

AGRIPOLYS – Molecularly Designed Polymers for Sustainable Agriculture

Nearly one billion people worldwide are currently living in conditions of food insecurity, and this number is expected to double by 2050. At the same time, climate change is intensifying factors that negatively impact crop yields and quality. To feed the growing global population in the era of climate change, it is crucial to reduce crop losses caused by pests and diseases, while also increasing overall crop productivity. Polymers have played a key role in advancing agricultural practices, being widely used in seed treatments, soil conditioning, and the controlled delivery of agrochemicals and fertilizers. However, the short-term benefits of plastics in agriculture should not come at the expense of long-term sustainability. Novel polymeric materials that follow benign-by-design principles can support sustainability but can only reach their full potential in a holistic approach in which industry partners co-design such materials with scientists at academia. Through a multidisciplinary and intersectoral team, AGRIPOLYS will generate a new class of macromolecules specifically designed for boosting agricultural output while preserving the environment. The AGRIPOLYS programme will train young scholars in developing the design principles for fully biodegradable and functional polymers that provide controlled release of agrochemicals and treatment of plants and seeds. Once integrated into ready-to-use formulations, the properties of the resulting materials will be comprehensively tested under greenhouse and semi-controlled pilot conditions in collaboration with industrial partners, including polymer biodegradation and fragmentation in the soil. Merging the competences of European chemical industry and public research laboratories, AGRIPOLYS will train the next generation of specialists in the development of advanced polymeric materials for agriculture.

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