

Implementation of a semi-automatic pilot plant for highly sensitising agents

Christoph Wallergraber, Christian Paulik

Institute of Chemical Technology of Organic Materials, JKU Linz, Austria

Hereby we present a pilot plant in lab scale, designed for methyl esters synthesis at the JKU Linz with implementation of significant safety standards. Esters used in this project show high skin irritation potential with long term effects. Therefore, the development of a pilot plant allowing safe operation conditions is of high importance.

An autoclave setup is implemented to handle pressures up to 30 barg while maximum temperature of 230 °C can occur. The reactor and all components are designed to operate with aggressive media. Therefore, material of stainless steel, PTFE or higher chemical stability are used. Via a programmed software application, adjusting and monitoring of the plant and its different heating zones is easily carried out. The reaction process can be adjusted via a manual sampling system while the resulting product quality is checked by analytical methods using gas chromatography and high-pressure liquid chromatography. Besides the core components of the pilot plant, several secondary devices are installed. These devices will be operative in case of uncontrolled reaction events. Safety washing tanks and an activated carbon tank act as barrier to deactivate the reaction medium. After reaction completion the media is transferred into a product tank equipped with temperature control, before draining the mixture for further operations.