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ADVANTAGES AND DISADVANTAGES OF USING BIODEGRADABLE POLYETHYLENE INSTEAD OF CONVENTIONAL PLASTIC FOR AGRO-INDUSTRIAL PURPOSES

(ПЕРЕВАГИ ТА НЕДОЛІКИ ВИКОРИСТАННЯ БІОРОЗКЛАДНОГО ПОЛІЕТИЛЕНУ ЗАМІСТЬ ЗВИЧАЙНОГО ПЛАСТИКУ ДЛЯ АГРОНОМІЧНИХ ПОТРЕБ)

Стаття присвячена вивченню особливостей хімічного складу та використання біополіетиленової плівки для сільськогосподарських потреб замість звичайної плівки та агроволокну, окресленню головних переваг та недоліків використання біоплівки.

Ключові слова: біоплівка, біорозкладання, сільськогосподарські потреби, поліетилен, біополіетилен.

The article is devoted to the study of the features of the chemical composition and the use of biopolyethylene film for agricultural needs instead of the usual film and agrofiber, to outline the main advantages and disadvantages of the use of biofilm.

Key words: biofilm, biodegradation, agricultural needs, polyethylene, biopolyethylene.

The purpose of the work is to highlight the main advantages and disadvantages of using biopolyethylene on agricultural fields instead of conventional types of plastic or agrofiber.

Plastic film is used to protect crops and inhibit the growth of weeds at agriculture enterprises. This is a very expensive process and it creates a huge amount of contaminated waste that needs to be disposed. However, oxobiodegradable polyethylene film can be programmed in the production for decomposition shortly after harvest.

Polyethylene biopackages differ from conventional packages in that they contain oxobiodegradable impurity d2W. This impurity is a catalyst superconcentrate that accelerates the decomposition of polyethylene in the environment.

The process of decomposition of polyethylene with the addition of d2W is divided into 3 stages:

- Step 1: d2W additive is added to the base polymer resin during the manufacturing process.
- Step 2: d2W breaks down molecular chains so that at the end of its predetermined service life, polyethylene begins to decompose in the presence of oxygen as a result of an oxidation process that is accelerated by light, heat, and pressure.

- Stage 3: finally, biodegradation is completed by microorganisms [1].

According to OPA studies (The Oxo-biodegradable Plastics Association), it has been determined that oxobiopolyethylene does not contain “heavy metals”. It contains metal salts, which are trace elements necessary for human nutrition. They should not be confused with toxic heavy metals such as lead, mercury, cadmium and chromium, which are never used in oscillating polyethylene [2].

The main advantage of using bio-polyethylene film is that such film does not need to be removed and disposed of from the fields after use. This is while ordinary film must be disposed of and cannot be reused or burned in the field.

Secondly, after decomposition, the biofilm decomposes into carbon, which in the future can be a potential source of organic matter for future generations of cultivated plants on this site.

An important advantage of oxobiodegradable polyethylene is that it can be programmed to decompose at any time. The average lifespan of a package made of such material is usually about 18 months (for distribution, storage and reuse), but shorter or longer periods are possible. During this time, the bags are often reused for shopping or used as a garbage bag and the like. Heat and light speed up the process, but not significantly. If the package enters the environment after the end of its service life, it biodegrades much faster than ordinary polyethylene. However, it is not necessary or may not be possible to provide a time frame for further biodegradation.

An additional advantage of biopolyethylene is that its physical and chemical properties are no different from ordinary plastic, that is, it will not affect agricultural activity and its technologies in any way [3].

Despite the many advantages, our own research shows that bio-polyethylene, that is, its decomposition products, has a negative effect on the germination, primary development and quality of agricultural crops.

The results of the study indicated the negative influence of biopackages decomposition products of all studied manufacturers. The packages of the Spanish manufacturer Mercadona have the smallest negative influence, and the Ukrainian manufacturers “Your Line” and “ATB” have the largest negative influence. This is a very powerful fact. Probably the most important in the direction of agricultural use.

Conclusion: this issue needs further research. Biopolyethylene film can be the best substitute for conventional polyethylene in the fields. This has many advantages, but we must also consider the disadvantages. Impact studies should be ongoing and more detailed to find the best biofilm with the best composition for field use.

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