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SUPERCRITICAL EPOXIDATION OF GRAPESEED OIL

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Nowadays, polyurethanes are the sixth most demanded polymers and their world production is currently well over 30 million tonnes annually. The synthesis of polyurethanes involves the condensation reaction between polyols and polyisocyanates. This reaction has two main drawbacks. On the one hand, both reagents are of petrochemical origin, leading to several associated environmental problems, and, in turn, isocyanates are environmentally toxic compounds, just as their exposure implies possible physiological harm to humans. Therefore, and with the aim of reducing the use of the above compounds, it exists an important trend on developing alternative routes of synthesis of polyurethanes that do not include isocyanates, the so-called NIPU (Non-Isocyanate PolyUretanes), obtained from the reaction of cyclic carbonates and polyfunctional amines. It is proposed to use vegetable oils as raw material to obtain these carbonates, since they are renewable, non-toxic and easily biodegradable resources. This route involves several stages, most of which are carried out in supercritical media using CO₂ as the reaction media. Under these conditions, there is an important solubility between CO₂ and oil, reducing up to a third of the reaction time. This work, is focused on the study of the viability of the first step, supercritical epoxidation of grape seed oil, which is carried out mainly at 150 bar, 40 °C and 15 hrs. Progress is also being made in the study of the operating window, as well as the optimization of the obtained product yield, through the analysis of the influence of the quantity and type of additives (such as phase transfer catalysts, PTC) and pressure on the conversion and selectivity of the obtained product.

Biography

Juan Catalá is actually pursuing her PhD at the Department of Chemical Engineering in Castilla La Mancha University in Spain. He is an Engineering Graduate from the University of Castilla La Mancha majoring Chemical Engineering and holds a Masters' degree from University of Castilla La Mancha in Chemical Engineering, too. He also has accomplished an Internship in the Swiss Federal Laboratories for Materials Science and Technology (EMPA) in Sankt Gallen (Switzerland).

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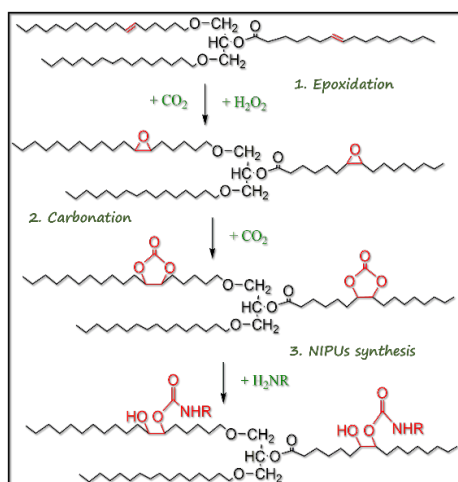


Fig. 1. Etapas de la síntesis de NIPUs a partir de aceites vegetales