

IGCW 2017: Workshop on solvent & reagent selection tools & techniques

The IGCW – ACS – GCI Pharma Roundtable (ACS-GCIPR) Workshop on Solvent and Reagent Selection Tools and Techniques is another one of the nine concurrent events that will take place at the 5th Industrial Green Chemistry World (IGCW) on the 6th of Oct, 2017 at Ramada Powai, Hotel & Convention Centre, Mumbai.

Background

The Green Chemistry Foundation organized a ‘Green Chemistry Pharma Week’ at Hyderabad and Visakhapatnam, from Feb. 20-24, 2017.

In the run-up to the event there was:

- Active reach-out to the top management of over 100 Indian pharma companies;
- Extensive interactions with 1,000+ senior representatives (from R&D, Production & EHS) of pharma companies across India; and
- Top-level engagement of key stakeholders such as government institutes, regulatory agencies, industry associations and media.

The ‘Pharma Week’ saw:

- Encouraging participation from 50 CXOs at the CEO Roundtable; and 150 senior representatives at the Conference.
- 11 one-to-one meetings of Senior Management with the GCIPR & Pharma Supply Chain Initiative (PSCI) delegation.
- Participating companies getting inspired to start engaging in GCIPR tools including Solvent Selection Guide, Process Mass Intensity/LCA calculator, Reagent Guide, etc.
- Participating industry recognis-



ing the importance of GC metrics, training modules, appropriate waste management strategies built-in at plant design stage, stronger compliance systems through EHS audits, etc. and realising the need for collaborating with knowledge platforms such as GCIPR.

- Common feedback received from all the participants for similar interactive forums and capacity building platforms over the coming years.

This one day work-shop is a step in the direction of fulfilling the stated need of the pharma industry.

Workshop Agenda

The workshop will enhance sustainability performance in developing and manufacturing Active Pharmaceutical Ingredients (APIs) and intermediates using Green Chemistry and Engineering (GC&E) techniques honed over 11 years by leading pharmaceutical companies. The ACS-GCIPR member companies have combined and leveraged their experience and expertise using GC&E principles and techniques and developed many tools like the Solvent Selection Guide, the Reagent Selection Guide and the Process Mass Intensity (PMI) calculator, to name a few.

In this one-day workshop partici-

pants will learn how to design a greener route, select the most appropriate reagents and solvents to minimize waste and maximize safety, choose sustainability metrics that make sense to monitor their progress toward greener manufacturing, and discover other technologies for streamlined synthetic approaches.

The ACS-GCIPR has performed several PMI benchmarking exercises of chemical processes across the different development stages over the last decade within the member companies and they all showed consistently that about 58% of the waste comes from solvents, about 28% from water and about 8% from raw materials.

Therefore, smarter decisions on solvents (including water) and raw materials using a solvent and reagent selection guide will result quickly in significant reductions of waste and enhance greener and more sustainable processing quickly.

The workshop will give a brief overview about the history of Green and Sustainable Chemistry; an introduction to the different metrics to enable the monitoring of success toward GC&E; introduce the concept to making smarter decisions on solvents and reagents by applying selection guides; discuss flow chemistry as a potential

greener option for certain reactions; and discuss examples of successful greener process developments within the ACS-GCIPR member companies.

At the end of the workshop, the participants will understand the importance of preventing waste, instead of treating it after creation; the use of metrics to identify the areas of greatest need; opportunities to streamline chemical routes; identify sustainable alternatives regarding solvents and reagent choices to limit waste; create a safer work environment; and provide cost savings. Finally, the attendees will have a better understand of how to minimize (hazardous) materials and streamline construction of complex molecules in a more sustainable and greener way.

Throughout the course interactive exercises will familiarize the attendees with the concepts of Green and Sustainable Chemistry and will show the benefits and wins when applied in practice. Green chemistry is a triple win: cost effective, better for the environment and safer for the employees. Chief representatives from R&D, R&T, production, operations and environmental health & safety areas will find this workshop of immense benefit.

Background about ACS-GCIPR

In 2005, the ACS Green Chemistry Institute and global pharmaceutical corporations developed the ACS-GCIPR to encourage innovation while catalyzing the integration of GC&E in the pharmaceutical industry. The activities of the Roundtable reflect its member's shared belief that the pursuit of GC&E is imperative for business and environmental sustainability.

The member companies include

Amgen, AstraZeneca, BoehringerIngelheim, Bristol-Meyers Squibb, Eli Lilly, F. Hoffman-La Roche, Glaxo Smith-Kline, Johnson & Johnson, Merck, Novartis, Pfizer and Sanofi. Member companies of the ACS-GCIPR come together to catalyze innovative approaches for improving process efficiency and product quality through GC&E. By working together, the Roundtable provides leadership and influence throughout the industry and supply chain. For example, it has awarded over \$1.84-mn in funding to further key research priorities for greener chemistries. In addition, the Roundtable continues to develop a valuable set of tools including a Solvent Selection Guide, Process Mass Intensity/LCA calculator, and a powerful Reagent Guide.

The resource persons

Dr. Ingrid Mergelsberg – Director, Process Chemistry, MSD, USA



Dr. Ingrid Mergelsberg received her Ph.D degree in organic chemistry from the University in Freiburg, Germany. After two postdoctoral trainings at the University of Rochester, NY and Hoffman LaRoche, Basel, Switzerland she started her industrial career at Parke Davis in Freiburg, Germany and then worked for Schering-Plough first in Switzerland and then in New Jersey, USA and later for Merck, New Jersey after the merger. During her more than 30 years in Chemical Development she has held a progression of roles of increasing responsibilities serving for the last seven years as Director in Process Chemistry. She is leading the cross functional/cross divisional Green and Sustainable Science team at Merck. A former co-Chair

of the ACS-GCIPR, Dr. Mergelsberg has been very active in green chemistry initiatives both at Merck as well as externally. She also leads the Green Chemistry Working Group of the International Consortium for Innovation and Quality in Pharmaceutical Development (IQ).

Dr. David Constable, Director – ACS-Green Chemistry Institute



Dr. Constable, has been the Director of the ACS-Green Chemistry Institute (ACS-GCI) in Washington, D.C., since January 2013. The mission of ACS-GCI is to catalyze and enable the implementation of GC&E throughout the global chemistry enterprise.

From September 2011 to January 2013, Dr. Constable was owner and principal at Sustainability Foresights, LLC, a consulting firm that assisted companies with sustainability; sustainable and green chemistry; energy; and environment, safety, and health (ESH) programmes. Prior to that, he was with Lockheed Martin as the corporate vice president of energy, environment, safety, and health.

Before joining Lockheed Martin, Dr. Constable was the director of operational sustainability in the Corporate ESH Department at Glaxo-SmithKline. In that global role, he led GlaxoSmithKline's development of sustainability-based programmes, systems, tools and methodologies. Prior to joining SmithKline Beecham, Dr. Constable served as Group Leader of the SHEA Analytical Services group at ICI Americas. Dr. Constable has a Ph.D. in Chemistry and B.S. in Environmental Sciences, Air and Water Pollution.