AddiLife™

The increasing use of plastic mulch films over the past decades has significantly increased agricultural yields. In particular, mulch films allow earlier planting, reduce pests and diseases, keep fruits clean, prevent wind and water erosion, and early ripening of crops. At the end of the season however, polyethylene mulch films should not be left on the fields and plowed within the soil. Instead they should be collected and transported to a recycling facility. To avoid the high recycling costs, many farmers collect the plastic films but burn them on location, releasing toxic pollutants such as heavy metals, dioxin, and airborne particles. Even worse in Iran, many farmers do not even collect plastic films and leave them on the fields, turning them into a plastic dump over time, reducing yields and polluting the crops.

Figure 1. Not collecting polyethylene plastic at the end of the season in Varamin farms in South East Iran

The solution would therefore be the production of a mulch film with biodegradable and compostable plastic so that it can be left on the field till the end of the season and decompose into soil nutrients, thereby further improving next crops instead of polluting the soil. AddiLife™ offers such a solution at a competitive price. Bio-mulches produced with AddiLife™ are materials that have all the properties of polyethylene plastic films but are composed of materials from natural resources such as corn starch, degradable polymers, vegetable oils, and minerals. Over time and under the influence of physical factors such as temperature, humidity, acidity, radiation, UV and biological agents caused by the activity of microorganisms (bacteria, fungi, and algae) mulch films produced with AddiLife™ are disintegrated

and converted into substances such as carbon dioxide, methane, water, and dry matter and acts as a fertilizer without leaving any harmful residues and microplastics

Figure 2. Bio-plastic decomposition at the end of the season

Benefits of AddiLife™ Mulch Films

- No need for collection and recycling

- Environmentally friendly and does not leave any toxic effects.

- Plowing at the end of the season ensures that no plastic particles are left to harm the next crop and the environment.

- No problem for harvesting

- Easy layering on the ground and strong resistance to pulling and tearing

- Preservation of environmental resources

- Prevention of weed growth

- Increase in soil temperature for better and faster crop yields

- Prevention of moisture evaporation and drought stress

- Prevention of water and wind erosion

- Protection of the irrigation strip against damage from birds and rodents

Figure 3. Comparison of lettuce growth with AddiLife™ bioplastic and without plastic four months after planting in Varamin

Uses of AddiLife™ bioplastics

Mulching, pruning, sunbathing, and packaging of agricultural products

How to use AddiLife™ bioplastics mulch?

1. Soil preparation: first prepare the planting bed, so that the plastic film lays directly on and in contact with the soil. The bed should be free of sharp objects such as rocks and remains of previous plants. Otherwise, puncturing and tearing may happen, resulting in moisture evaporation, weeds growth, and wind blowing under the film, further damaging it. Also, organic fertilizers should be applied much earlier than the compostable mulch films. This is because after fertilization, the activity of

microorganisms in the soil will increase, and could lead to an accelerated degradation and early decomposition of the compostable plastic films.

2. Mulching operations: If the farm is mechanized, the mulching operation of AddiLife™ bio-mulching films can be done with the same equipment used for polyethylene mulching films and there are no problems in terms of traction and plastic resistance. It is recommended however not to lay bio-mulching plastic films during the hottest hours of the day or during strong winds. It is also best to sow seeds or seedlings immediately after plasticizing.

3. Irrigation: The mulching system is completed with the drip irrigation system. Therefore, it is necessary to place the irrigation strip under the plastic when plasticizing. Note that irrigation should be uniform and water should not be allowed to build up at any one location, as excessive moisture will accelerate the decomposition process.

4. Durability of AddiLife™ Bio Mulch: The durability will depend on environmental conditions and on the thickness of the compostable plastic film. In warm regions, the process of degradation and decomposition will start earlier. Therefore, depending on the season, and the type of plants, the durability of the plastic thickness will be adjusted according to the customer's specifications. Under normal circumstances, AddiLife™ bioplastics will decompose after 6 months. Note that plowing must be done at the end of the season to completely decompose the remaining pieces of plastic.

5. Storing AddiLife™ bio mulch: It is necessary to keep the rolls of plastic films in their original packaging and keep them sheltered from heat, water, and light. Birds and rodents can also damage the product.