INCLUDING GC×GC-HRTOFMS AS A POWERFUL TOOL IN THE METHODOLOGY FOR THE SELECTION OF SUITABLE ADDITIVES TO REDUCE UNDESIRABLE ODOUR / VOC FROM BIOCOMPOSITE MATERIALS

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Quality of life is becoming a growing concern and customer's expectations have evolved. Higher demands are made in regard to factors such as comfort and safety. To address this issue, the entire supply chain, from producers to end-users, attempts to find ways and means to reduce emissions and smells from materials.

Odour and Volatile Organic Compounds (VOCs) emissions can have different origins, usually resulting from residual monomers and solvents, additives, modifiers, moisture, residual catalysts, resins decomposition products and additives. To avoid the occurrence of plastic materials related off-odours, some additives can be added to the formulations. Due to the wide variety of VOCs and their possible interactions, the trial and error approach is often used in order to evaluate which additive can properly reduce the undesired odour / VOC.

Practical examples will be presented with a case study of manufacturing process of biocomposites, i.e. combining a resin matrix and natural fibers for reinforcement. There is a growing interest for this kind of materials in terms of industrial applications, fundamental research and favourable environmental properties. Additives with different action mechanisms such as adsorbing agents or chemically active agents were incorporated during the process. The impact of the additivation was evaluated with a specific objective methodology, taking into account both odor and VOC emissions. In specific cases, the direct correlation of odour decrease and VOC emission profile could not be established. Using GC×GC coupled to High Resolution Mass Spectrometry (GC×GC-HRTOFMS) was identified as a powerful tool to characterize the complex VOC profiles emitted by the biocomposite materials, to possibly identify the chemical type of VOCs that could be specifically decreased by the additivation process, as well as to monitor possible undesirable produced compounds.