1. Infrared Spectroscopy (FTIR-ATR)

FTIR measurements were carried out using a Fourier Transform IR spectrophotometer (Jasco 4200 Type A). The FTIR spectra, in the wavenumber range from 400 to 4000 cm^{-1} and resolution 4 cm^{-1}, were obtained by the KBr pellet technique. The pellets were prepared by pressing a mixture of the sample and dried KBr (sample: KBr approximately 1:200) at 7.5 ton/cm^2. The evaluation of FTIR spectra was carried out by the use of Jasco Spectra Manager™ Suite software. The Figure 4 shows Jasco 4200 Type A spectrophotometer.

Jasco 4200 Type A FTIR spectrophotometer

2. TGA

Thermo gravimetrical analysis was conducted on a Q500 equipment provided by TA Instruments (Cerdanyola del Vallès, Spain) to determine the thermal resistance of those samples as well as to quantify the presence of any other inorganic components such as fillers or pigments. While for PE and PET samples, the test was performed at constant rate of 10K/min between 30 and 1000ºC, switching gas to oxygen at 800ºC, the PVC condition are summarized in the table below:

Table 1 TGA test conditions for plasticized PVC samples

Temperature range (ºC)	Heating rate (ºC/min)	Gas
30-170	20	N_2
170-400	5	N_2
400-800	10	N_2
800-1000	10	Air

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These samples were tested in that conditions in order to gain resolution of the plasticizer degradation when incorporated in the PVC and thus quantify the plasticizer incorporation effectiveness.

3. DSC

A differential scanning calorimetry was performed on a Q20 calorimeter produced by TA instruments (Cerdanyola del Vallès, Spain) in order to characterize the thermal transitions and crystallinity of the analyzed materials. All samples were heated twice to erase the thermal memory during the first heating. The test conditions are shown in Table 2.

Table 2 Test conditions for the different materials

Material	T_{max} (ºC)	T_{min} (ºC)	Heating/cooling rate (ºC/min)
HDPE	220	30	10
PET	300	60	10
PVC-P	110	-90	10
PVC-U	200	30	10

4. MVR

The melt volume rate was measured according to ISO 1133 using an MI-3 Melt Indexer equipment provided by Göttfert. The MVR was only determined for the PE and PVC materials. The set temperature for measuring both samples' MVR was 190ºC. For measuring the MVR of the PE from the second lot was necessary to increase the testing weight up to 5kg for obtaining a measure. This was not necessary in the case of the third lot PE, which was able to measure at 2.16kg, the standard weight condition. For rigid PVC, a weight of 21.6kg was used for MVR determination; whereas, plasticized PVC was conducted with both 21.6 and 5kg.

5. Crosslinked content determination

A soxhlet extraction with xylene (isomer mixture) was carried out during 72 hours in order to quantify the crosslinked content of the polyethylene sample. Afterwards, the not-solved sample was weight and thus XLPE content was quantified.

6. Scanning electron microscopy

Morphological characterization of wood and polyethylene fibres has been assessed before and after the surface treatments by electronic microscope that images the sample surface by scanning it with a high-

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energy beam of electrons in a raster scan pattern. The equipment used for this purpose has been JSM-6010-LV model (from JEOL). The samples have been previously coated by a gold layer (to make them conductive) using the equipment Cressington Sputter Coater 108 auto.

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