BIO RESCUE

BIOrescue:
A novel biorefinery concept for mushroom compost

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Deliverable 5.2

Report on nanocarriers production rates and loading compounds (hydrophilic / hydrophobic)

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PUBLISHABLE SUMMARY

One of the objectives of BIOrescue activities within Work Package 5 (Secondary conversion process) is the formulation of lignin-nano/microcarriers by miniemulsion polymerization and their loading with drugs (pesticides, antifungals, both hydrophilic and hydrophobic) as well as their upscaled production. This report describes the analysis of several liquid extracts obtained after thermochemical pretreatment of combined mixtures of the spent mushroom substrate (SMS), oat-, barley- and wheat straw produced in Work Package 3 (Separation and Fractionation). The following two processing sequences were analyzed in order to determinate the lignin content:

- Liquid samples directly obtained after pressing the pretreated samples;
- Liquid samples obtained after organosolv pretreatment of the solid recalcitrant fraction obtained after enzymatic hydrolysis.

A detailed understanding of the chemical composition of these samples is essential for a later synthesis of biodegradable, enzyme-responsive lignin nanocarriers. Therefore, a series of analyses, including UV/Vis- and NMR spectroscopy as well as size exclusion chromatography, was carried out. The results obtained show that samples obtained after organsolv pretreatment have a higher lignin content than the ones directly obtained after thermochemical procedures. For this reason, one of these samples was used for the formulation of nanocarriers. These carriers were generated by selective polyaddition at the oil-water interface using an adapted cross-linking agent.

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