Material Flow Analysis of Textile Waste: A Case Study of the Czech Republic

Shtukaturova, Anastasia
2021

Material Flow Analysis of Textile Waste: A Case Study of the Czech Republic

Student: Ing. Anastasia Shtukaturova
Supervisor: doc. Ing. Vladimír Kočí, Ph.D. MBA.
Supervising Expert: Ing. Michal Šyc, Ph.D.

The constantly growing population and buying behavior of fashion followers caused a worldwide increase in textile consumption. The textile industry, like the food, construction, and automotive industries, is one of the main contributors to primary resource consumption, environmental pollution, and the production of waste and greenhouse gases.

The global amount of textile fibers produced in 2019 was 100 million tons and production is expected to increase to 121 million tons by 2025. In many developed countries such as the USA, UK, and Australia, the amount of end-of-life (EOL) garments is much higher than in other countries, and this trend will keep on increasing in the following years. The European Commission states that the textile industry generates about 16 million tons of waste per year within the EU alone, most of which ends up in landfills or incinerators. Globally, less than 1% of the textiles used for clothing are recycled to create a new garment. Such a low level of recycling is caused by various factors, including the lack of recycling facilities, lack of producer and consumer awareness, and the absence of stricter regulations. In 2018, the EU decided to face up to the environmental problems connected with new waste streams, including textile waste. The Circular Economy Package was issued and required each Member State to transition to a circular economy. In the Czech Republic, a new waste treatment law was passed based on the Circular Economy Package in 2020. According to the new waste treatment law and EU legislation, from 2025, the separate collection of textile waste will become mandatory and, from 2030, the ban of landfilling for recyclable materials will be applied.

The current situation with textile waste in the Czech Republic is not clear enough. For many years, textile waste has not been considered to be problematic. Used garments and other textile products are historically a part of municipal solid waste (MSW) or their collection is realized by charities. Apart from these flows, several categories of textile waste associated with the production are generated by textile

plants. As it has been mentioned, according to the new waste treatment law, the collection and recycling systems for textile waste need to be changed significantly, but it is impossible without relevant knowledge about material flows of textiles and textile waste. However, data about textiles and textile waste streams in the Czech Republic are insufficient and not easily available. Therefore, the main aim of this study is to analyze the flows of these streams in the Czech Republic. To achieve this goal, we have cooperated with different institutions that are working with textiles and textile waste in order to create a material flow analysis (MFA) and collect any available data. Separately collected textile is either reused, downcycled, incinerated (energy recovery), or landfilled (disposal). Textile in MSW is only incinerated or landfilled. The analysis of the composition of the textile in MSW can allow to estimate the potential in terms of recycling and future changes in the composition of separately collected textile. The data regarding these flows are important for the development of recycling technologies and changes in the recycling system.