08:30

Comparative assessment of the duramenization of agroforestry hybrid walnut trees with their respective forest controls

*** Lucie Heim, Arts et Métiers, France**
Kévin Candelier, Cirad, France
Loic Brancheriau, Cirad, France
Rémy Marchal, Arts et Métiers, France
Nabila Boutahar, Cirad, France
Eric Badel, INRAE, France
Louis Denaud, Arts et Métiers, France

The quality of agroforestry trees is little studied, even though these trees develop in spatializations far removed from those of conventional stands. This study focused on the quality of hybrid walnut wood from agroforestry systems, walnut wood quality being strongly defined by its aesthetic aspects. This notion is particularly determined by the woody material color, directly linked to its duraminisation. This phenomenon of ageing is monitored among other things by the environmental growing conditions. This work consisted in a comparison of the duraminisation biological process through the quantification of extractives contents of hybrid walnut trees (Juglans regia × nigra cv. NG23) from agroforestry systems (AF) and from forest controls (FC) plots, both located in Restinclières Agrofestry Platform (South of France). Two successive soxhlet extractions, using water and ethanol solvents, were performed on samples taken across the width of the trunk in order to obtain a radial distribution of the extractive fractions of AF and FC walnut trees. These quantitative analyses were coupled with infrared spectroscopy (NIRS) measurements in order to develop a rapid system to evaluate the chemical properties of agroforestry walnut wood. The first results obtained indicate that there is no significant difference between the amount of extractives in the trunks of AF and FC walnut trees. Moreover, since the walnut trees studied were 25 years old, the duramenization process was not yet visible to the naked eye. However, we observed a greater quantity of extractives compounds in the middle area of the trunk than at the periphery for both the AF and FC plots (Figure 1) which suggests that the hardening process is underway even if the phenomenon is not visible. The next step of this study will be focused on the screening of heartwood of each studied walnut samples, using a photographing cross sections of their trunk with a hyperspectral camera system. Such analyses could be an interesting to observe the chemical composition variation across the radial orientation if the tree and could be able to estimate if the development conditions in the agroforestry environment has an impact on the walnut trees heartwood formation process.