

# Preface

When in 1948 Prof. E.M. Emmert built, for the first time in the world, a greenhouse covered with plastic sheets (cellulose acetate film), maybe he did not imagine that a real revolution in the agriculture world was starting. Professor Emmert used, for his first trial, four ft square plastic films that replaced the glass sheets, employed for traditional greenhouses, up to that time used just in top botanical gardens, to grow and study tropical plants and flowers. Initially, his goal was to realize a new greenhouse made with innovative and cheaper materials. The experimental results were so appealing to extend the use of plastic film for mulching and low tunnel. Later, Prof. Emmert moved to a more efficient polyethylene film. Thanks to his studies and his great contribution to agriculture, he is worldwide considered “*the father of plastic greenhouse.*”

Ever since, the so-called plasticulture has extended and brought many important benefits to modern agriculture, among which it is necessary to highlight the reduction of water consumption and loss of minerals, the reduction of use of chemicals for spontaneous weed control, the possibility to manipulate light, to thermally insulate the crops, to provide mechanical protection.

Where are we today? About 5 million tons of agricultural plastic resin is used worldwide and the number is growing. Films’ application has been extended to other items, such as sheets, rods, tubing, and transplanting pots. Burning these plastics in the fields is not an option because it contributes to serious environmental air and particulate pollution. Therefore, this practice is being phased out and many countries have strict regulatory bans on plastic film burning. Collection, cleaning, and recycling these plastics to same or other products offers an approach to managing plastic waste and there are several companies that offer these services. Nevertheless, a complete analysis of the managing and running costs of collections, grinding, cleaning, and recycling plastics shows that, at least for some items, material recycling is economically and environmentally unsustainable, and soil degradation would be a feasible and desirable managing option.

Although agriculture soil degradable plastics have still a less than one digit share of the market of plastics, they are growing at very fast rate, and the properties of biodegradable compostable plastics have even opened new fields of applications

which were not possible with polyolefin-based plastics (for example, soil degradable nursing, and transplanting pots).

This book originates from at least 30 years' experience of soil degradable plastics for agriculture. The seven chapters span from films for mulching, direct cover, and tunnel to other applications. Some chapters open windows to future technologies, such as biodegradable waterborne varnishes, which are still far from technological maturity. The authors, to whom goes my gratitude, are among those who made most of their research efforts, in academia and in public and private research centers, to design, process, test, and optimize the plastics, either biobased or synthetic, and to assist the development of norms and directives. Harmonized environmental norms and directives are absolutely necessary. We must be conscious that a man-made material which is designed to remain in the nature after use poses ethical problems on the top of the reasons of technology, economy, and profit.

This book is dedicated to Rosario Palumbo and Gianni Maglio, retired Professors of Chemistry at University of Naples Federico II, and to Alfonso Maria Liquori, Professor of Chemistry at University of Rome Tor Vergata (deceased). By their teaching and their moral rectitude, they have strongly contributed to my human and scientific personality.

***Naturam expelles furca tamen usque recurret (Orazio, Epist., I, 10, 24)***

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