CUSTOMIZED ORGANIC CHEMISTRY. PRODUCTION AND PROCESS RESEARCH AND DEVELOPMENT IN FINE ORGANIC CHEMISTRY

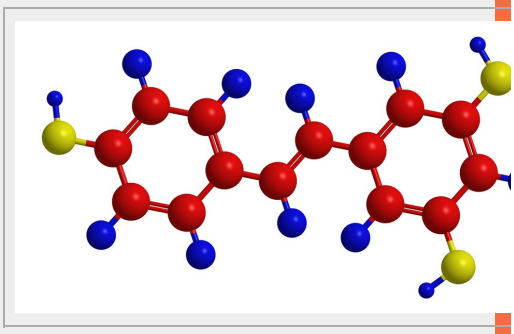
CONTACT DETAILS:

Research Results Transfer Office-OTRI
University of Alicante
Tel.: +34 96 590 99 59
Email: areaempresas@ua.es
http://innoua.ua.es

ABSTRACT

The Department of Organic Chemistry of the University of Alicante has a wide reaching experience, expertise and "know-how" which allow it to develop and scale-up chemical processes from laboratory to industrial scale in a pilot plant working under ISO9001:2000 and conditions of complete traceability.

Services offered include: Process R&D, Process scale-up, custom manufacturing of fine chemicals and pharmaceutical intermediates both at laboratory scale and in a general purpose pilot plant.



TECHNICAL DESCRIPTION

DEPARTMENT OF ORGANIC CHEMISTRY PROFILE

The Department of Organic Chemistry of the University of Alicante was founded in 1990 and since then has been continually developing its teaching and research programmes in the area of Organic Chemistry. The Department is composed of approximately 40 members, 26 of which are full time permanent staff engaged in teaching duties to more than 3000 students of Chemistry, Chemical Engineering, Biology and Optics.

Research, based on public, private and mixed funding, is currently carried out in the following broad areas:

- Synthesis of molecules with possible biological and pharmaceutical properties using stereo- and regio-selective methodologies.

- Development of new selective synthetic methodologies based on reactive organometallic intermediates.

These research areas contribute annually to the publication of approximately 30 scientific papers in "high impact" journals and the presentation of 4-5 Doctoral theses. Applied research such as industrial process scale-up and process development is also carried out.

The Department also prides itself on being able to receive each year conferences and seminars in Organic Chemistry from at least a dozen visiting foreign Professors and its international commitment is also emphasised by the presence of Postdoctoral students from a number of countries.

The Department of Organic Chemistry is extremely well equipped with scientific instrumentation and, together with the complete analytical services offered by the University itself, can consider itself to be comparable to the best of other organic chemistry laboratories in Europe. The pilot plant facilities are also comparable to similar installations found in major pharmaceutical and fine chemical companies.

Over the past few years, the Department has sought to improve the quality of its principal product, graduates in Organic Chemistry, by supplying a product which is more useful to the end user, the Chemical Industry. To this end the Department has invested both time and financial resources in the development of courses which cover the industrial aspects of organic chemistry and towards the building and implementation of an industrial scale pilot plant which provides not only experience to students but also allows the Department to widen its already substantial contacts with the chemical industry in Spain, Europe and indeed the world as a whole.

PILOT PLANT PROFILE

Apart from the obvious requirements of the academic syllabus of the department, the Pilot Plant of the Department of Organic Chemistry has been designed to provide a complete service to the Fine Chemical and Pharmaceutical Industries and follows procedures which meet or better the requirements of ISO9001:2000. The Pilot Plant facilities and supporting warehouse, analytical and QC services ensure that possible clients of the Pilot Plant will receive products or processes, together with the necessary confidential and validated documentation, which are immediately transferable to their own production procedures and manufacturing facilities.

As a further innovation, in order to avoid the traditional reticence of the chemical industry towards projects carried out in University/Research facilities, the day to day organization and running of the Pilot Plant is controlled by qualified personnel (2 Chemistry PhD's) with a combined industrial R&D/ Production experience of more than 25 years. This invaluable industrial experience allows the Department and the Plant personnel to deal with its potential clients on their "own terms" and allows for an adequate relationship between the client, his requirements, the possibilities of success with the resources available, the usual considerations of product/process economy, environmental impact and the establishment of reasonable specifications, product price and delivery time.

TECHNICAL DESCRIPTION OF SERVICES AVAILABLE

The resources of the Pilot Plant can be divided into various physically separated but inter-related areas each of which has the necessary infrastructure to provide a complete service to potential clients.

(a) Production facilities:

The Pilot plant has the following general purpose equipment:

- Glass-lined jacketed reactor of 250 L with: 50 L addition vessel, distillate receivers of 25 L and 10 L, glass header for reflux, distillation and Dean-Stark

trap, bottom valve and baffle temperature probes and complete services of steam, compressed air, nitrogen, cooling water and glycol-water.

- Glass-lined jacketed reactor of 100 L with: 50 L addition vessel, distillate receivers of 25 L and 10 L, glass header for reflux, distillation and Dean-Stark

trap, bottom valve and baffle temperature probes and complete services of steam, compressed air, nitrogen, cooling water and glycol-water.

- Stainless steam reactors of 300 L, 150 L and 150 L, each equipped with:

addition vessels of 25-50 L capacity, headers of stainless steel. One 150 L reactor with a stainless steel condenser and the 300 L and 150 L with glass lined steel condensers, complete services of steam, compressed air, nitrogen, cooling water and glycol-water, temperature probes incorporated in the reactor bodies, each reactor with 50 L distillate receivers.

- Borosilicate glass reactor/distiller 50L with: addition vessel of 10 L, complete services of steam, compressed air, nitrogen, cooling water and glycol-water,

distillate receivers of 10 L.

- Borosilicate glass jacketed reactors of 20 L and 10L capacity, the 10L reactor having a double jacket for low temperature applications.

- Stainless receiver/crystalliser of 300 L with a complete service of steam, compressed air, nitrogen, cooling water and glycol-water.

- Stainless Steel (316L) Autoclave/ Hydrogenator of 20L capacity, rated to 20 BarG and 250ºC.

- Short-Path High-Vacuum Distillation equipment for purification/distillation of high boiling/ heat sensitive materials.

- Stainless steel semi-automatic solvent rectification/ recovery system.

- Centrifuge: vertical type with 80 cm diameter 316 stainless basket isolated from working zone in a "clean room". The specification conforms to cGMP standards.

- "Nutze"/Rosenmund type filter: 0,375 m2 filter area, stainless steel, and 300 L capacity. Conforms to cGMP standards and equipped for in situ drying of the

filtered product with solvent recovery. This unit is installed in a "clean-room facility separated from the production area.

- Buchner-Type filter: stainless steel, jacketed with facilities for inert-gas purging.

- Stainless Steel and polypropylene cartridge filters for solvent "polishing" and in-line filtration.

(b) Drying Facilities:

- Vacuum tray drier, 6 trays 60x80 cm, thermostatted oven with capability for high-vacuum drying or inert atmosphere drying.

- Vacuum tray drier, 2 trays 30x40 cm.

(c) Physical treatment:

- Rotor mill SR200, 10 to 120 Kg/h. <0,08 mm. Stainless steel.

- Vibratory tumbler sieve, stainless steel.

(d) Stores/Warehouse facilities:

The Pilot Plant has a completely independent Stores facility for raw material handling which has been divided into sections for the proper handling of materials under cGMP conditions.

(e) Process Control and Analytical Laboratories:

The pilot plant has its own independent process control and analytical laboratories which can provide an ample service of process and product specification controls. The analytical laboratory, with sufficient authority for starting material, intermediate and product approval or failure according to specification, has the following instrumentation:

FT-IR, Automatic Titrator, Automatic Karl Fischer determinations, GPC, HPLC with automatic injection and diode array detector, M.pt. determination, etc. Other facilities such as GC-MS, High-Field FT-NMR, elemental analysis, optical rotation etc. are directly accessible through services offered by the Department of Organic Chemistry and the University of Alicante.

MARKET APPLICATIONS

The facilities offered by the Pilot Plant of the University of Alicante make them suitable for use by the following industrial sectors:

- Fine Chemical and Pharmaceutical manufacturing Companies.

- Veterinary/Agro-chemical manufacturers.

- Research and Consulting establishments.

COLLABORATION SOUGHT

The Department of Organic Chemistry of the University of Alicante has a wide experience and the installations required to develop commercially viable industrial processes for the fine and pharmaceutical chemical industries. The Department offers the following services to potential clients:

- Custom synthesis of intermediates and products to clients' specification.

- Toll manufacture of products and intermediates.

- Process R&D and process scale-up from laboratory to pilot plant.

- In-house equipment rental to clients wishing to perform their own reaction scale-up.

- Physical treatment of finished products.

MARKET APPLICATION (4)

Pharmacology, Cosmetics and Ophthalmology
Materials and Nanotechnology
Medicine and Health
Chemical Technology