

Chemical Technology Congress, Wrocław University of Technology, May 11-15 2022.

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The event took place on May 11-15, 2022 Wrocław and was organized by the Wrocław University of Technology. It gathered over **500 participants** from academic and industrial sectors. At the congress wide variety of topics have been covered including waste management and circular economy issues.

IMP PAN presented the results of the WASTEMAN project in the form of a POSTER, among others the technological treatment of source-segregated kitchen waste, including the use of effective microorganisms (EM) in methane fermentation and biogas production, as well as methods of producing fertilizers from raw organic and fermented waste.

The results of the influence of EMs on methane fermentation and the comparison of the effectiveness of fertilizers from kitchen waste between the winter and summer seasons as well as economic and social issues were presented.

Several bullet points interesting for WASTEMAN project results were listed below and therefore may constitute further inspiration for continuation of the research within waste-to-energy and waste-to-fertilizers.



1. Potential recovery of N+P from the food waste, animal manure, animal byproducts, ashes is 0.66, 11.7, 1.98, 0.13 million t/ year, respectively,
2. Current recovery of N+P from the food waste, animal manure, animal byproducts, ashes is **only** 0.19, 8.9, 0.03, 0.016 million t/ year, respectively,
3. There are already thermochemical and extraction methods (piloted or implemented) available for phosphorus recovery, and they could account for **17-38%** of total phosphorus demand in EU (**17 million t/ year**)
4. New and useful for WASTEMAN project research, **nitrogen utilisation efficiency parameters** were presented such as N balance (kg N/ ha), N utilisation efficiency (%), Partial productivity of N applied (kg/ kg), Agricultural efficiency of N fertilization (kg/ kg) and Physiological efficiency of N fertilization (kg/ kg),
5. Russia and Belarus is responsible for **12% of nitrogen fertilizers** export globally,
6. Waste can be diverted into **7 classes of fertilizer products** according to the Polish certification procedures: fertilizer, soil liming agent, soil improver, growing substrate, inhibitor, biostimulator, mixed fertilizer product,
7. **UE limits for fertilizers** according to UE 2019/ 1009, in mg/ kg dry matter are: Cd (3), Cr (2), Hg (1), Ni (100), Pb (120), As (40), Cu (300), Zn (800)

8. **Synthos** company invests in chemical recycling of **plastic waste**, eg. imports monomers derived from PAH in the form of pyrolytic waxes after thermal decomposition of plastic waste,
9. **Antibiotics** in treated wastewater account for **2%** in condensate **after microfiltration**, and for **5%** in condensate **after ultrafiltration**. So their concentration increases from 11 µg/L to 55 µg/L in the final condensate that is insignificant.
10. Application of **biostimulators** to further enhance the mobility of poorly available nutrients from the organic fertilizers is better instead of increasing NPK fertilizer dosages. Its **5% (weight/ weight) addition** compensates the **30% reduced NPK dosage** and even provides net profit for the farmer accounted for 800 – 1300 PLN,
11. A HORIZON 2020 Project called **“BIONANOPOLYS”** focuses among others in polyphenol compounds recovery from waste leaves
12. Various methods of plant biomass feedstocks pre-treatment have been listed and compared prior to extractions of valuable compounds,
13. **Polymer based hydrogels** can be effectively used in coating organic fertilizers and their thermal conversion products (eg. tannery waste and their biochars) providing gradual and controlled nutrients supply for plants,
14. A cooperation with BACTOTECH company has been initiated and bacteria-based biostimulator BACTOFOS for enhancement of phosphorus availability from waste products have been used for WASTEMAN fertilization experiments.

Annexes:

1. Agenda of the meeting,
2. Chosen and attended sessions,