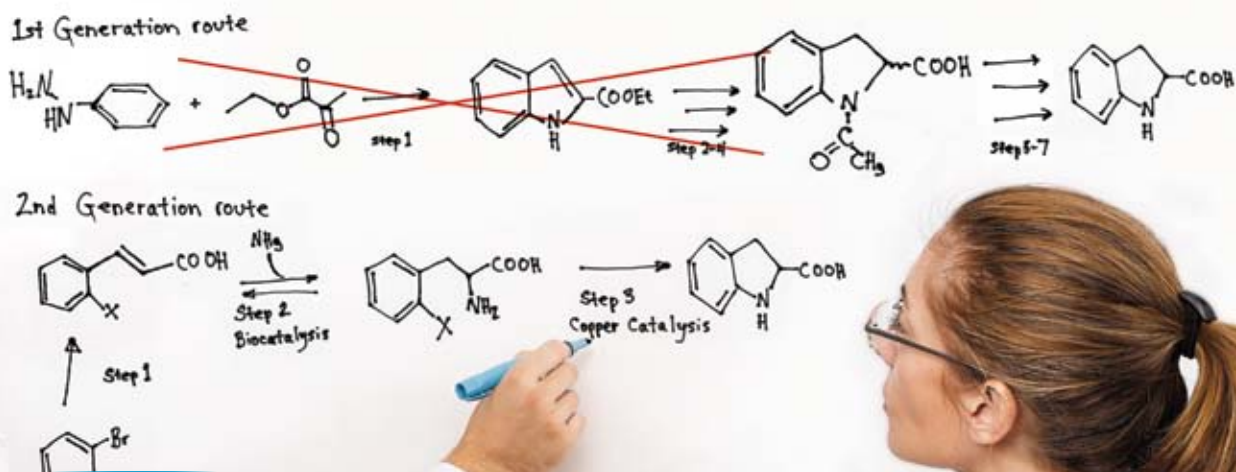


Pharma Chemicals



InnoSyn™ Route Scouting Services

DSM offers focused, flexible, stand-alone route scouting services to meet the individual needs of customers in the pharmaceutical industry. The InnoSyn™ route scouting team provides these unique services to support research and development, as well as the implementation of economical and scalable routes. This service offering includes consulting, route scouting, (bio)catalyst screening, pre-feasibility studies, full feasibility studies, mini-plant campaigns, and support in transfer and implementation.

Our differentiating route scouting services deliver proven technical packages by integration of DSM competences:

- :: Biocatalysis
- :: Homogeneous catalysis
- :: Organic chemistry and Process R&D
- :: Continuous chemistry (micro reactor technology)

DSM's world-class route scouting capabilities provide you:

Cost advantage

:: The Most Sustainable Synthesis Route

Robustness

:: A Proven Scalable Tech Package

Secured competitive advantage

:: IP Protection of your Innovative Syntheses

Flexibility

:: Implementation at the Most Appropriate Manufacturing Partner

Our differentiating route scouting services deliver proven technical packages by integration of DSM competences:

:: Biocatalysis

:: Homogeneous catalysis

:: Organic chemistry and Process R&D

:: Continuous chemistry (micro reactor technology)

The information and data on this sheet are accurate to the best knowledge of DSM at the time of production and is distributed for informational purposes only. DSM makes no representation or warranty of any kind, express or implied, including any representation or warranty of accuracy, reliability, or completeness of the information. If you would like more information on DSM's capabilities, please contact DSM sales or customer services. Copyright © 2011 DSM Pharmaceuticals, Inc. All rights reserved.

Pharma Chemicals

InnoSyn™ Route Scouting Services

InnoSyn™ Route Scouting Services Success Stories

InnoSyn™ route scouting services lead to significant cost savings by the reduction of synthesis steps or redesign of synthesis routes.

Recent success stories have included the introduction of new efficient enzymes, such as pharmaPLE®, lyases, transaminases, dehydrogenases, and new, easily accessible homogeneous catalysts for asymmetric hydrogenations, aromatic substitutions, and oxidations. Furthermore, a safe and clean nitration reaction was implemented under cGMP for manufacturing of an API based on DSM's micro reactor technology.

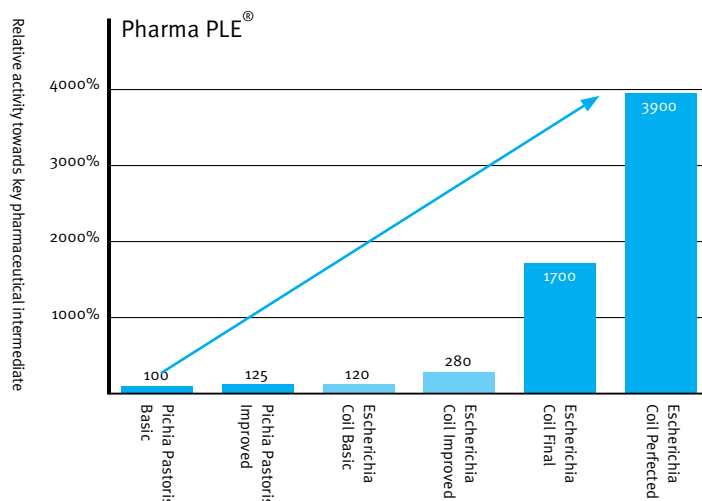
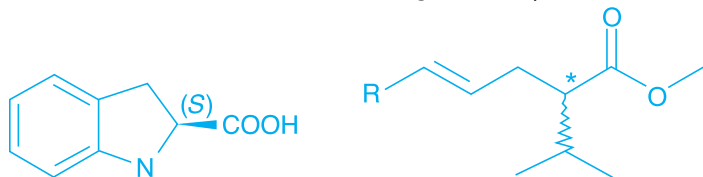
Non-animal derived biocatalysts—pharmaPLE®:

- :: Safe; non-animal origin
- :: Reproducible; no batch-to-batch variations
- :: Scalable; available and implemented at ton scale
- :: Enzyme engineering; excellent activity, stability as well as regio- and stereoselectivity

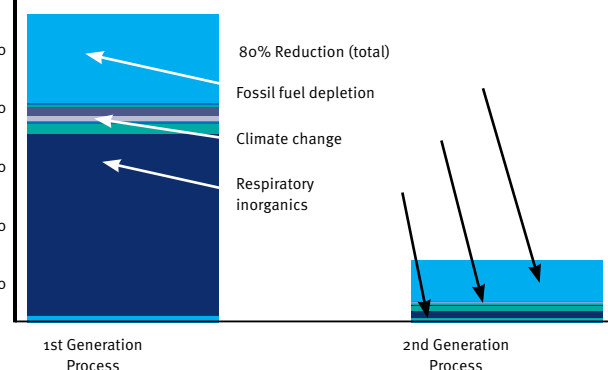
Sustainable route design:

From a 7 to 3-step synthesis route

- :: Reduction of synthesis steps by route scouting
- :: Identification of best suited enzyme
- :: Unique combination of biocatalysis and copper catalysis
- :: Reduction of environmental impact illustrated by life cycle assessment (LCA) for the 1st and 2nd generation process



LCA (Eco-indicator 99)



DSM Pharmaceuticals, Inc.
DSM InnoSyn™ route scouting services
www.innosyn.com | www.dsm.com/pharma

Dr. Oliver May, Business Manager
Tel: +31 4647 60551
oliver.may@dsm.com
www.info.innosyn@dsm.com

