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CARBOHYDRATE UPGRADING VIA DIALKYL CARBONATES

CHEMISTRY FOR THE ENVIRONMENT
2. Addressing Environmental Issues through Bio-sourced Materials and Green Chemicals

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Abstract

In the last twenty years biorefinery has gained exceptional attention in the scientific community. This interest has been prompted by the substitution of petroleum-based compounds with renewable substances with the aim of establishing a bio-based economically self-sustained industry. In this prospect the US Department of Energy (DOE) has published a list of 15 target molecules starting from 300 original candidates, that were considered of special interest for biorefinery development.[1] These compounds have been selected by taking into consideration numerous factors such as available processes, economics, industrial viability, size of markets and their possible employment as a platform for the production of derivatives.

Over the years, due to the considerable progress in biorefinery development, this list, as well as, the criteria used to identify bio-based products has been revised. Several new compounds substituted the ones that have not received a great research interest. However, among the original selected chemicals, D-sorbitol, together with 5-hydroxymethylfurfural (HMF) derivatives still occupy a top position in the list as they encompass all of the desired criteria for a bio-based platform compounds. In fact, these building blocks have found numerous applications in the synthesis of chemicals, materials and bio-based polymers (Figure 1).

In this perspective, it is herein reported our recent work on the reactivity and upgrading of D-sorbitol, isosorbide and HMF with organic carbonates employed as green reagents and solvents. As a result, several industrially appealing products have been achieved with potential applications as high boiling green solvents (i.e. dimethyl isosorbide), biofuels candidates (2,5-bis-alkoxymethylfurans - BAMF) and monomers for bio-polymers [2].

Bibliography

[1] J.J. Bozell, G. R. Petersen, *Green Chem.*, **2010**, 12, 539.

[2] a) P. Fuertes, M. Ibert, E. Josien, P. Tundo, F. Aricò, US 8,399,601 B2, 2013; b) F. Aricò, P. Tundo, *Beilstein J. Org. Chem.* **2016**, 12, 2256; c) F. Aricò, A. Aldoshin, P. Tundo, *Chemsuschem.* **2017**, 10 (1), 53; d) M. Musolino, J. Andraos, John, F. Aricò, *Chemistryselect.* **2018**, 3 (8), 2359.

Figure 1