

Conclusion

In recent years we have been dealing with the accumulation of social concerns of various types such as demographic issues related to social exclusion or the labour market. Health is one of the most important societal issues, that is often disregarded in the context of the relevant societal development prospects. Social innovation in the area of health care constitutes the righteous response to the problems faced by the modern society that lives and works more and more intensively, while equally intensively exploiting its resources (including health). Active commitment to counteract the adverse impact of social problems may boost innovation that will have practicable economic application, concurrently arising from a social need.

Implementation of social innovation may bring about advantageous deliverables that will fill in the market gap, which at the same time mitigates the adverse social impact (e.g. exclusion from social life). Fortunately, examples of such implementations in the Polish economic reality are not unique. This is evidenced by the effective use of the EU funds in the 2014–2020 financial perspective and the number of implementations of innovative solutions.

Every consecutive year, the social awareness of the need to care for the ecosystem in which a single individual lives is growing. Health is a constituent of this ecosystem that provides for health care also in terms of the podiatric medicine. Today's society is an increasingly conscious and demanding consumer. It also indirectly participates in the process of boosting social innovation – especially in the area of health care.

Footwear comfort – the comfort of the footwear user is difficult to define and is certainly a subjective feeling of each user. Based on studies conducted on users, this comfort is certainly influenced by the microclimate in the footwear depending on the properties of the materials used for manufacturing the footwear, the correct longitudinal and transverse size of the footwear, cushioning – often dependent on the properties of the sole material. Additional functions of the footwear, for instance, include antimicrobial properties that inhibit the growth of bacteria and fungi, thanks to which they improve the comfort of the user but also increase the mechanical resistance of the materials from which footwear is made, and eliminate unpleasant odour. Merging design and functionality of footwear materials in order to give them antimicrobial properties may be carried out by means of various methods, including spraying, bathing, sol-gel method, application

of microcapsules. An important innovative property of footwear is the auxetic property that makes the footwear fit the foot better and grow with the foot, which is particularly important for children's feet that grow rapidly. Auxetic materials for footwear are still in the realm of research and have enormous potential.

Based on the results indicated above, it is plausible to conclude that tannery shavings prove a great application potential for their closed-loop reuse as additives especially in the areas of construction, composite, plastics and packaging industries, as well as agriculture.

The proposed methods of processing tannery waste by means of pre-screening and pressure-free granulation, using readily available mineral additives and, among other things, an aqueous water glass solution for bed wetting, are relatively simple, waste-free, and their application costs remain economically reasonable. The granulation of the shavings makes it possible to produce agglomerates of suitable shape, size (from 0–1 mm to >14 mm fraction) and properties. An additional advantage of this solution is the possibility of using also other types of industrial waste, including waste gypsum arising from the flue gas cleaning process at the Belchatow Power Plant. In summary, it can be plausibly stated that the disc granulation process of tannery shavings provides for a solution successfully addressing the problem of the related processing and makes it possible to obtain a durable, mechanically stable, easily transportable and storable semi-finished product. The agglomerates obtained, using the indicated granulation method, due to the identity of the mineral additives used, such as gypsum, dolomite, lime or chalk meals, are dedicated to manufacturers of leather-like and composite materials. The granules and seed pellets produced from tannery waste may be used in agritechology as biostimulants, including soil improvers and fertiliser additives.^{1, 2}

The obtained results and conclusions in the identification of selected properties of tannery shavings, optimisation of unit processes for the purpose of the related processing and verification of new solutions based on those types of solid waste have confirmed the hypothesis. The application of unit processes for the purpose of reusing and processing leather waste makes it possible to develop new products that are environmentally friendly, compostable and non-toxic to the ecosystem with a wide range of applications (especially in plastics processing, construction and road building, as well as agriculture). In addition, given the organic quantities

- 1 M. Skwarek, M. Wala, J. Kołodziejek, K. Sieczyńska, M. Lasoń-Rydel, K. Ławińska, A. Obraniak, (2021), *Seed coating with biowaste materials and biocides—environment-friendly biostimulation or threat?*, "Agronomy", vol. 11.
- 2 M. Skwarek, J. Nawrocka, M. Lasoń-Rydel, K. Ławińska, (2020), *Diversity of plant biostimulants in plant growth promotion and stress protection in crop and fibrous plants*, "Fibres & Textiles in Eastern Europe", vol. 28, pp. 34–41.

of natural raw materials, efforts to recover individual valuable components from solid waste should be intensively developed, while optimising costs.

Therefore, the issues addressed in the monograph concern social, economic and environmental aspects, which is why this publication is addressed primarily to scientists, students, and practitioners dealing with innovation and knowledge-based economy. The monograph adopts a practical approach to social innovation, which may be an inspiration for the further research in the areas that the monograph could not include in detail.