



**DELIVERABLE D.T2.2.2 REPORT BASED ON THE OUTCOMES OF THE BUSINESS SUPPORT SERVICE (UGRINPACK)**

Prepared by: DBH Project Management Kft.

## TABLE OF CONTENT

1. Trends in Europe
  - 1.1. Bioplastics
  - 1.2. Packaging market
  - 1.3. New potential markets of PLA
  - 1.4. Regulatory environment
2. Country specific data – Hungary
  - 2.1. Hungarian market
  - 2.2. Multimaterial products
  - 2.3. Bioplastics and biocomposites market in Hungary
3. Economic feasibility study
  - 3.1. Calculation of the total cost of new packaging material
  - 3.2. Benefits

## 1. TRENDS IN EUROPE

### 1.1. BIOPLASTICS

According to the forecasts, there is an increasing demand for the use of bioplastics, so the market certainly could use a TPS or PLA production plant with a capacity of 100 to 130 tons per year. The production of TPS in any other Western European country exceeds this amount. During the production, TPS in itself is used rarely, usually mixed with other types of plastics, so the amount of produced raw material can be multiplied and be able to supply the local market. It is important to emphasize that there is no similar initiative in this region - for setting up PLA or TPS factory - and it cannot be expected in the catching-up countries, so the establishment of the factory is justified from several point of view.

### 1.2. PACKAGING MARKET

Consumer applications such as food, beverages and cosmetics account for the bulk of the global packaging market. In 2018, the consumer sector was worth almost \$511 billion, or 56.4% of the overall packaging market. Since 2013, the consumer sector has grown by a rather modest 1.4%, owing to factors such as the maturity of the packaging market and many leading end-user sectors across much of the developed world. The share taken by the consumer sector is expected to decrease slightly within the next decade at the expense of its industrial counterpart, shrinking to just under 56% by 2023 and 55.5% by 2028.

### 1.3. NEW POTENTIAL MARKETS OF PLA (HELPS TO SPREAD PAPER AND PLA COMBINED MARKET)

Method of processing: polylactide, in addition to its advantageous characteristics, still has a beneficial feature that can be processed with existing polymer processing technologies and equipment.

- extrusion,
- blow molding,
- injection molding,
- injection blow molding,
- thermoforming.

It can be used for producing extruded products with different profiles, injection molded parts, decomposable foils, biaxially oriented films, hollow objects, thermoformed trays, anti-cracking foams, fibers, textiles. Packaging and medicine industries are the main users of PLA. Syringes, sachets for blood storage, catheters, surgical catguts, implants, prosthesis, tissue engineering products for patients with burn injures, and also can be used in pharmacy, e.g. by controlled release drug delivery.

### 1.4. REGULATORY ENVIRONMENT

Sustainability issues are having a profound effect on regulatory activity within the packaging industry at present, driven by the growing desire for a truly circular economy. Europe and the EU appear to be at the forefront of much of the regulatory activity currently taking place as far as sustainability is concerned, via legislation such as the Packaging Waste Directive and the new law banning single-use plastic items such as plates, cutlery, straws and cotton buds stick by 2021.

An important driving force would be the propagation and impact of the EPR system at EU level. Extended Producer Responsibility (EPR) involves the extension of a producers' financial and/or physical responsibility for its product to the post-consumer stage of the product's life cycle.

## 2. COUNTRY SPECIFIC DATA – HUNGARY

### 2.1. HUNGARIAN MARKET

According to the data of Hungarian Central Statistical Office (HCSO), in 2011 the packaging industry has grown by 4.4% in value. This pace of growth is far less than we have experienced during 2010 (16.3%) and also smaller than the average Hungarian industrial growth of 5.4%. The packaging materials consumption of different packaging materials are paper, plastic, wood, metal, glass. In terms of materials, paper appears as the most important packaging material, both in value and volume. The growth pace of these two packaging materials was almost parallel in the last ten years. The leading role of paper and plastic as packaging materials correlates with the international trends. It is important to point out the intense growth of use of metal packaging materials – also in value. Regarding the wood packaging materials the trend, in value, seems to be steady, but in volume, after a short relapse, shows a moderate growth in volume since 2007. In glass packaging there is a slow and steady decline in value and a more intense decline in volume. In case of paper packaging materials, national production dominates and import exceeds the level of export. All the three areas (national production, import, export) are growing, and export and import show a flat tendency. Distribution of paper packaging by types is the following according to statistics: corrugated board products: 55%, cardboard boxes: 32%, paper sacks, bags: 6%, traditional labels: 3% self-adhesive labels: 2%, corrugated paper: 2%. The leading packaging materials – corrugated board and cardboard boxes, paper sacks, bags – show similar shares as in the past years. Plastic packaging materials have endured – both in value and volume – the largest decline in 2009.

EuroStat data reveals that in the European Union packaging usage is 160kg/person/year; in Germany it is 208kg, in Hungary it is 102kg and in Romania it is 49kg. In 2015 Hungary's packaging industry expanded in both volume and value: sales were up 3 percent at more than HUF 500 billion and 950,000 tons of packaging was marketed.

Well-designed packaging solution can be one of the most important tools for saving natural resources, base materials and energy. According to a recent study, food production has a ten times bigger impact on the environment than packaging. Packaging is one of the most dynamically developing industries: in 2015 the world used packaging in the value of USD 839 billion and until 2020 a 3.5-percent annual expansion is forecasted in this field.

### 2.2. MULTIMATERIAL PRODUCTS

As an example, FUSION Zrt., managing Burger King Magyarország, is open for environmentally friendly products on the domestic market. For boxes, bags and other paper products members of Omnipack Cluster are suppliers of Burger King chain in Hungary. Coated paper cups are currently purchased from abroad. The operator of Burger King Magyarország has provided their forecasted demand of paper cups by 2018 that means about 10 million pieces of paper cups.

### 2.3. BIOPLASTICS AND BIOCOSCOMPOSITES MARKET IN HUNGARY

Europe is a major hub for the entire bioplastics industry; it ranks highest in the field of research and development and is the industry's largest market worldwide. Around one fifth of the global bioplastics production capacity is located in Europe. This share is predicted to grow to up to 27 percent by 2023. Currently, bioplastics represent about one percent of the about 335 million tonnes of plastic produced annually. But as demand is rising and with more sophisticated biopolymers, applications, and products emerging, the market is continuously growing.

In addition to the current regulation, which is not specifically provided for the biodegradable plastics/materials in the Act about environmental product fee, it is difficult to set up a domestic base of production capacity. The paper-plastic (composite) packaging materials collection is not standard in Hungary. Most of the collectors handle these materials in paper material flow (e.g. drink cartons) but there are some who collect them with plastic.

In Hungary work one big and about five smaller paper mills. The big one is the Hamburger Hungária Ltd, it is the member of the Austrian Prinzhorn Group. First of all it produces paper by the recycling of the waste paper-corrugated sheet, its annual capacity is about 600.000 tons. The main raw material is the waste paper-corrugated sheet but there is not enough quantity in Hungary therefore producers need to import. Besides, there are several smaller producers with different profiles.

The Hamburger Hungária Ltd’s paper waste handling technology is not suited for handling of drinks carton or other paper products which are combined with plastic in huge volume. There is not any information about it from the other producers. At present waste bales of drink cartons are taken to Austria, the paper mill has another technology (soaking of waste paper takes more time). Otherwise it would be valuable waste in our country because the component of paper contains primary and long fibers.

Price of bioplastics are still much higher comparing to the price of conventional, bulk plastics. Occasionally the prices of plastics consist of renewable resources and/or biodegradable plastics might be 3-4 times more expensive than bulk plastics. In the future manufacturers with the appropriate production instructions and recipe will be prepared for the application of PLAs and other bioplastics on their existing machine lines instead of traditional plastics.

With its approx. 1,5 multiplier on the price level, PLA is an exception, which price level per kilogram (approx. EUR 2-3 /kg) approaches the conventional plastic’s price. This is due to the leading role of PLA among bioplastics. Actually PLA is the bulk plastic of bioplastics, that can be produced by many manufacturers. An approx. 1,5 multiplier in prices is still significant, considering that purchasers are highly price sensitive in case of purchasing e.g. a plastic vs. PLA teaspoon and even a 10% surplus cost is not acceptable for them.

In the future manufacturers with the appropriate production instructions and recipe will be prepared for the application of PLAs and other bioplastics on their existing machine lines instead of traditional plastics.

### 3. ECONOMIC FEASIBILITY STUDY ON SOLUTION

Base of the solution:

To replace Pe (polyethylen), Ecovio was recommended. This product is already known at Ugrinpack, so an alternative is Biotec's new development, which is slightly cheaper and also suitable for home composting. This product is currently unavailable but the manufacturer provides 700kg for testing.

During extrusion coating, switching from Pe (polyethylene) to a compostable version is very costly because the machine has to be "thoroughly washed" and passed until the Pe is completely removed from the system. This requires approximately 300kg of material. Therefore, based on our other suggestion, we have also recommended a dispersion lacquer that can be done with a suitable lacquer coating technology. Its conversion cost is much lower and has almost the same barrier water and barrier properties. We also tested the dispersion technology and the results were very satisfying for Ugrinpack.

#### 3.1. CALCULATION OF THE TOTAL COST OF NEW PACKAGING MATERIAL

Material cost/kg	~5,3 EUR	~4,5 EUR

Freight cost	including	including
Operator cost (labour)/hour	10	10
Additional cost (tax)	-	-
Energy cost/ hour		
Cost of setting up the machine for the new material	0 EUR	0 EUR
Waste cost	150	1200
Price of product	7g/m <sup>2</sup>	20g/m <sup>2</sup>

### 3.2. BENEFITS

The new material is slightly more expensive but bio-friendly, biodegradable, ecobio and compostable.

Additional benefit is that the company would not need to purchase other technology or to purchase a new machine, they could use the same lacquer technology which they have to produce this new material.