

Green catalytic upgrading of renewable biobased lactones

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Studies on biomass transformation into chemicals have demonstrated that some of them can be efficiently produced. Lactones are among the most interesting ones, being a key step for the synthesis of fine chemicals, solvents, and polymers [1,2]. In this work, the reactivity of bio-based lactones (γ -butyrolactone, γ -valerolactone, δ -valerolactone and ϵ -caprolactone; GBL, GVL, DVL, and ECL respectively), with dialkyl carbonates (DAICs) [3], has been studied, aiming to obtain higher value added chemical compounds by new greener broad-based chemical technologies [2]. Under basic catalysis, the lactones reacted with three different DAICs (both reactants and solvents) to yield selectively either the α -alkyl derivatives from of the five-membered ring GBL and GVL or the highly oxygenated acyclic monomeric derivatives from of the six- and seven-membered rings DVL and ECL [4]. The ring-opening derivatives of the model lactone GVL can be obtained in conditions of acidic catalysis. The novel effect of DMC in such conditions was investigated, both in batch and continuous flow conditions. The selectivity towards methyl 4-methoxy-pentanoate or methyl pentenoate can be tuned by optimising the operating parameters.

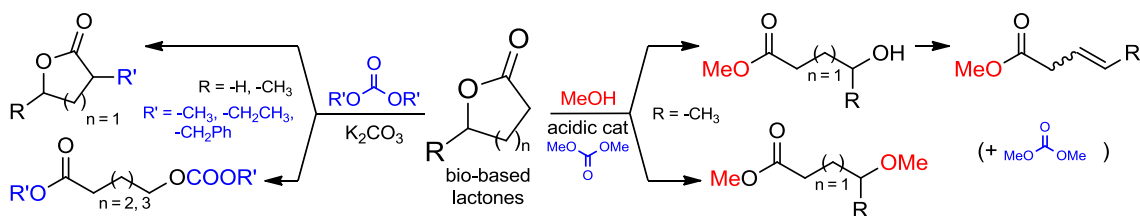


Figure 1: Upgrading of bio-based lactones via dialkylcarbonates

References:

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- [3] M. Selva and A. Perosa, *Green Chem.* **10** (2008) 457-464.
- [4] A. Caretto, M. Noè, M. Selva and A. Perosa, *ACS Sust. Chem. Eng.* **2** (2010) 2131-2141.