

Process research

Mercachem has an experienced team of chemists, skilled in process research offering the following services:

- Route scouting
- Reaction and process optimization
- Catalyst screening
- Material supply (up to 1 kg)

Route scouting

In route scouting projects Mercachem uses its unprecedented creativity and knowledge of synthetic organic chemistry and modern production methods to suggest multiple alternative routes towards a target structure. In such projects a wide range of problems are addressed, such as:

- Replacement of starting materials and reagents with high cost or limited availability
- Replacement of unselective and low-yielding chemical transformation steps
- Removal of chromatographic purifications
- Strategic choice of reagents and solvents with regard to cascading, telescoping and product isolation

In consultation with our customers the suggested routes are evaluated. The prioritized routes are further explored in the laboratory. On average these projects are completed in 2-6 months and require the use of 1-2 chemists.

Reaction and process optimization

In reaction and process optimization projects Mercachem combines its vast experience in organic chemistry with the power of parallel experimentation and design of experiments methodology to quickly establish improved or alternative conditions for a reaction step or conditions for a process. Reaction and process optimization projects cover a wide range of different problems such as:

- Improvement of the (overall) yield and selectivity
- Waste reduction
- Replacement of stoichiometric reagents with a catalyst
- Identification of IP-free conditions
- Reduction of cost of goods (COG)

By studying multiple key parameters simultaneously solutions are obtained in a short period of time.

The data obtained from screening experiments are evaluated using Design of Experiments to predict the best reaction or process conditions which are consecutively tested at larger scale. On average these projects are completed in 1-2 months and require the use of 1 chemist.

Catalyst screening

Mercachem has built a unique in-house collection of ~475 commercially available catalytic systems that are routinely used for screening experiments. The following materials are available off the shelf:

- Heterogeneous (~200), precious metals, base metals
- Homogeneous (~250), transition metal complexes, (chiral) phosphine, non-phosphine (chiral) ligands
- Biocatalytic (~25), (immobilized) lipases and esterases
- Lewis acids, zeolites, clays

Our available equipment (24-, 48- and 96-position reactor arrays, 48-position parallel autoclave, glove box for handling oxygen sensitive reagents on small scale) allows us to screen 200 - 400 different conditions in one month to improve a reaction or process step. Besides screening catalysts also other key parameters will be studied simultaneously so that solutions are obtained in a short period of time.

Again, the best reaction or process conditions will be consecutively tested at larger scale. On average these projects are completed in 1-2 months and require the use of 1 chemist.

Material supply

Mercachem has the capability to produce specialty chemicals up to 1 kg amounts. Currently, Mercachem produces on an exclusive basis such materials for flavor, agrochemical and high-performance material companies. The following equipment is available for the safe production of such materials:

- 20 l glass reactor
- 4 l stainless steel autoclave
- Microflow reactor systems for hazardous chemistry

Working with Mercachem ensures efficient execution of your process research projects.

