

Chemical Development & Scale-Up in the Fine Chemical & Pharmaceutical Industries

Principles and Practice

6 - 8 March 2011

The Grand Hotel Baglioni, Florence, Italy



“The course was excellent in general. In particular, the breadth of subjects that were covered in a very clear and concise manner, plus the format and number of problem sessions, were excellent in my opinion. High quality handouts with a wealth of literature references.”

Novoxel SA

PROFESSIONAL DEVELOPMENT TRAINING

Scientific Update provides training courses for industrial chemists and chemical engineers in chemical development and scale-up and many other specialist topics in organic and process chemistry.

Our short intensive training courses enable scientists to learn about highly relevant topics, to broaden their knowledge and to keep abreast of new science, new technology and new techniques.

www.scientificupdate.co.uk | info@scientificupdate.co.uk

SCIENTIFIC

UPDATE
We've Got Chemistry

Chemical Development & Scale-Up in the Fine Chemical & Pharmaceutical Industries

Principles and Practice

6 - 8 March 2011 The Grand Hotel Baglioni, Florence, Italy

"Very useful and enjoyable - thanks!"

Hospira Boulder Inc

Fee & General Information

£1325.00

Includes lunch & refreshments, course dinner and comprehensive course manual.

The course begins with registration at 8.30am on Tuesday 6 March and finishes at approximately 3pm on Thursday 8 March.



Introduction

Chemical process development is generally not taught as part of degree courses in higher education; the conversion of a synthetic route used for making milligram or gram quantities of a chemical into a process for manufacturing multi-kilogram and tonne quantities is typically learnt "on the job" by chemists in industry. For many years, little chemical development work was published in the literature, until the establishment of the Organic Process R & D journal by Dr Trevor Laird (*founder of Scientific Update*). Even now, "tricks of the trade" are handed down within individual company organisations, and it can be difficult to gain an awareness of what is involved in chemical development, and of the skills and techniques required to efficiently scale-up chemical processes.

This three-day course, written and presented by highly experienced process chemists from the pharmaceutical and fine chemical industries, provides a comprehensive overview of this fascinating and important element of the chemical industry. A logical investigative approach to all aspects of chemical development is described, with an abundance of case studies from literature, conferences and private communications. The multi-disciplinary nature of chemical development is emphasised, from the initial interaction with laboratory research scientists to the vital partnership with chemical engineers in the pilot plant and in the production environment. The lectures are interspersed with interactive problem sessions, enabling participants to share in the problem solving and troubleshooting typically experienced during chemical development.

Course Outline

Introduction

- The purpose of chemical development

Synthetic Route Discovery

- Route design
- Selecting the best route for scale-up
- Choice of raw materials, reagents etc

Costing of Chemical Processes

- Raw materials
- Overheads
- Context

The Investigative Approach to Chemical Development

- Optimising Chemical Reactions
- Making processes robust
- Minimising scale-up difficulties

Solvent Effects

- Often overlooked
- Key to making a modest process a great process

Statistical Methods of Optimisation

- Vital, but under-utilised
- Design of Experiments
- Simplex
- Factorial design

Analytical Issues

- In Process Control
- Quality Control and Specification Setting
- Regulatory Guidelines
- GMP, Validation
- Use of analysis to aid process optimisation

Work Up

- Product isolation

Planning for Scale-Up

- Key points to consider

Appreciation of Chemical Engineering Principles

- Mass Transfer
- Mixing
- Heat Transfer
- Kinetics

Crystallisation and Polymorphism

- Particle size control
- Polymorph control
- Methods of analysis

Chemical Development of Enantiomerically Pure Compounds

- Resolution
- Chemocatalysis
- Biocatalysis
- Crystallisation-induced asymmetric transformations

Thermal Hazard Testing and Runaway Reactions

- Essential process safety considerations
- Equipment and screening approaches

Effluent Minimisation and Control

- Environmental considerations
- Cost considerations
- Green chemistry

Course Tutors



Will Watson gained his PhD in Organic Chemistry from the University of Leeds in 1980. He joined the BP Research Centre at Sunbury-

on-Thames and spent five and a half years working as a research chemist on a variety of topics including catalytic dewaxing, residue upgrading, synthesis of novel oxygenates for use as gasoline supplements, surfactants for use as gasoline detergent additives and non-linear optical compounds. In 1986 he joined Lancaster Synthesis and during the next 7 years he was responsible for laboratory scale production and process research and development to support Lancaster's catalogue, semi-bulk and custom synthesis businesses. In 1993 he was appointed to the position of Technical Director, responsible for all Production (Laboratory and Pilot Plant scale), Process Research and Development, Engineering and Quality Control. He helped set up and run the Lancaster Laboratories near Chennai, India and had technical responsibility for the former PCR laboratories at Gainesville, Florida. He joined Scientific Update as Technical Director in May 2000. He is also involved in an advisory capacity in setting up conferences and in the running of the events. He is active in the consultancy side of the business and sits on the Scientific Advisory Boards of various companies.

Will can be contacted by email:
will@scientificupdate.co.uk



Derek Robinson gained his PhD in Physical Organic Chemistry from the University of St. Andrews in 1981. After completing two

years post doctoral research at the University of Strathclyde, he joined the Pharmaceutical Research and Development group at Parke-Davis/Warner Lambert. During the next eleven years he was responsible for the development and optimisation of synthetic routes to novel drug candidates, organising the scale-up to pilot plant and transfer to production facilities. He was manager of synthetic chemistry laboratories at Pontypool, Wales and Freiburg, Germany. Since 1995 he has been an associate lecturer at Scientific Update. Derek has developed courses on Good Manufacturing Practices (GMP), Basic Organic Chemistry for Chemical Engineers and Statistical Experimental Design for Chemists. He also tutors the Chemical Development in the Fine Chemical and Pharmaceutical Industries course. He has also worked with fine chemical companies to help develop documentation procedures and GMP training courses.

Derek can be contacted by email:
derek@kolvox.net

Who Should Attend?

Young Chemists who have just started work in industry as development chemists.

Organic Chemists/Medicinal Chemists in Research and Development who would like to gain an appreciation of development and scale-up and who are perhaps contemplating moving into chemical development.

Development and Production Chemists in industry who would like to improve their efficiency and gain an insight into alternative approaches to chemical development.

Chemical Engineers who wish to understand a chemist's approach to chemical development of batch processes. (Engineers would, however, need a good grounding in organic chemistry.)

Students who are about to enter the industry & can obtain company sponsorship.

Experienced Chemists looking to refresh and/or augment their knowledge of chemical development.

Analytical Chemists who wish to gain a broader appreciation of process chemistry.

Managers who might benefit from a comprehensive and up to date overview of chemical development.

What does the course set out to achieve?

To train R&D chemists and engineers in the most efficient methods for developing cheap, robust processes for the manufacture of fine organic chemicals in the minimum amount of time.

To educate chemists in the principles of scale-up and development, in basic engineering concepts and in techniques for the optimisation of processes.

To teach chemists to learn from the experience (*and mistakes*) of others by examining case studies from industry.

Venue

The Grand Hotel Baglioni Piazza Unita Italiana, 50123 Florence, Italy
Tel: +39 055 23580 Fax: +39 055 2358 8895

The 19th Century Grand Hotel Baglioni once the residence of Carrega Bertolini princes, is typical of Tuscan architecture and is centrally situated in the heart of Florence. Whilst still retaining Florentine charm and good taste, the hotel offers all modern comforts and facilities, including air conditioning.

Accommodation has been reserved at the hotel for the special rate of €153 per night for single occupancy. This price includes breakfast and taxes. You will need to make your own arrangements and a hotel booking form will be sent when you register.

At the end of the course, participants will have gained

A **logical investigative approach** to chemical development and optimisation

An **insight** into the factors involved in scale-up

An appreciation of **chemical engineering concepts**, particularly mixing, heat transfer and process control

A preliminary **knowledge** of statistical methods of optimisation

Improved ability to decide which parts of the chemical process to examine in detail

Ideas for efficient resource allocation

Improved troubleshooting and problem solving ability

Register for this course by using the form overleaf or contacting us by: tel +44 (0)1435 873062 info@scientificupdate.co.uk fax +44 (0)1435 872734



Chemical Development & Scale-Up in the Fine Chemical & Pharmaceutical Industries

6 - 8 March 2011 The Grand Hotel Baglioni, Florence, Italy

SCIENTIFIC
UPDATE

Please register attendee(s) @ £1325.00

First Attendee Name

Company	
Title (Dr/Prof/Mr/Mrs/Ms)	
Job Title	
Name	
Surname	
Address	
<input type="text"/>	
Postcode/ZIP	
Country	
Telephone	
Fax	Mobile
Email	
Special Diet	

Second Attendee Name **SAVE 5%**

Title (Dr/Prof/Mr/Mrs/Ms)	
Job Title	
Name	
Surname	
Address	
<input type="text"/>	
Postcode/ZIP	
Country	
Telephone	
Fax	Mobile
Email	
Special Diet	

Third Attendee Name **SAVE 15%**

Title (Dr/Prof/Mr/Mrs/Ms)	
Job Title	
Name	
Surname	
Address	
<input type="text"/>	
Postcode/ZIP	
Country	
Telephone	
Fax	Mobile
Email	
Special Diet	

Please select to receive the FREE bimonthly e-Newsletter

Purchase Order No.

Payment Method

I would like to charge the fee(s) to my credit card.



Cardholder	
Card No	
Expiry Date	Security No***
Address (if different from first delegate name)	
<input type="text"/>	
Signature	
Date	

Please invoice my company

Invoice Address

Name	
Company	
Address	
<input type="text"/>	
Postcode/ZIP	
Country	
Telephone	
Fax	Mobile
Email	

Payment will be made by: cheque bank transfer

Promotional Code

Terms and Conditions of Business

Payments ALL PAYMENTS MUST BE RECEIVED BEFORE THE EVENT DATE. Confirmation of your registration will be supplied by fax or e-mail and an invoice will be sent by post.

Discounts* Complete the details for either two or three delegates and your discount will automatically be applied. This offer only applies where all delegates are booked simultaneously and at the same billing address. Attendee names can be substituted at any time prior to the event date, but please notify us as soon as possible.

Promotional Code (from an advertisement or email) please enter the reference in Promotional Code box above.

Security Number*** This is the last three digits of the number on the signature strip on the BACK of the credit card. For American Express customers, this is the four digit number printed to the right of the main card number on the FRONT of the card.

Substitutions/Cancellations Should you be unable to attend and cancel in writing no later than 28 days prior to each event date, Scientific Update will refund your registration less £300 processing fee. It is regretted that after this date refunds are not possible. Substitutions can be made at any time.

For late applications please register on line at www.scientificupdate.co.uk or fax the completed registration form, including credit card payment information.

Venue/Accommodation You will be sent details of how to reserve your accommodation with your event confirmation details.

Change of Details If the details on the envelope are incorrect or if you do not wish to receive any further information from us, please contact us on +44 (0) 1435 873062. As all literature is mailed at least three months in advance, you may experience a delay in the changing of your details.

Data Protection The personal information on this form may be used by Scientific Update for marketing purposes. If you do NOT wish this information to be disclosed to any third parties, please tick this box.

Please complete this form and fax to +44 (0)1435 872734.

You can also download the PDF from the website, complete the form online and email back.

Scientific Update LLP, Maycroft Place, Stone Cross, Mayfield, E. Sussex TN20 6EW, UK Tel: +44 (0)1435 873062 scup@scientificupdate.co.uk