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Modified Biomass for Pollution Cleaning under the Frames of Biorefinery and Sustainable Circular Bioeconomy

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The issues of global population growth, dwindling fossil fuel resources and the ever-advancing climate change show the need for the establishment of an alternative biobased economy. The biorefinery concept is the center of a bio-based economy, and promising largely waste-free use of biomass, efficient conversion routes, and pathways for the production of energy, biofuels and numerous value added natural products such as natural fine chemicals, polymers, fuels etc. An integrated biorefinery will play an important role in a future bio-economy providing its economic feasibility and socio-environmental sustainability. Multi-product/service biomass processing systems, consisting of sequences including: feedstock handling and storage, pretreatment (physical, chemical, biological), fractionation to main and co-products, product and co-product upgrading, product & co-product marketing, integrated material /energy /economic flows.

Biorefineries are one of the pillars of sustainability as long as they preserve the bioremediation of degraded land and poor crop production i.e. exploitation of coastal wastes. Furthermore, the biorefineries' processing tends to be a zero waste process through the holistic use of renewable resources following the green chemistry principles. Moreover, the biorefineries show a multi-level (industrial and social) profitability producing high value added products, creating employment, supporting by national and European funds. In the frames of biorefining, nowadays there is a worldwide resurgence of interest in the exploitation of marine derived biomass, in the frame of the overall return to the natural resources. This trend is based firstly on the fossil fuel depletion and secondly on the increasing public awareness of the environmental and health hazards related to chemical product. Modified biomass can be widely used for pollution cleaning (as in the case of oil spills) under the frames of biorefinery and sustainable circular bioeconomy.