FUTURE OF ZERO WASTE GARDENS

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Introduction

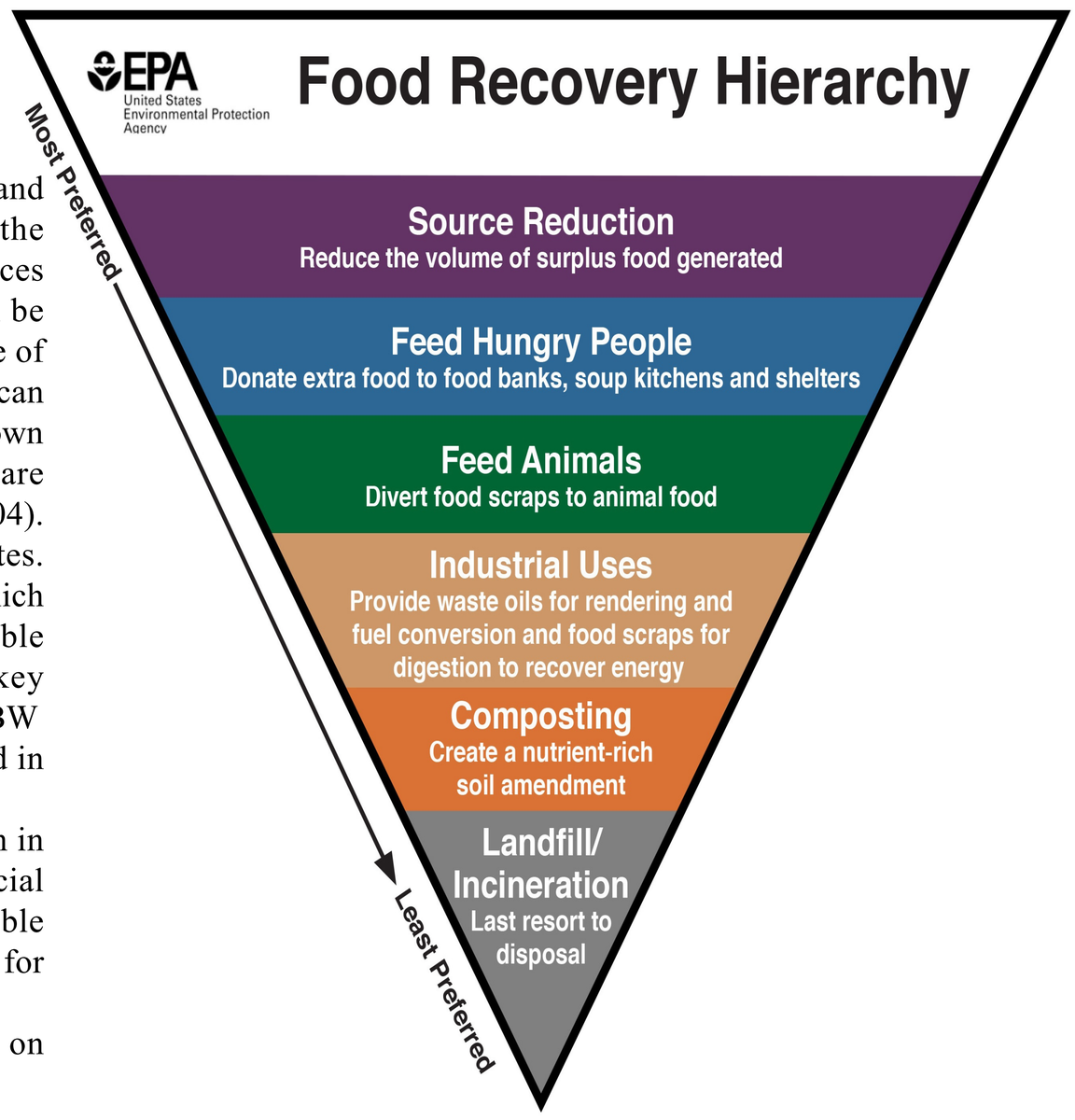
The aim of the work is to present the analysis of scientific literature in the field of new cultivation and processing technologies currently applied in Lithuania in the horticulture in order to ensure the principles of the circular economy. The revealed potential and weaknesses allow us to identify strengths and opportunities for beginners and advanced farmers, entrepreneurs, purposefully choose investments, develop innovative products and implement technologies.

Methods

The various databases like PubMed and Science Direct were used to identify, analyze and summarize the research literature on wastes that are generated in the garden, food recovery hierarchy, potential reuse in the circular economy. This review will highlight wastes concepts and causes of generation, recent developments of the nutrient raw material, food recovery.

Results

The treatment of biodegradable wastes (BW) may include the use of both heat and chemicals, and it can depend on the predictability of their transport across the treated material. This material can be considered as a solid matrix with spaces filled with heterogeneous gaseous and liquid fluids. The flow of these fluids can be considered essentially as a transport processes in the porous medium. The advantage of studying BW as porous media is that technological solutions for their management can be designed independently from their composition and source, adopting well known and established engineering, physical, computational and modelling tools, which are already developed for porous media in other technological fields (Richard et al., 2004). BW Wastes with a high or dominant organic fraction are described as organic wastes. The presence of organic matter implies high susceptibility to microbial digestion which can transform the waste into a potential resource of energy, nutrients and/or a stable material with various possible uses. Therefore, biodegradability is one of the key parameters in organic waste characterization, and it has such relevance that the term BW is increasingly used in place of organic waste. Food recovery hierarchy is presented in picture 1.



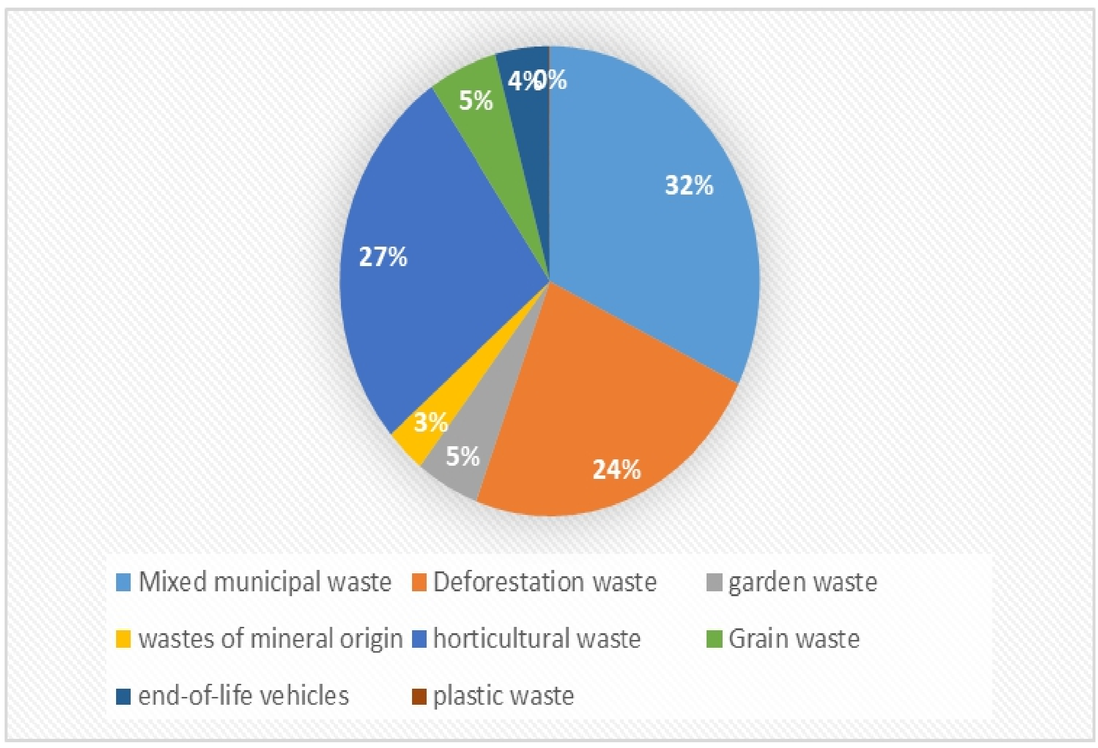
Picture 1. Food Recovery Hierarchy

The current European legislation (EC/99/31, 1999) stresses the need for a reduction in the quantities of BW to be dis-posed of in landfills. Nevertheless, there are no official standards for assessing the biodegradability of this waste. A large number of possible tests for assessing the waste bio-degradability are now available and there is a need for international standardization (Cossu and Raga, 2008).

The biodegradation rate of a waste undergoing biological treatment depends on several factors:

- the initial microbial community;
- moisture content;
- oxygen availability;
- the physical availability to degradation (mainly determined by particle size);
- temperature;
- the chemical composition of its organic matter (fat, proteins, cellulose, etc.).

The potential for waste prevention depends on many factors: economic growth, how operators have already applied best practice in reducing waste, and so on. Waste prevention is only possible by influencing the practical decisions made at different stages of the life cycle: how the product will be designed, manufactured, made available to the consumer and, finally, how it will be used. The generation of waste from commercial gardens also depends on the behavior of gardeners, which is related to the social structure, income, investments made and the development of technologies. In 2018, horticultural waste in Lithuania accounted for 27% (picture 2). As technology has improved in recent decades, more value-added products are being produced from berry and fruit waste for the cosmetics and pharmaceutical industries.



Picture 2. Waste generation in agriculture, forestry and fishing in 2018 in Lithuania

Zero-waste programs are becoming popular all around the world. Increased interest in environmental sustainability, the importance of recycling, and heightened awareness of climate change. From public schools to private businesses, these initiatives are playing vital roles in sustainability efforts. Improving our waste management system in the gardens is a key challenge that is currently engaging World's citizens and governments. A primary goal is to reduce our dependence on landfill in favors of more environmentally sound alternatives.

Conclusions

The National Strategy on Biodegradable Waste sets out a range of measures to meet our ambitious diversion targets. The key to success is for all involved – local authorities, the Environmental Protection Agency, waste operators, businesses and householders – to play their part in the successful implementation of the full range of integrated waste management options proposed in the Strategy document. Recycling of paper, cardboard and other materials in recent years has shown us what progress can be made. Now we need to aim even higher and increase recycling rates across the board as well as developing the necessary infrastructure for composting and residual waste treatment. Gardeners should be taken seriously and reach their full potential in the production of high value-added products from plant leaves, stems, processing waste seeds, pulp