**Developed of bio-based coatings with barrier properties applied on recycled polyethylene and biopolymer using an ultrasonic spray coating**

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Plastic films are one of the most popular products used for food packaging, due their unique properties, such as ease of processing and low cost. In addition, the production of multilayer packaging using different synthetic polymers allows to achieve excellent barrier properties. However, the post-consumption of these materials continues to be a big challenge and recycle these materials still to bring difficulties. The development of coatings applied on plastic films can improve the properties of films allowing to reduce the multilayers using different synthetic polymers (e.g. EVOH) and improve their recyclability. The aim of this work was developed bio-based coatings with barriers properties, namely oxygen and water vapour, and to apply on monolayer films of the pure polyethylene (PE) and recycled polyethylene (re-PE). In addition, the new coatings were also applied on biopolymer films (Master-bi®) to compare with synthetic films. The materials selected for producing the coatings were cellulose nanocrystal (CNC) and cellulose microcrystalline (CMC) which were applied on the surface of films using ultrasonic spray coating. The ultrasonic spray coating allows to produce thin film layers and can also reduce the amount of compound to add. To improve the adhesion of the coating to the surface a surface treatment was applied. Water vapour and oxygen permeability were measured and the dispersion of coatings by scanning electronic microscopy (SEM) was evaluated. Moreover, the mechanical and optical properties were studied. The visual observation showed that the colour of films was modified with bio-based coatings. The thickness values increased with application of all the coatings when compared to the films without coating. Regarding the oxygen transmission rate and the water vapor transmission rate of the PE, re-PE and biopolymer films were reduced with application of the coatings. The application of a bio-based coating improved the barrier properties of the films by over 50 %, highlighting its effectiveness in enhancing film performance.

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Poster presentation