Development of New Competitive and Sustainable Bio-Based Plastics

PLA/PHB blends characterization

During the last months, Tecnopackaging has analyzed the potential PLA/PHB blends with improved sustainability performance to be further validated in real industrial environments. Firstly, the Spanish entity carried out a deep characterization of the first PLA/PHB blends developed by Proplast (as reference matrix) with different percent of these two components, as well as a plasticizer. This characterization was based on the following pillars: (i) Rheological properties, (ii) Structure (microscopic level), (iii) Mechanical behavior, (iv) Thermal behavior and (v) Thermo-mechanical behavior. Following, two SEM images (35 and 480 magnifications respectively) are attached where two tested tensile specimens from one of the PLA/PHB blends can be observed.

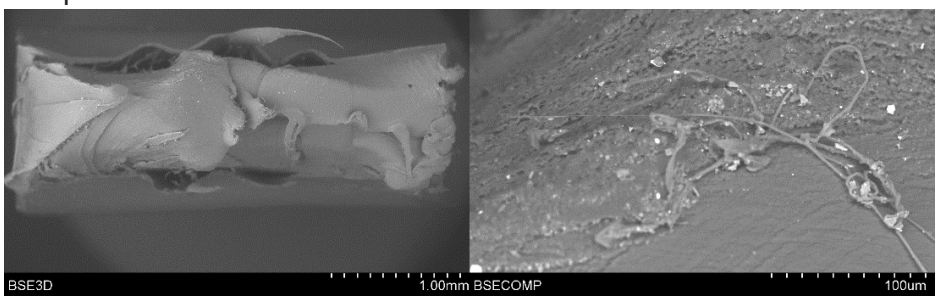

Figure 1: SEM images from two tensile specimens

After discussing about the results of the characterization carried, one reference matrix was selected and further improved by the addition of nanoadditives, such as nanowhiskers and nanochitin, which will be also produced at pre-industrial scale during the project. After this, Proplast carried out the first trials to obtain films from some final blends and Tecnopackaging tested them mechanically (tensile testing to know Young's modulus, maximum strength and maximum elongation at break). Following, some specimens that were tested (in parallel direction) are shown below (Figure 2).
The first results made possible to reach some conclusions, which will be used for future testing phases.

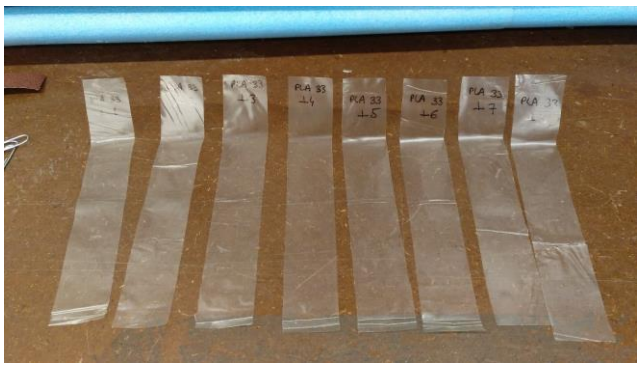

Figure 2: Tested specimens

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