flow chemistry enables continuous processing of reactants through microreactors. This method allows for better control of reaction conditions, including mixing, heat transfer, and mass transfer, resulting in higher yields and more consistent product quality.

Flow chemistry is particularly beneficial for reactions that are challenging to control in batch processes, such as nitration and hydrogenation. By using flow chemistry, Soneas can perform these difficult reactions more safely and efficiently, while also reducing operational costs and shortening the time-to-market for new APIs.

One of the most significant applications of flow chemistry within Soneas has been the modernization of an API production process initially developed in 1964 for treating Obsessive-compulsive disorder (OCD). This API is recognized as an Essential Medicine by the World Health Organization (WHO), but its original batch production process faced challenges related to high costs, inefficiencies, and supply chain vulnerabilities. By implementing flow chemistry for key steps like acetylation and nitration,

Soneas was able to improve the efficiency and yield of the process while reducing reliance on external suppliers. This transition led to a significant boost in space-time yield, which increased from 6.75 kg/m³/day to 488 kg/m³/day, a remarkable improvement in productivity.

Looking ahead, Soneas plans to further expand its flow chemistry capabilities. By the first half of 2025, the company aims to scale up production to 30 kg/day, allowing it to meet growing demand for APIs. In addition to scaling up existing processes, UQUIFA site in Spain and Hungary is also exploring new applications for flow chemistry, including gas-liquid reactions and cryogenic processes. These developments will further enhance the company's ability to produce high-quality APIs while maintaining cost-effectiveness and safety.

The UQUIFA Group remains committed to staying at the forefront of pharmaceutical manufacturing by continuously innovating and improving their chemical synthesis capabilities. With metathesis and flow chemistry, the UQUIFA Group is endeavoring to set new standards for efficiency, scalability, and quality in API production. As the pharmaceutical industry continues to evolve, UQUIFA Group's expertise in these advanced processes ensures that it will remain a leader in chemical synthesis, delivering innovative solutions that meet the demands of a dynamic market.

