CASAVA-B2

Comprehensive AnalysiS of DecArbonized Valorization of Lignocellulosic biomass with Artificial Intelligence-Aided design in Biomaterials and Biofuels productions

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Summary

Context —
Global warming and energy shortage are currently worldwide concerns. One of the actions to mitigate climate change is to increase the use of woody biomass to produce sustainable material and bioenergy. Regardless of any usage, wood requires improvement of its properties. Heat treatment is an ecofriendly method to upgrade expected qualities.
The optimal and integrated valorization of wood products' chains is a key issue and a major concern for the forest and wood sector. A good knowledge of wood characteristics and thermal behavior makes possible the trees' preselection according to the thermal conversion objectives, reducing the risk of products wastes because of an unsuitable quality. Moreover, the lignocellulosic waste and end-of life wood products can be transformed into biochar, which has been shown to have many benefits in terms of soil amendment while acting as a carbon sink.

Objectives —

This proposal is an exploratory pre-study based on the latest techniques of artificial Intelligence to enhance the woody biomass transformation in a short cycle logic; to limit the carbon footprint and to reach a decarbonation optimum. The aim is to implement an integral biomass valorization. The concern of health and safety management is also included.

Approaches —

The conversion process, raw material, and products are evaluated by employing several analyses, including physicochemical, statistical, and AI analyses to evaluate the improvement of the quality and quantity of the product, life cycle assessment (LCA) are scheduled to identify the overall system. The aim is the development of multidisciplinary research and industrialization as well as beneficial to give comprehensive information to the reader, researcher, or practitioner with a similar interest.

Expected results and impacts —
CASAVA-B2 aims to promote the short cycle use of local forest resources to produce a sustainable material or energy with a low carbon footprint, avoiding soil depletion, to contribute to the local bioeconomy.