

Executive Summary

Rhodiasolv® IRIS, is a diester solvent produced from a polyamide 6, 6 chain co-product which is burned up to now. This valorisation enables us to optimise our non-renewable materials footprint and then reduce our environmental impact (reduction of 0.5 ton of CO₂ per ton of valorised MGN which may represent at maturity a global CO₂ reduction equivalent to the 16 000 cars' gas release).

Rhodiasolv® IRIS is biodegradable, nontoxic, non-volatile and non-flammable. We can then propose efficient and safer solutions in various fields like paint stripping, graffiti removal, resin dissolution or industrial degreasing.

In 2009, Rhodiasolv® IRIS wins the prix Pierre Potier « de l'innovation en chimie en faveur du développement durable ».

To launch first industrial quantities and validate performances of Rhodiasolv® IRIS, a direct route was developed by using classical steps (nitrile hydrolysis followed by an esterification with methanol of the so formed diacid. The main drawbacks of this process are the large quantities of salts formed and the high energy consumption.

To enable a sustainable and long term viable model, the project team in the Lyon Research Center and Technology (Rhodia CRTL) developed an innovative catalytic chemistry to hydrolyse nitriles and transform imide into diesters. This chemistry doesn't generate any salts and leads to an energetically optimised process.

The goal of « IRIS » project is to demonstrate the industrial and sustainable viability of this new process to manufacture this solvent by respecting health and environment. This is achieved valorising a co-product of the polyamide chain and consuming as less as possible raw material and energy and generating very few effluents.

The project aims to develop these two chemistries and associated technologies (reactors and separation) allowing to reach the goals of the development of sustainable conditions. The project's ambition is also to acquire strong basic data so that scale-up can be done without intermediate demonstrator. The project's organisation is focused on the three main axis:

- Basic data acquisition, (kinetics, thermodynamics liquid/ vapour equilibrium, solubilities....) and definition of models describing mechanisms and all the observed phenomena.
- Conception and realisation of a laboratory scale pilot to acquire data (recycling effect, catalysts duration...) and validation/ adjustment of the models.
- Then, validation of the consolidated models of simulation by running a long term (3 months) run.



The technical part of this report will summarise all the results of this study with the laboratory data collection, pilot construction and use to confirm the numerical models definition for scale-up and simulation. These results will be used to assess and confirm the sustainability of this solvent manufactured via this process. In the financial part of this report, all the expenses dedicated to the realisation of this project will be tackled.

The growth of solvent field was slower than expected during the creation of this project. This obliges us to postpone the investment of an industrial unit based on these results. Nevertheless, this project is a real success as all the objectives targeted during its implementation were reached successfully.