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"GOAST"- Green Organic Agents for Sustainable Tanneries

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Life GOAST project is a European project funded by LIFE Programme, which focuses a novel leather tanning technology. Leather manufacturing is classified as water, energy and waste intensive and it is considered to be an activity demanding for integrated prevention and control of pollution. Nowadays, over 85% of the world leather production is chrome tanned; unfortunately, at certain conditions, and in case of not well controlled process, dangerous chemicals species can be formed, which poses much attention and prompts users to find innovative and more environmentally friendly solutions (1). Therefore, GHOST technology aims to develop a more sustainable tanning process based on the combination of polymer based chemicals and protocol which allows to produce Chrome-Free high-quality leather. This project is an example of synergic collaboration between the university and industrial reality. Indeed, life GOAST project brings together the competencies of an international leader in leather-tanning auxiliary production GSC, with a tannery represented by Conceria Pasubio and waste-water treatment provider Medio Chiampo; the three partners are sustained by UNIVE which gives environmental and technical support to the project.
Thus, life GOAST pays attention to the overall production chain from manufacturing of leather articles to treatment of liquid wastes and solid waste.
Leather solid waste produced by GOAST technology are consequently Cr-free, which can be fully recycled. In view of this, an effective and sustainable process for the valorization of leather waste produced by GOAST technology has been developed.
In particular, the attention has been focused on the enhancement of GOAST shaving waste for the production of "biochar" by pyrolysis and its application as soil improver (2,3). Biochar thanks to its intrinsic characteristic such as: elevated porosity and specific surface, high density, high absorption of organic substances and adsorption of metal cations, can be used as soil improver.
The optimal pyrolysis conditions have been investigated taking into account the effect of different parameters, such as temperature, heating rates, time, grinding size of raw material and inert flow rate, on the characteristics of biochar (4).
The condensable fraction (bio-oil) has been also collected and characterised by GC-MS in order to investigate its chemical composition and figure out its possible industrial applications.
Finally, the thermal degradation of GOAST shaving waste has been studied through the analysis of the evolved gas by thermogravimetric analysis simultaneously coupled with mass spectrometry and Fourier transform infrared spectrometry (TG-IR-FTIR).

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