Non Catalytic Continuous-flow transesterification of organic carbonates with glycerol acetals [1]

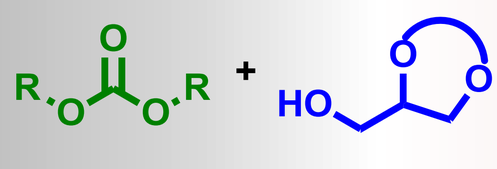
M. Selva, A. Perosa, S. Guidi

Department of Molecular Sciences and Nanosystems, Centre for Sustainable Technologies,
Università Ca' Foscari Venezia, Dorsoduro 2137 – 30123 – Venezia (Italy)

From Biomass

Acetalization [2]

Continuous flow transesterification

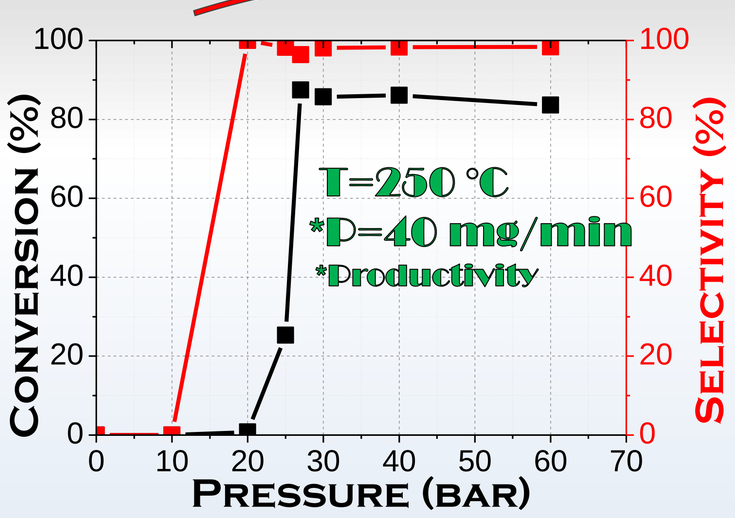


- High Atom Economy
- Carbonates act as solvent/carrier
- ROH is the only byproduct

2 MeOH, Cat2, Cat1, + CO_2 [3]

20 ÷ 70 bar

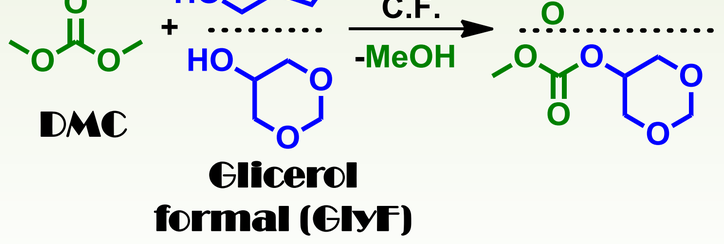
Reaction Profile



The process plausibly occurs in supercritical phase

For the DMC: Tc= 284 °C
Pc= 48 bar
dc=4 g/mL

Model Reaction



*Conversion
*Selectivity
} ≥ 97%

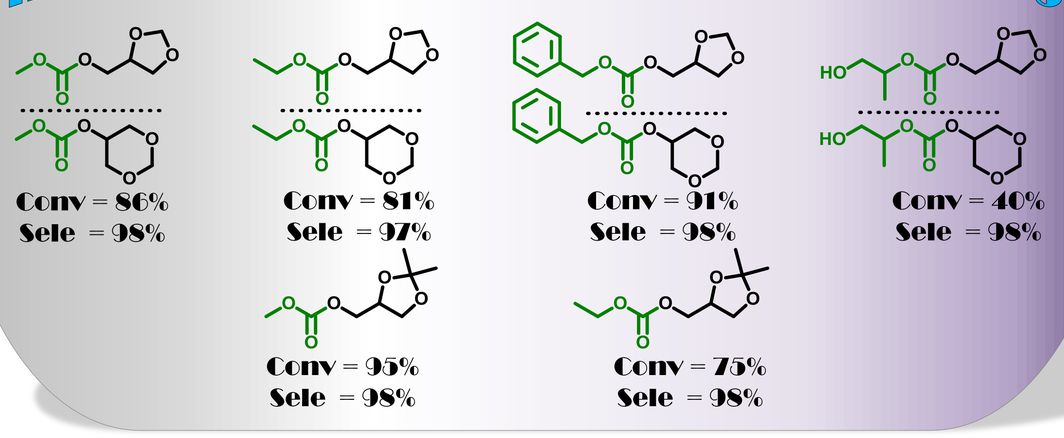
*With a single recycle of the mixture

The Innovation [4]

Catalyst-Free Reactions

Reactions performed in an empty capillary reactor

Products from different acetals and carbonates



CONCLUSIONS:

- Continuous-flow transesterification
- Pure thermal reactions (Catalyst-Free)
- Plausibly, a supercritical phase is needed
- Synthetic extension to different acetals and carbonates

REFERENCES:

[1] Selva, M.; Noe, M.; Guidi, S., *Green Chemistry*, **2014**.

[2] Vanlaldinpuia, K.; Bez, G., *Tetrahedron Letters,* **2011**, 52, 3759-3764.

[3] Bhanage, B.; Fujita, S.-i.; He, Y.; Yakushima, Y.; Shirai, M.; Torii, K.; Arai, M., *Catalysis Letters,* **2002**, 83, 137-141.

[4] Pasias, S. A.; Barakos, N. K.; Papayannakos, N. G., *Ind. Eng. Chem. Res,* **2009**, 48, 4266-4273.