Title: **Degradation study of bio-based PCM to improve the energy efficiency of active systems**

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Nowadays, sustainability is one of the most important fields of research due to the importance of making a profitable use of the planet resources. In many fields are working to develop new ways to improve energy efficiency. This is the case of development in phase change materials, a type of chemical substances which contribute to a better efficiency of the thermal energy storage in systems like buildings or refrigerate compartments.

There are different materials that can be used as phase change materials, but bio-based materials are very interesting to overcome those made by fossil fuel, for their sustainable characteristics. However, bio-based PCM commercially distributed have been not investigated in deep and due to the lack of investigation on them, these phase change materials implementation in actual buildings is low. One of the principle problems of these materials is the lack of information about their degradation towards daily thermal conditions in a real building.

This work focuses in the study of degradation of two fatty acids used as PCM, capric acid and myristic acid, in order to evaluate if their structure or their thermo-physical properties change after two different types of thermal treatments which try to reproduce the daily conditions of a building.

Some similar investigations have been previously done on fatty acids degradation, but they focused characterization on infrared spectroscopy, not being able to determinate a structural change on the fatty acids molecules. In this work, further characterization is done, such as DSC and TGA to analyse thermo-physical properties, rheometry to determinate changes in viscosity, and gas chromatography with mass spectrometer detector to obtain better results in structural characterization.

Keywords: thermal energy storage, phase change materials, fatty acids, degradation, materials characterization, DSC, TGA; FT-IR, Chromatography, Rheometry.