PROJECTFACTSHEET

WheyLayer®

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Whey protein-coated plastic films to replace expensive polymers and increase recyclability

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ABSTRACT:

In the food industry, the oxidation of fats, oils, and other food components produces off-flavours, offcolours and nutrient loss. Protection against oxygen is a vital requirement of food packaging. Common synthetic polyolefin films such as PE and PP are excellent moisture barriers, but must be coated or laminated with synthetic polymers including EVOH and PVDC copolymers to provide an oxygen barrier. The resulting polymeric structures, while effective in minimising the permeation of oxygen, water vapour, and odour, are characterised by their poor reuse due to difficulties in separating each layer for its individual recycling. For this reason, scientists are continually investigating alternative packaging materials such as the use of biopolymers. Despite all the advantages offered by biopolymer films, they present limitations in their application due to a series of physical properties and difficulties in formation.

Recent academic studies reveal that whey, the milk protein by-product of cheese production, acts as a good moisture-barrier film with acceptable mechanical integrity. In addition, the use of whey coating on plastic films can improve the recyclability and reuse of the plastic layer by removing the whey protein chemically or enzymatically. This present project will build on past research in order to arrive at a commercially feasible technique for developing whey coated plastic films, without compromising the oxygen or moisture barrier performance of conventional plastic films, while increasing their recyclability.

The impact of this project will be considerable and embraces many issues: finding a value-added commercial use of currently discarded whey protein, replacing harmful petroleum-based plastics with a natural by-product which would safeguard the performance and enhance the recyclability of substrate film, meeting to growing consumer and political environmental concerns, thus adding huge value for EU packaging, food and dairy industries.

KEYWORDS: Plastic recyclability, food films, packaging materials, Whey protein, biopolymer films, active packaging

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