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Butyl-5-(Dibutoxymethyl)-2-Furoate (BDMF): a New Bio-sourced Furanic Platform Molecule for the Green Production of Biodegradable Surfactants and Industrial Chemicals

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PURPOSE OF THE ABSTRACT

With increasing awareness of environmental issues brought by the use of petroleum-based compounds, a recent growing interest in sustainable chemistry for the development of novel molecules derived from renewable resources has been witnessed. This translates into the need for the development of platform molecules obtained from biomass feedstocks through environmentally friendly synthesis in accordance with green chemistry principles. To this end, platform molecules such as 5-(hydroxymethyl)-furfural (HMF) [1] and 5-(chloromethyl)-furfural (CMF) [2] have been the focus of numerous studies as they can be transformed into different building blocks for various applications. While the former exhibits a problematic instability and high water miscibility, preventing an efficient extraction, the latter requires the use of chlorinated chemicals. We herein report the robust conversion of homo- and hetero- uronate polysaccharides through a one-pot process into a novel more stable bio-based furanic derivate with lower water miscibility, the butyl 5-(dibutoxymethyl)-2-furoate (BDMF) [3]. This derivate exhibits two different and already protected functional groups allowing to access a furanic ester or carboxylic acid without the oxidation of HMF. BDMF can in turn be converted to higher value chemicals in one or two easy steps to reach the targeted functional groups such as aldehyde, acid, oxime, amine or nitrile. These simple transformations allow their use for various applications as monomers, coating additives, polymers, pharmaceutical compounds, agrochemistry and surfactants. Fully bio-based, biodegradable and non-ecotoxic anionic surfactants were obtained using an eco-friendly synthesis and their characterisation showed that these surfactants are promising anionic moieties with efficient surface tension reduction and high foaming power.

Keywords: butyl 5-(dibutoxymethyl)-2-furoate, 5-(hydroxymethyl)-furfural, biomass, sustainable chemistry, platform molecule, surfactant.

FIGURES

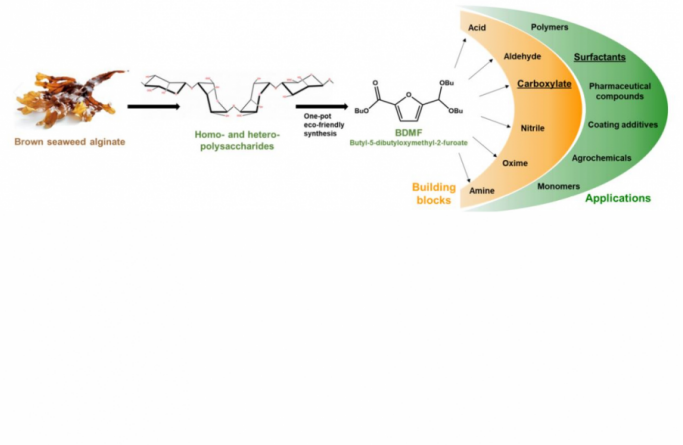

FIGURE 1

Graphical abstract BDMF

Butyl-5-(Dibutoxymethyl)-2-Furoate (BDMF): a New Bio-sourced Furanic Platform Molecule for the Green Production of Biodegradable Surfactants and Industrial Chemicals

FIGURE 2

KEYWORDS

Butyl 5-(dibutoxymethyl)-2-furoate | Biomass | Platform molecule | Surfactant

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