

WEB-APPLICATION WITH GEOINFORMATION MODULE FOR ENVIRONMENTAL RISK ASSESSMENT OF LAND POLLUTION BY HEAVY METALS

D. Chemerevsky, U. Ivaniukovich

*Belarusian State University, ISEI BSU,
Minsk, Republic of Belarus
chemervelo@mail.ru*

Environmental risk is one of the main indicators of the impact of pollutants on the natural environment. In connection with this, the management of the decided to develop a web-application that would allow assess environmental risk by the concentration of heavy metals in the soil.

Keywords: environmental risk, heavy metals, ASP.NET, C#, web-application, MySQL, leafletjs, ECMAScript.

Web-application with geoinformation module was written on ASP.NET MVC technology. According international obligations the web-application should be open source and anyone can use provided public information. MySQL data base management system (DBMS) is using to store large amount of data. The main reasons of this choice is openness of software product and DBMS performance. The aim of our work is development web-application and integrate geoinformation module in it to show spatially distributed information on the interactive map.

To reach main goal we should complete a number of tasks. They are: 1) design database; 2) develop user interface; 3) use *leafletjs* API to show spatially distributed information; 4) develop administrative and user parts of this geoinformation module.

These tasks are solved: frontend part by using *leafletjs* API, HTML, CSS and ECMAScript programming language with it's different frameworks; backend part by using ASP.NET technology and C# programming language; storage access part by using DBMS MySQL and SQL programming language.

BIO-BASED SOLUTIONS FOR RESOURCE RECOVERING FROM WASTES

Ye. Chernysh

*Sumy State University,
Sumy, Ukraine
y.chernysh@ecolog.sumdu.edu.ua*

This paper focuses on the study the possibility of phosphogypsum and sewage sludge utilization in the bio-based technologies for nutrients recovery. The disparate areas under the heading of by-products and bio-based products was linked via life cycle analysis approach. The integrated biotechnological solutions for using and processing of secondary resources include research on biogas purification in bio-desulfurization system with bio-methane and bio-sulfur production.

Keywords: bio-based solutions, phosphogypsum, sewage sludge, bio-based products.

Currently, the actual energetic waste utilization rate is significantly lower than possible, even though it would promote the diversification of available energy sources and could also play an important role in the landscape development. Furthermore, a considerable amount of artificial fertilizers and irrigation water could be saved with the utilization of the sewage sludge digested. Thus, the important task is detoxification organic wastes, such as sewage sludge.

Phosphogypsum (PG) is the other waste that requires to treatment. About 5 tons of PG are generated per ton of phosphoric acid production, and worldwide PG generation is estimated to be around 100 Mt per year. Currently, over 50 million tons of PG were accumulated in Ukraine.

Reduction of nutrient inputs and nutrient recycling is the one of priorities in HELCOM chairmanship 2018-2020. While the nutrient recycling strategy is expected to be a tool to tackle particularly diffuse sources, it is also important to look for opportunities in the present point sources and especially in cases where results can be achieved quickly and cost-effectively [1].

The Figure 1 below schematically shows how the disparate areas under the heading of by-products and bio-based products can be linked via life cycle analysis approach.

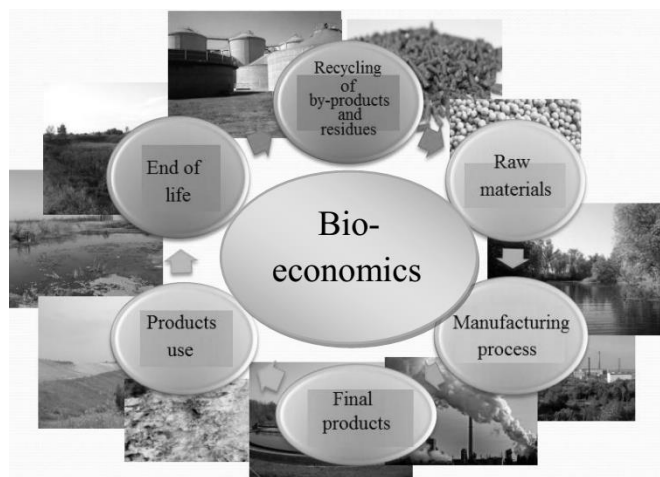


Fig. 1. Life cycle approach to bio-based solutions for processing of secondary resources

Besides phosphogypsum and sewage sludge can be useful for the extending feedstock basis for the lactic acid fermentation under biopolymers production. They can be useful as cheap carbon sources for fermentation processes and the additional nutrients are important as well in view of an economic feasible entire process.

BIBLIOGRAPHY

1. Seeking further solutions for less nutrient inputs to the Baltic sea. HELCOM. 2014. – URL: <http://www.helcom.fi/news/Pages/Seeking-further-solutions-for-less-nutrient-inputs-to-the-Baltic-Sea0515-3281.aspx> (date of access: 09.10.2018).
2. Chernysh, Y. The Influence of Phosphogypsum Addition on Phosphorus Release in Biochemical Treatment of Sewage Sludge / Y. Chernysh, M. Balintova, L. Plyatsuk, et al. // Int. J. Environ. Res. Public Health. – 2018 –. № 15. – P. 1269.

DETERMINATION OF MASSES OF THE SUPER HEAVY ELEMENTS IN THE EXPERIMENTS ON SYNTHESIS OF 112 AND 114 ELEMENTS USING THE REACTIONS $^{40}\text{Ar} + ^{148}\text{Sm}$; $^{40}\text{Ar} + ^{166}\text{Er}$; $^{48}\text{Ca} + ^{242}\text{Pu}$

A. Dvorakovskiy¹, D. Hrytskevich¹, V. Dorozhkin¹, V. Vedenev²

¹Belarusian State University, ISEI BSU,
Minsk, Republic of Belarus

²Joint Institute for nuclear research, JINR,
Dubna, Russian Federation
tuukkarask1997@gmail.com

The article describes main parts of MASHA (Mass Analyzer of Super Heavy Atoms) facility, chemistry of superheavy elements such as Hg and Rn, main results of completed calibration.

Keywords: island of stability, TIMEPIX detector, hot catcher, target, multy-nucleon transfer reaction.

The MASHA setup designed as the mass-separator with the resolving power of about 1700, which allows mass identification of super heavy nuclides is described and the same time to detect their alpha decay and spontaneous fission. Based on the beam line of Cyclotron U-400M. Constructed as the mass-spectrometer in a large variety of masses (from 1 to 450 (in theory) a.m.u.).

The hot catcher system uses the block of rotating targets, assembled into cassettes. The idea to use rotating target instead stationary are larger surface of target material and better heat distribution.

The disc rotated at the frequency of 25 Hz via Siemens electric engine. Heater is a block which represents thermally expanded graphite heated directly by electric current. This removes the heating losses and irregularity of the heating. The division foil is made from thin graphite foil in connection to its thermal reliability in comparison to previously used titanium foil.