Title: Opportunities for the development of sustainable production processes

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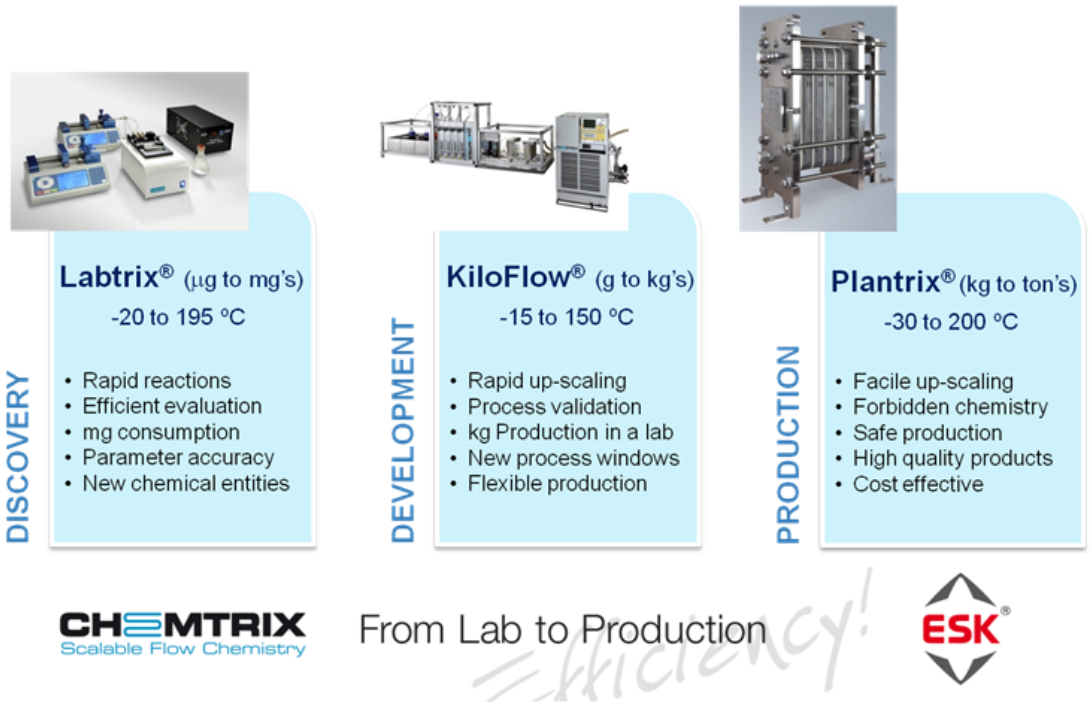
Abstract:

Whilst chemical engineers are trained to think of continuous processing as being an efficient route to the development of safe and controllable processes, synthetic chemists have received largely the same training for Centuries – which is based on the use of stirred reaction vessels. Consequently, within medicinal chemistry and development laboratories, focus is on the speed of compound preparation and not on the process or route employed to obtain the material. Looking to how reactions are conventionally performed they are often executed under non-ideal conditions in order to gain control over the process; this can include the use of large volumes of solvent, cryogenic conditions, the use of stoichiometric reagents and long dosing/reaction times. Subsequent product isolation is then time consuming and results in the generation of large quantities of waste. Time is then lost when a target is identified as the synthetic route must be redeveloped in order to be suitable for up-scaling to the target production quantities.

Compared to stirred vessels, flow reactors have significant processing advantages which include improved thermal management, enhanced mixing control and access to larger operating windows enabling the development of safe, efficient, robust and sustainable production processes – with benefits not only harnessed for the reaction steps, but also in cost and waste reduction when considering that increased product purities require less downstream processing. Applicable at both the lab and production scale, continuous flow reactor technology therefore has the ability to benefit both early stage researchers and process development chemists/engineers in the exploitation of sustainable synthetic processes.



The presentation will demonstrate through a selection of Customer case studies the advantages that can be leveraged through the use of continuous flow reactor technology including control of hazardous processes, small-footprint systems, low material consumption for process development and on-site local production.