

# Plastics and its waste: trends and attitudes

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Keywords: plastics, recycling, environmental knowledge and behaviour, waste.

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**Introduction.** Plastics have gained a significant attention recently due to increasing pollution. As plastics waste remains in environment for hundreds of years, it becomes a source of terrestrial, marine pollution, biodiversity loss and health impacts. Plastics in the ocean are identified as one of the main environmental problems (Dilkeshoffman *et al* 2019).

Currently Europe produces 29.1 million tonnes of plastic waste and only 32.5% of plastic collected is recycled (PlasticsEurope, 2019), in many countries mainly being dumped in landfills mostly Central and Eastern Europe, Southern countries. According Eurostat in 2017 16.76 million tonnes of packaging plastic waste was generated in ES.

Not only production or products limitation, but also people's attitudes and behaviour regarding consumption of plastic goods and afterward proper plastic waste management are of importance. As stated in European Strategy for Plastics in a Circular Economy (2018) consumers play an important role in the transition to the circular economy regarding plastics and by 2030 “citizens are aware of the need to avoid waste, and make choices accordingly”. According Special Eurobarometer (2017) 74% Europeans agree that they are worried about the impact on their health of everyday products made of plastic. 87% respondents say that they are worried about the impact of plastic products on the environment. In addition, 72% of respondents say that they have cut down their use of single use plastic carrier bags; however, there are countries with much lower level of environmental friendly behavior. For ex. consumers stated reduced use of plastic bags in the last 12<sup>th</sup> month was 21% in Bulgaria, 22% in Greece (Special Eurobarometer 468, 2017). Education on how to reduce their plastic waste (53%) and more and better collection facilities for plastic waste (51%) are seen as measures to reduce plastic littering. Number of factors might influence plastic consumption and waste separation attitudes and behaviour. Some authors suggest habits and social factors to influence plastic-related behaviour most (Heidbreder *et al* 2019).

Therefore, research aims to analyse trends in plastic waste generation and examine overall consumer attitudes and knowledge regarding plastics, its consumption and waste management behaviour in Lithuania.

**Material and methods.** In order to study trends in the generation and management of plastics and plastic packaging waste in Lithuania and the EU over the period 2004-2016 (17), data were collected from the Eurostat database (Statistical Office of the European Communities). Trends in the total amount (tonnes) of plastics waste and plastic packaging waste generated (kg / capita) were analyzed.

A questionnaire was developed to examine and analyze people's awareness and perceptions of plastics, its products and health effects. The demographic and social factors that may influence the distribution of respondents' answers to the above questions were also included. Questionnaire was posted on the survey website ([apklausa.lt](http://apklausa.lt)), thus the respondents' answers were collected electronically by distributing the questionnaire on social networks and by e-mail. Data were collected between February and April 2015. In total 184 answers were received. The questionnaire consisted of 7 socio-demographic and 14 research-related questions. The questions were based on literature analysis and sought to clarify the respondents' knowledge of the properties of plastic, the labeling of plastic packaging, the impact of bisphenol A on human health, the use of plastic bags after possible taxation, sorting plastic waste, PET bottle management and more.

Possible influence of socio-demographic factors was analyzed applying Chi square test.

**Results.** Results show increasing plastics waste generation since 2004 in Lithuania and in 2016 amounting to 88.74 thousand tonnes. Plastic packaging waste generation was rather stable showing some increase, except 2009 decline due to the financial crisis. In 2017 packaging waste generated amounted to 68.74 thousand tonnes in Lithuania. To compare to EU28 (32.7kg/cap), packaging waste generation per capita in Lithuania is still lower (24.3kg/cap). This suggests possible further increase, but also opens possibilities with increasing economy to reduce or at least stabilize per capita plastic packaging waste generation.

Regarding survey results, most of the respondents buy beverages in plastic bottles. Majority of the respondents disposed plastic bottles together with municipal waste. This was the case until deposit-refund system was launched for plastic beverage bottles in autumn 2015.

The largest part of respondents indicated that on average they use 4-6 plastic bags (31.5%) weekly, and if they would be taxed, most respondents would buy them only in urgent cases (61.4%). More than half of the

respondents (51.6%) would be willing to pay 1 euro cent for one single use plastic bag. Multiple use plastic shopping bags are not given free currently and starting from 2020 supermarkets and sellers are exposed to pay fines if such plastic bags are given free of charge.

In addition, survey indicate some more than half of respondents were not familiar with plastic packaging recycling codes which are safe for contact with food; also, with bisphenol A harmful effect on human health. Those aware more often were older, with higher education and having children up to 6 years old (Table 1). According to the respondents, there is lack of information about plastic sorting (53,8%) and its risk to human health and the environment (48,4%). Therefore, the public should be provided with information about the potential harm of plastic and plastics waste sorting and management.

Table 1. Awareness about bisphenol A and influencing factors (bold values  $p < 0.05$ )

Possible factor	$\chi^2$	p
Gender	1.869	0.172
Age	<b>23.550</b>	<b>0.001</b>
Education	<b>9.969</b>	<b>0.041</b>
Income	0.899	0.343
Social status	3.970	0.410
Urbanization level	8.610	0.072
Children up to 6yr	<b>17.259</b>	<b>0.000</b>

**Conclusions.** Though total amount of packaging waste was rather stable in Lithuania, plastic packaging waste was on increase during analyzed period. Taking into account that per capita plastic packaging waste is still lower in Lithuania than EU on average, increase in plastic packaging could be projected if special policy measures are not applied. Possibilities to stabilize or reduce plastic packaging waste, hence, lies not only on the production side, but also on the consumers. Their attitudes and behaviour might be of importance. However results reveal that consumers lack knowledge of plastics and their impacts to health and environment. Also waste sorting habits could be enhanced. Economic measures for the use of single use plastic bags could be an option as results of survey suggests, not only for multiple-use plastic shopping bags. Different socio-demographic factors might be of importance then planning information and other measures to reduce plastic waste generation.

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