Strengthening the confidence in bio-based building materials – BIO4ever project approach

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ABSTRACT

The trend for rapid deployment of innovative material solutions at reduced-costs through predictive design of materials and innovative production technologies is observed nowadays. Such materials are optimized for specified applications, assuring at the same time expected properties and functionality at elongated life, minimizing the environmental impact and reducing risk of product failure. As a consequence, higher numbers of well performing (also in severe environments) construction materials are available on the market. It is extremely important for the bio-materials production sector to follow this trend and to continuously improve its offer.

The expansion of bio-based products availability and its wide utilization in modern buildings is a derivative of the Europe 2020 strategies. It is foreseen that bio-materials will play an increasingly important role in the future, in order to assure the full sustainability of the construction sector.

The development of really innovative and advanced bio-products relies on the deep understanding of the material properties, structure, assembly, formulation and its performance along the service life. Today's bio-based building materials, even if well characterized from the technical point of view, are often lacking of reliable models describing their performance during service life. The other factor, often underestimated (but critical for the sustainable use of bio-based building materials), is related to the transformations of building materials after their service-life. The advantage of the elevated resistance for degradation can become a restraining factor in recycling, reuse or depose/landfill.

The overall goal of Bio4ever project is to contribute to public awareness, by demonstrating the environmental benefits to be gained from the knowledgeable use of bio-based materials in buildings. Performance of 120 selected façade materials provided by over 30 industrial and academic partners is recently evaluated (Figure 1). Aesthetical aspects of service life, specific consumer demands and preferences, as well as the functionality of building assemblies are the central focus of Bio4ever. A dedicated software simulating bio-materials performance, degradation and end-of-life in severe operating environments is under development. It will serve as a tool for demonstrating advantages of using bio-based materials when compared to other traditional resources. The tool is dedicated for investors, architects, construction engineers, professional builders, suppliers and other relevant parties, including also final customers

Figure 1: Facades materials exposed to natural weathering (up) and during degradation in soil – simulation of landfilling (down)