Proceedings from the international seminar

27-29 November 2019

Częstochowa

ENVISAFEBIOC

BEZPIECZEŃSTWO ŚRODOWISKOWE BIOODPADÓW
W GOSPODARCE OBIEGU ZAMKNIĘTEGO

Organized by

Faculty of Infrastructure and Environment

Czestochowa University of Technology

The EnviSafeBioC PROJECT is funded by the NAWA National Agency for Academic Exchange.

nr umowy PPI/APM/2018/1/00029/U/001

The main scientific goal is to undertake international institutional cooperation in the field of defining sustainable strategies for the management of sewage sludge / bio-waste, their treatment and disposal, taking into account the current state of knowledge and legislation, characteristics and ecotoxicology.

More information from international seminar as well as project:

https://envisafebioc.is.pcz.pl/pl/

International seminar at Czestochowa University of Technology

November 27-29, Częstochowa, Poland

ORGANIZER

Czestochowa University of Technology, Poland

Faculty of Infrastructure and Environment

INTERNATIONAL SCIENTIFIC COMMITTEE

Prof. Rémy GUYONEAUD

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Institut des Sciences Analytiques et de Physico-Chimie pour l'Environnement et les Matériaux, France

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The problem of biodegradable waste under Polish conditions in the context of environmental safety

Małgorzata KACPRZAK,
Ewa NECZAJ,
Agata ROSIŃSKA,
Anna GROBELAK,
Anna GROSSER,
Krzysztof FIJAŁKOWSKI

Czestochowa University of Technology

https://www.pxfuel.com/en/search?q=humus

GOALS

In the presentation, a comprehensive review of municipal solid waste management and sewage sludge in Poland is provided. In document following aspects are discussed: current status of waste collection, transport and disposal, challenges in view of EU requirements and legislative changes as well as the future challenges for waste management.

CONCLUSION

- increased attention to climate change and mitigation of greenhouse gas emissions and thus recognized additional benefits of biodegradable waste applications to soils;
- there will be increased treatment of biodegradable waste with energy recovery through anaerobic digestion, incineration or other thermal treatment, with recycling of the ash and recovery of phosphate;
- there may be increased production and utilization of biogas from sewage sludge, as well as some production of alcohols and other fuels directly from biodegradable waste using pyrolysis and gasification;
- increased application of biodegradable waste to fuel crops such as Miscanthus, willows, hybrid poplars and other non-food energy crops;
- biodegradable waste is being turned into a carbon neutral construction material that could replace traditional clay and concrete bricks.

MORE INFORMATION

Presentation you can find on this site

https://envisafebioc.is.pcz.pl/pl/wydarzenia

Part I

Presentation no 5.

The problem of biodegradable waste under Czech conditions

Marek KUCBEL,

Barbora ŠVÉDOVÁ

Michal ŠAFÁŘ,

Pavel KANTOR

VŠB - Technical University of Ostrava

https://www.peakpx.com/616461/brown-wooden-garbage-bin-sorter

GOALS

In the work trends in biodegradable waste generation and management in Czechia is presented.

CONCLUSION

- In 2018, the main method of handling municipal waste management was landfilling. Biowaste accounts for about 40% of waste from landfill.
- Landfilling of biowaste is prohibited.
- At present, the Czech Republic is able to recycle only 38% of the generated municipal waste, but in 2025 it will be 55%, and in 2030 according to law, the state has to recycle 60 % of municipal waste.
- After 2020, the direct application of sewage sludge on agricultural land as well as composting will be possible only after sanitation.
- Processed sludges must be utilized or disposed within 8 months after end of the processing.
- Processed sludges can be stored maximum 30 days before their utilization and introduced into soil within 48 hours.
- Main problem during thermal treatment of sludge is increased mercury content in emissions.

MORE INFORMATION

Presentation you can find on this site

https://envisafebioc.is.pcz.pl/pl/wydarzenia

Part I

Presentation no 3.

The problem of biodegradable waste under France conditions

Rémy GUYONEAUD*,

Eléonore ATTARD*,

Franck VANDENBUCKLE**

*Institut des Sciences Analytiques et de Physico-Chimie pour l'Environnement et les Matériaux

**Université de Lille, Sciences et Technologies

https://www.pxfuel.com/en/search?q=wast&page=10

GOALS

In the work definitions of biodegradable waste as well as laws and method of treatments in France is presented.

CONCLUSION

- Biowaste represents one third of the residual bins in France.
- The law provides that all individuals will have a practical solution for sorting their biowaste at source before 2025.
- Organic recovery via composting, spreading or methanisation makes it possible to return to the soil or to transform raw organic matter into a valuable material such as compost or digestate, adapted to the agronomic needs as well as biogas e and to use it as a source of energy.
- composting can be carried out at:

1) the professional scale,
2) at the domestic or local scale, via a garden composter or a vermicomposter.

- Since January 1, 2012, people who produce or hold a significant amount of bio-waste have the obligation to sort these bio-waste and have it valorized in adapted sectors (such as composting or anaerobic digestion). This duty is obligation for professionals producing per year more than 10 tonnes of biowaste, and 60 liters for oils.

MORE INFORMATION

Presentation you can find on this site

https://envisafebioc.is.pcz.pl/pl/wydarzenia

Part I

Presentation no 1.

The problem of biodegradable waste under Norway conditions

Kari-Anne LYNG

Østfoldforskning AS

GOALS

- Food waste prevention is the global challenge and big problem.
- Changes in preferred technologies for organic waste management and biogas production.
- To meet the circular economy strategy (65 % material recycling of household waste and similar waste from industry within 2035) - significant effort and new solutions are required.

CONCLUSION

The main solutions for food waste prevention is the possible trade agreement for edible food waste, as well as suggested legislation changes forbidden to throw edible food. Preferred technology for organic waste management is biogas production as a fossil fuel substitution, since landfilling is ban for organic waste. Currently about 70 % of the Norwegian population have source separation of food waste in their homes. During the last years an increase in the use of biogas as a fuel for transport has been noted. The organic waste treatment processes can be transferred into production of high value products.

MORE INFORMATION

Presentation you can find on this site

https://envisafebioc.is.pcz.pl/pl/wydarzenia

Part I

Presentation no 4.

https://en.wikipedia.org/wiki/Sustainable_Technology_Optimization_Research_Center

Regulations and use of biowastes in Norway

Bal Ram SINGH

Norwegian University of Life Sciences

https://www.wallpaperflare.com/chop-bio-waste-garbage-garden-mulch-shredding-day-land-wallpaper-ggoej

GOALS

- Revise the knowledge about the regulations and use of biowastes in Norway.
- The phosphorus pools in organic residues are significant and can be estimated.

CONCLUSION

Waste policies and regulations in Norway and the EU are based on the principle of the wastes hierarchy, describing general priorities concerning the treatment of wastes; firstly prevention, then reuse, material recycling , energy recovery and lastly disposal (EU commission 2008). In the aspect of regulations for use in agriculture – the usage depends on what the sewage sludge contains. The 50% of sewage sludge in Norway has been used as soil improvement in agriculture. Potential of secondary P resources can be estimated.
When considering the minimum plant-availability of P in manure, this resource alone could potentially meet the fertilization demand of Norway (estimated at 5.8 kt plant-available P/yr). This will also avoid the accumulation of residual P. Overall, it was found that the plant-available fertilizer recycling potential of Norwegian secondary P resources ranged from 12.7 to 26.3 kt plant-available P/year. There is still substantial opportunity to substitute mineral P fertilizer, with manure showing, by far, the largest potential as large quantities nationally.

MORE INFORMATION

Presentation you can find on this site

https://envisafebioc.is.pcz.pl/pl/wydarzenia

Part I

Presentation no 2.

Composts from biodegradable waste and plant residues for organic and/or vegan agriculture

Danuta DRÓŻDŻ

Czestochowa University of Technology

https://commons.wikimedia.org/wiki/File:Compost-heap.jpg

GOALS

The purpose of this review is to examine the current literature regarding potential of production organic fertilizers from biodegradable waste for vegan plant cultivation.

CONCLUSION

- Vegan agriculture has important advantages regarding sustainability as a compared to the typical agriculture.
- Vegan Organic Network promotes vegan and ecological methods used in agriculture and horticulture around the world.
- Waste generated from plant food preparation in households can be divided on unavoidable and avoidable waste.
- Lupine, mustard, soy waste, malt waste, sugar beet, lucerne or clover show higher contents of nitrogen, and thus could be considered as feedstock for composting mixtures.
- There are examples of vegan entrepreneur in Poland such as producer of carrots or company which processing fiber from pineapple leaves into a material that imitates natural skin well.

MORE INFORMATION

Presentation you can find on this site

https://envisafebioc.is.pcz.pl/pl/wydarzenia

Part II

Presentation no .5.

Soil carbon sequestration under sewage sludge soil treatment

Aneta KOWALSKA

Czestochowa University of Technology

https://www.pexels.com/photo/brown-soil-3859201/

GOALS

Soil organic matter is a key component of soil that affects its physical, chemical, and biological properties, contributing greatly to its proper functioning.
Soil organic carbon sequestration strongly depends on soil texture, profile characteristic and climate. However, it is necessary to understand all processes in global carbon cycle, since soil emits GHGs by respiration of soil organic matter. Sequestrated carbon may be stabilized and stored in the soil via many mechanisms: physical, chemical and biochemical.

CONCLUSION

SOC is a vital component of soil with important effects on the functioning of terrestrial ecosystems. Biowaste such as sewage sludge have shown a high potential for carbon sequestration and its storage in the many types of soil. However, in some studies the effect of sewage sludge application depended on initial SOC value. Soil carbon sequestration may contribute to the mitigation of climate change.

MORE INFORMATION

Presentation you can find on this site

https://envisafebioc.is.pcz.pl/pl/wydarzenia

Part II

Presentation no 9.

Applying of biomass in power generation

Aleksandra WARZECHA

Czestochowa University of Technology

GOALS

Presentation reviews the existing literature related to biomass power generation industry, focus on their advantages and drawbacks as well as shows role of different biomass types in relation to overall renewable energy production in the different EU Member States

CONCLUSION

Energy of biomass – is particularly useful in reducing the use of fossil fuels and in reducing greenhouse gas emissions. In the most cases, biomass is also economically viable alternative.

MORE INFORMATION

Presentation you can find on this site

https://envisafebioc.is.pcz.pl/pl/wydarzenia

Part II

Presentation no 2.

https://www.pikist.com/free-photo-ippxw

Chosen organic micropollutants in drinking water

Patrycja SOBCZAK

Czestochowa University of Technology

https://www.publicdomainpictures.net/pl/view-image.php?image=25861&picture=odizolowanych-wody

GOALS

The aim of the study was to determine whether the time of year and place of sampling affect the concentration of contaminants in drinking water

CONCLUSION

- All the water samples taken from water treatment plant contained PAH.
- Concentration of chosen PAH compounds was depending on the time and place in the technological.
- system of the plant that the water sample was taken.
- The only substance that was present in all the water samples was naphthalene.
- The highest concentration of PAH was detected in the water sample taken from the reservoir in the fall.
- The highest concentration of the substance from the PAH group in all the taken water samples was noted for benzo(b)fluoranthene and benzo(k)fluoranthene – 190 ng/L.
- In the water sample taken from the pumping station in the spring, the concentration of chosen PAH was the lowest.
- Concentration of benzo(a)pyrene in the water sample taken from the reservoir in the fall and the water sample taken after final ozonation in the spring was higher than the acceptable concentration contained in EU norm
- The concentrations of PAH in the water might depend on a season and changes in ambient temperature what connects with higher combustion of fossil fuels (e.g. for heating houses) when the temperature is lower.

MORE INFORMATION

Presentation you can find on this site

https://envisafebioc.is.pcz.pl/pl/wydarzenia

Part II

Presentation no .4

Role of metal-induced molecular biomarkers in Sinapis alba L. with special reference to the safety of sewage sludge application on contaminated sites

Marta JASKULAK

Czestochowa University of Technology

http://www.publicdomainfiles.com/show_file.php?id=14021054413093

GOALS

Problem with heavy metal-polluted soils is increasing significantly throughout the world, as a result of industrialization, mining operations, improper waste and water treatment. Metal-induced molecular biomarkers in Sinapis alba L. can be found as sensitive biomarkers with special reference to the safety of sewage sludge application on contaminated sites.

CONCLUSION

Soil degradation will remain an important global issue for the 21st century because of its adverse impact on farm productivity, the environment, its effect on food security and the quality of life. ABC transporters and metallothioneins (MT) genes expression as a sensitive biomarker for the prediction of a phytoremediation outcome.The study showed the effects of sewage sludges on the level of genotoxic effects caused by heavy metals as well as on MT and ABCC and ABCG expression. As such, a significant increase in the expression levels of those genes was observed in plants grown under metal stress. With proper supplementation of degraded soil with sewage sludge, the level of DNA damage and MT expression significantly decreased. The differences showed statistically significant changes between related conditions which means that presented assay can be used as a sensitive stress markers for phytoremediation process. ABC and MT expression as a sensitive biomarker for the early prediction of a phytoremediation outcome. Fast induction and high expression of ABC transporters is a desirable trait in choosing plant species for phytoremediation.

MORE INFORMATION

Presentation you can find on this site

https://envisafebioc.is.pcz.pl/pl/wydarzenia

Part II

Presentation no 8.

Application of AOP methods for industrial wastewater treatment

Jolanta KOZAK

Czestochowa University of Technology

https://pl.m.wikipedia.org/wiki/Plik:Industrial_water_treatment_for_Ostrow_Wielkopolski_in_Rabczyn.jpg

GOALS

This presentation reviews the application of AOP for the removal of different kinds of toxic pollutants from the industrial wastewater.

CONCLUSION

- AOP methods are environmentally friendly
- Could be an independent process or can be complement to conventional wastewater treatment methods
- AOPs methods are recommended as a pre-treatment step to reduce toxicity and increase bioavailability of contaminants before biological treatment.
- All modifications approach to increase the efficiency of removing micropollutants

MORE INFORMATION

Presentation you can find on this site

https://envisafebioc.is.pcz.pl/pl/wydarzenia

Part II

Presentation no 1.

Biodegradable non fossil derived plastic accessories for organic agriculture

Agnieszka SZCZYPIÓR

Czestochowa University of Technology

https://commons.wikimedia.org/wiki/File:Oxo_Biodegradable_plastic-Logo2.jpg

GOALS

The aim of this study was to determine the effect of the addition of biochar obtained from sewage sludge on the selected properties of the composites produced biodegradable plastics.

CONCLUSION

It is possible to manufacturing of biocomposites from biodegradable plastics with the addition of biochar. Mentioned additive causes a significant modification of the investigated properties, in particular mechanical properties. Further studies will be focus on:

1) Analysis of the properties of agricultural accessories (such as films, clips,support) produced from the investigated biocomposites.

2) Compostability and biodegradability of these biocomposites will be analysed in composting bins in laboratory and backyard.

MORE INFORMATION

Presentation you can find on this site

https://envisafebioc.is.pcz.pl/pl/wydarzenia

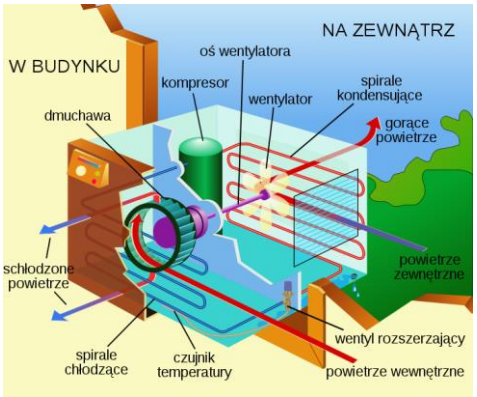
Part II

Presentation no 3.

Looking for high quality of indoor air

Magdalena STOLARSKA

Czestochowa University of Technology



https://pl.wikipedia.org/wiki/Plik:Air_conditioning_unit-pl.svg

GOALS

Presentation shows selected results of a long-term measurements in existing residential building with natural and hybrid ventilation. It focusses on an indoor environment condition in buildings for tested type of ventilations.

CONCLUSION

- We can observe increasing range (level) od CO and CO2 contaminations in existing building, especially equipped in gas heaters (boilers).
- We had to solve the problem without serious rebuilding.
- Applying hybrid ventilation with balance range of pressure in buildings equipped in gas heating boilers could be the solvation.
- Polish technical regulations are restricted to these propositions – it is not allowed so far.
- But it occurs one of the easiest way to improve indoor air quality in our buildings

MORE INFORMATION

Presentation you can find on this site

https://envisafebioc.is.pcz.pl/pl/wydarzenia

Part II

Presentation no 6.

Production and analysis of vermicompost with biochar

Jakub ŚWIĄTEK

Czestochowa University of Technology

https://www.flickr.com/photos/oregondepartmentofforestry/16637208254

GOALS

Soil additive based on vermicopmposting of waste substrates with biochar in place of traditional bulking agents has a big potential for improving water retention, promotion of plant growth and microbial activity.

CONCLUSION

Soil degradation is a serious issue. Biochar can successfully replace traditional bulking agents. Dose of 10% of mixture mass is a good compromise between amount of biochar and achieved results. Higher doses may not have an economical and technological justification. The biochar will become an important part of the future sustainable agriculture and environmental engineering. Combined with fast and effective process of biowaste vermicomposting, it constitutes a promising strategy for the production of a fertilizer useful for organic farming. The proposed product may be used to improve the soil quality, both in the context of crop production and counteracting the effects of soil degradation.

MORE INFORMATION

Presentation you can find on this site

https://envisafebioc.is.pcz.pl/pl/wydarzenia

Part II

Presentation no 7.

Technologies of coke wastewater treatment in the frame of legislation in force

Piotr BARGIEŁ

Czestochowa University of Technology

GOALS

In this presentation, an information about coke production, coke oven gas cleaning installation, coke oven wastewater formation as well as their treatment in the Częstochowa coking plant is presented.
The special attention was given to the legislation in force, which were found to be the key factor in define the following research task of PhD candidate: assessment of the applicability of selected dust and granular adsorbents to clean coke wastewater from total nitrogen and phenol.

CONCLUSION

The dynamically developing coke production in Poland requires use of effective methods of wastewater treatment. Due to the content of many chemical compounds, coke wastewater treatment creates a lot of problems, which is why their treatment is most often carried out in many stages. Currently, efforts are being made to implement modern methods of wastewater treatment in order obtain treated wastewater that will meet the requirements of the legislation and at the same time be environmentally friendly

MORE INFORMATION

Presentation you can find on this site

https://envisafebioc.is.pcz.pl/pl/wydarzenia

Part III

Presentation no 1.

https://www.pikist.com/free-photo-iowxn

Water supply and sewerage joint stock company of the Częstochowa district

Emil KULIŃSKI

Czestochowa University of Technology

https://commons.wikimedia.org/wiki/File:Cologne_Germany_Fire-Water-Supply-01.jpg

GOALS

Areas of cooperation between water supply and sewerage joint stock company of the Częstochowa and the Czestochowa University of Technology is showed.

CONCLUSION

Cooperation between these entities includes:

- research on the effect of dynamic pressure regulation on the failure rate of the water-pipe network;
- research on the impact of dynamic pressure regulation on water flow rate from leaks;
- effect of water age on its quality (including variation of total number of bacteria or concentration selected ion along the distance from the source);
- hydraulic modeling of the water supply network.

MORE INFORMATION

Presentation you can find on this site

https://envisafebioc.is.pcz.pl/pl/wydarzenia

Part III

Presentation no 2.

Waste Composting at Czestochowa Municipal Enterprise

Magdalena WROŃSKA

Czestochowa University of Technology

GOALS

- Presentation of the waste management system in Czestochowa.
- Effects of biochar addition on the composting process was investigated.

CONCLUSION

- The composting process with the addition of biochar contributed to the rise in temperature in the intensive phase which indicates better process efficiency and contributes to its shortening and greater sanitation of the stabilizer.
- The appearance of plants was observed after composting with biochar additives, which indicates that the stabilizer is not phytotoxic.
- Increasing the biochar content is likely to increase AT4

MORE INFORMATION

Presentation you can find on this site

https://envisafebioc.is.pcz.pl/pl/wydarzenia

Part III

Presentation no 3.

https://en.wikipedia.org/wiki/Compost

The International Seminar at Czestochowa University of Technology
27-29 November, 2019

Environmental safety of biosolids in the circular economy

PROGRAM

27 November, 2019 Wednesday

Place: J. H. Dabrowskiego 73 (the first floor - room of Faculty Council

9:00 - 9:30	Registration, coffee and tea
9:30 - 9:40	Seminar inauguration - *Małgorzata Kacprzak, Maciej Mrowiec*

SESSION I INVITED SPEAKERS

9:40 - 10:00	The problem of biodegradable waste under Polish conditions in the context of environmental safety *Małogrzata Kacprzak, Ewa Neczaj, Agata Rosińska, Anna Grobelak, Anna Grosser and Krzysztof Fijałkowski*
10:00 - 10:20	The problem of biodegradable waste under Czech conditions *Helena Raclavska, Marek Kucbel and Barbora Svedova*
10:20 - 10:40	The problem of biodegradable waste under France conditions *Eleonore Attard, remy Guyoneaud and Franck Vandenbuckle*
10:40 - 11:00	The problem of biodegradable waste under Norway conditions *Bal Ram Singh and Kari-Anne Lyng*
11:00 - 11:20	The problem of biodegradable waste under South Africa conditions *Eyob Tesfamariam*
11:20 - 11:45	Coffe break

SESSION II PhD STUDENTS PRESENTATIONS

Concerning on wastewater and aenergy management according to environmenatal safety

11:45 - 12:00	Composts from biodegradable waste and plant residues for organic and/or vegan agriculture *Danuta Dróżdż*
12:00 - 12:15	Soil carbon sequestration under sewage sludge soil treatment *Aneta Kowalska*
12:15 - 12:30	Applying of biomass in power generation *Aleksandra Warzecha*
12:30 - 12:45	Chosen organic micropollutants in drinking water *Patrycja Sobczak*
12:45 - 13:00	Role of metal-induced molecular biomarkers in Sinapis alba L. with special reference to the safety of sewage sludge application on contaminated sites *Marta Jaskulak*

13:00 - 14:00 Luch

14:00 - 14:15 **Waste composting in the Czestochowa Municpal Enterprise**
Magdalena Wrońska

14:15 - 14:30 **Technologies of coke wastewater treatment in the frame of legislation in force**
Piotr Bargieł

14:30 - 14:45 **Application of AOP methods for industrial wastewater treatment**
Jolanta Kozak

14:45 - 15:00 **Biodegradable non fossil derived plastic accessories for organic agriculture**
Agnieszka Szczypiór

15:00 - 15:15 **Production and analysis of vermicompost with biochar**
Jakub Świątek

15:15 - 15:30 **Indoor air quality measurement in multi-family buldings**
Magdalena Stolarska

15:30 - 16:00 Coffe break - the end of offical part of Seminar

16:00 - 17:30 **EnviSafeBioC project kick of meeting** - *for EnviSafeBioC project team and partners*

18:00 - 20:00 **Dinner at restaurant** - *for EnviSafeBioC project team and partners*

28 November, 2019 Thursday

SITE VISIT **FOR** PROJECT PARTNERS

7:00 - 18:00 **The visit at the Regional Center for Water and Wastewater Management Co. Tychy** - *lunch, dinner and regional attractions included*

29 November, 2019 Friday

SESSION **OF** INVITED SPEAKERS

9:00 - 12:00 **Session with the invited speakers from local authorities and industry**

12:00 - 13:00 Lunch

13:00 End of the Seminar