Local wood (biomolecules) valorisation through the characterization and industrial production of Robinetin, a yellowish fluorescent colorant

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LOCAL WOOD (BIOMOLECULES) VALORISATION THROUGH THE CHARACTERIZATION AND INDUSTRIAL PRODUCTION OF ROBINETIN, A YELLOWISH FLUORESCENT COLORANT

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ABSTRACT

Plants are able to synthesize a great variety of secondary metabolites known to present many biological activities. Due to their size, diversity and also through the different parts that can be collected from them, trees represent important sources of biomass, both quantitatively and qualitatively. Consequently, many biomolecules of interest could be harvested from them and provide supplementary outlets for the local timber industry. Interestingly, heartwood formation (corresponding to the final step of wood differentiation occurring within the trunk of many broad-leaved and coniferous tree species), is often associated with the accumulation of specific phenolic extractives that will affect the natural color and durability of each wood (Magel et al. 1994, Burtin et al. 1998, Beritognolo et al. 2002). Even though the use of wood for cosmetics does not appear evident to the common << tree loggers >>, the Valrob project aims at finding new uses for wood sources available at the regional or national level.

As a proof of concept, our project focused on a fluorescent colorant that accumulates in great quantity within the heartwood of black locust (Robinia pseudoacacia) making this wood highly fluorescent to UV irradiation produced by a common black light (Figure 1). Analysis by HPLC and DAD of the different molecules present in the extracts allowed us to characterize robinetin as the fluorescent marker of interest. Its conditions of extraction were studied at the laboratory scale and focused mainly on temperature and solvent nature. The optimal conditions defined allowed us to obtain 1.94g (dw) of concentrated colorant matter from 78.5g of grinded wood. It contained 34% of robinetin (final yield : 8.5g of robinetin per kg of wood) confirming the potential interest to use robinia's wood as starting material. We are presently studying a way to adapt the extraction process to the industrial level. This will allow us to evaluate the possible use of robinetin in cosmetic formulations.

Beyond cosmetics, several applications can already be foreseen in many areas using this colorant through surface treatments (varnishing or spraying) or impregnation (paper, cloth,...). In addition, wood or wood powder can also be directly used, providing thus complementary in the box (formulations) and out of the box perspectives of use (packaging, store decoration).

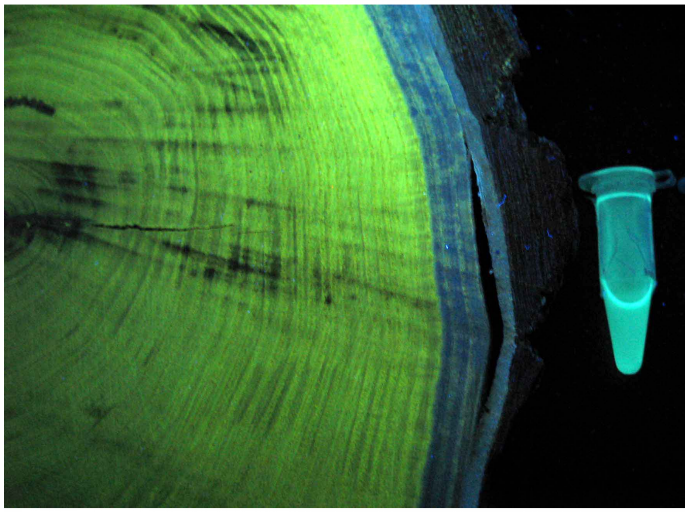

FIG1 LEGEND

Fluorescence of Robinia pseudoacacia heartwood and concentrated robinetin in wood extracts (1 g/l) under UV irradiation (365 nm). The effective color of the fluorescence (bright yellow) is modified by the photographic process to appear greenish.

FIG2 LEGEND

KEYWORDS

fluorescent dye | natural colorant | wood extract | Robinia pseudoacacia

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