Co-feeding lignocellulosic-biomass-derived intermediates (BioMates) into conventional refineries is a promising option to decarbonise road, jet and bunker fuels and to reduce import-dependence of mobility. Of course, this strictly requires compatibility of bio-based intermediates with refining processes and reliability of the intermediates properties. The ultimate goal of this approach is to produce fuels of high-quality abiding by existing standards, with no intermediate-caused off-spec production lowering the refineries yields. The BioMates concept involves two state-of-the-art conversion technologies in series. The first step is ablative fast pyrolysis (AFP) for converting lignocellulosic feedstock (straw and miscanthus) to bio-oil with an innovative in-line-catalysis system integrated in the AFP-reactor. The second step (optionally at another location) is mild hydrotreatment for upgrading the bio-oil into bio-based intermediates with compatible to refinery properties to be co-fed without any risk. This step is improved by applying solar-generated make-up hydrogen and electrochemical compression and recovery of the hydrotreating gaseous product, lowering upgrading costs and carbon footprint. The AFP technology enables a near-field-operation of the first conversion step, reducing the bulk volume from straw to bio-oil by a factor of 10. This serves for high transportation efficiency and promotes rural job creation, while still enabling a near-refinery operation of the mild hydrotreatment step. Catalyst development will complete the project set-up.

Several investigations concerning sustainability, economics, possible business plans and technical applicability of the generated intermediates will ensure a later industrial-scale implementation. The underlying results will be used for various feedback loops to the technical R&D in order to identify possible industrial-scale obstacles even before they really arise.

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