

## Using 100% bio-based 1,3-Propanediol as building block in biosynthesis for downstream applications.

Using 1,3-propanediol (1,3-PDO) as a building block in high performance materials allows downstream producers to enter the high-end market with products that combine performance with a higher sustainable profile compared to corresponding fossil-based materials. From sustainability point of view using 100% bio-based and renewable 1,3-PDO might be a good opportunity for many manufacturers of polymers, fibers for textiles, garments, artificial leather and coatings to full-fill their sustainability goals by reducing scope 3 emissions and GHG emissions while increasing renewable content.

Since 1,3-PDO is end-functionalized, the possibility arises to use this monomer as an effective building block in many polymeric applications. Besides classic polyether (PO3G) and polyesters between 1,3-PDO and any bio-based diacid, facilitating formation of well performed PU and polyester application; the 1,3-PDO can be functionalized further with a big variety of functionality supporting specific downstream applications. A 1,3-PDO based polyether, and polyester can be 100% biobased and be carried out in a variety of applications. Sorona® (a CovationBio brand) and Creora® (a Hyosung brand) are two well-known brands that are based on 1,3-PDO polyester and polyether respectively. Sorona® is a polyester fiber, that is often utilized in carpets and textiles to provide stretch. Creora® is a spandex material using polyurethane technology where the backbone is based on 1,3-PDO polyether (PO3G).

In this study the possibility of using 1,3-PDO in bio-renewable chemistry supporting material manufacturers will be presented. The chemistry background will be explained and two commercial products presented that are used in a variety of applications, e.g. carpets and clothes. Finally, the various sustainability aspects of bio-renewable 1,3-PDO such as ability of lowering the carbon footprint substantially reducing GHG emissions up to 86% will be highlighted by providing peer reviewed LCA data.