

ENVIRONMENTALLY SAFE UTILISATION OF WASTE IN THE ANAEROBIC CONVERSION PROCESS

Major Challenges

Landfill

trend

Circular waste management systems



Advantages of anaerobic digestion:

- waste is reduced;
- renewable energy is produced;
- risks of uncontrolled greenhouse gas emissions are avoided.

Discussion



Phosphogypsum



- ✓ contains calcium, sulphur, phosphorus, silicates, trace elements for the development of necessary ecological and trophic groups of bacteria.
- ✓ acid-resistant mineral carrier
- ✓ can stimulate metabolic processes of producer cells that belong to different trophic groups

Mineral additive to stimulate bacterial growth

Animal manure

Plant residue

Sewage sludge

Eutrophic water

anaerobic
digestion process

Energy

Methane

Fertilizers

Biohydrogen

Conclusions

Almost all types of organic waste can be used as an initial substrate for anaerobic digestion. Phosphogypsum is an additional source of macro- and microelements, and it is important to find new ways of recycling chemical waste such as phosphogypsum. The addition of trace metals increases the efficiency of the anaerobic process by enhancing substrate digestion, biogas production, and low concentrations of intermediate fermentation products, i.e. volatile fatty acids. The use of a support medium for the immobilization of microorganisms is widely known to provide a surface for microbial growth and a shelter that protects the microorganisms from inhibitory compounds. It should be noted that phosphogypsum additive can be used in different bioconversion processes (anaerobic and aerobic) for the growth stimulation of different bacteria species.

“EcoMining: Development of Integrated PhD Program
for Sustainable Mining & Environmental Activities”

