BOOK OF
ABSTRACTS

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Agricultural residues from Western Africa to produce biocomposite panels for building applications.

T2.12 Future biorefineries: forest biomass and side streams supporting circular economy

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Abstract: This work is part of the BIO4AFRICA project (H2020-N° 101000762) which aims to diversify incomes in rural areas of Africa through sustainable and locally replicable solutions. The project focuses on developing technologies adapted to the environment and improving traditional techniques in African rural contexts with the local biomass available to develop bio-sourced materials for habitat. In this context, three agricultural residues issued from Côte d'Ivoire and Senegal were selected to produce composite panels for building applications as non-load-bearing materials. The selected biomasses are oil palm empty fruit bunch, rice husk, and cocoa pods. All the listed biomasses have no nutritional value and their use in such applications is beneficial, first economically and second to reduce waste and solve the induced health and environmental problems; they are left on plantation sites, which is the main cause of many diseases in the Western Africa area. They are available in large quantities, seasonal, and present different inherent properties.

Firstly, the biomasses are pre-treated using dry fractionation process. The resulting lignocellulosic fillers are chemically, biologically, physically, and thermally characterized in order to study their effect on the panel production and properties. For this, biocomposite formulations are prepared using a conventional binder (melamine urea-formaldehyde). Many parameters can affect the final properties of the panels such as the inherent properties of the biomass (chemical composition, size, density, porosity…), the type of the binder, and the ratio between biomass and binder. Our aim is to obtain particle panels with interesting mechanical, insulating acoustic, and thermal properties, fire resistance, and durability regarding the international standards; while taking into consideration the climate of Western Africa where the panels are destined to be applied. The tropical climate is known for its high temperature and humidity levels which are two major factors that can affect the service life of biocomposites. Therefore, it is necessary to develop durable and resistant panels in these conditions.