

**LEMBAR**  
**HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW**  
**KARYA ILMIAH : JURNAL ILMIAH**

Judul Jurnal Ilmiah (Artikel) : An Improve Performance of Geospatial Model to Access the Tidal Flood Impact on Land Use by Evaluating Sea Level Rise and Land Subsidence Parameters

Penulis Jurnal Ilmiah/ Jumlah penulis : Muhammad Zainuri, Muhammad Helmi, Maria Griselda Anindyan Novita, Hermin Pancasakti Kusumaningrum, Magaly Koch/5 org

Status Pengusul : Penulis anggota

Identitas Jurnal Ilmiah :

- a. Nama Jurnal : Journal of Ecological Engineering
- b. Nomor ISSN : 2081139X, 22998993
- c. Volume, nomor, bulan, tahun : 23 (2): 1-11
- d. Penerbit : Polskie Towarzystwo Inzynierii Ekologicznej
- e. DOI artikel (jika ada) : <https://doi.org/10.12911/22998993/144785>
- f. Alamat web jurnal : <http://www.jeeng.net/pdf-144785-71275?filename=An%20Improve%20Performance%20of.pdf>
- g. Terindeks di SCOPUS, Q3, SJR 2021 0.32, H Indeks 22

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Semarang, 27 April 2023

Reviewer I



Prof Dr. Endah Dwi Hastuti, MSi.

NIP. 196105051986032003

Unit kerja : Departemen Biologi Fakultas Sains dan Matematika Universitas Diponegoro Semarang

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Semarang, 28 April 2023

Reviewer II



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From 2006 to 2012, it is known as *Magnuma Energogazeta* (print, ISSN 2297-1997),  
From 2013, continued – *Journal of Ecological Engineering* (on-line, ISSN 2299-8993)

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## The Use of Phosphorus-Containing Waste and Algae to Produce Biofertilizer for Tomatoes

Assel Tleukeyeva, Nuradin Alibayev, Akmaral Issayeva, Lyazzat Mambetova, Aygul Sattarova, Yerzhan Issayev

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## Metagenomic Analysis Reveals Microbial Communities in Lake Qarun – Egypt

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## Nitrate Reductase Activity in *Eucalyptus urophylla* and *Khaya senegalensis* Seedlings: Optimization of the in Vivo Assay

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## Application of the Ozonation Process for Shaping the Energy Properties of the Surface Layer of Polymer Construction Materials



## Metagenomic Analysis Reveals Microbial Communities in Lake Qarun – Egypt

Mahmoud Mohamed Yosef<sup>1\*</sup>, Ali Mohamed Elrefy<sup>1</sup>, Fawzy Ali Elfeky<sup>1</sup>

<sup>1</sup> Biotechnology Department, Faculty of Agriculture, Al-Azhar University, Cairo, Egypt

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### ABSTRACT

Characterization of water quality in Lake Qarun indicated that the water is very poor for irrigation and aquatic life. At the same time, the bacterial community was represented mainly by five bacterial phyla with different proportions: *Firmicutes* (53%), *Proteobacteria* (33%), *Bacteroidetes* (7%), *Actinobacteria* (5%) and *Thermi* (1%). Furthermore, metagenomes prediction of bacterial communities using PICRUSt indicated important functional gene families associated with metabolism, environmental information, genetic information processing, and cellular processes. It is worth noting that Benzoate degradation had the highest average relative abundance, followed by aminobenzoate degradation among 18 individual KEGG pathways from xenobiotics biodegradation and metabolism which showed higher relative abundance. The obtained data indicate that a different source of pollution in Qarun Lakes has an impact on the bacterial community's structure, as well as the biota and is expected to cause health problems.

**Keywords:** bacterial community, Ion Torrent, Qarun Lake, 16S rRNA high throughput.

### INTRODUCTION

Lake Qarun (Moeris) is a historic lake that has supported human culture for over 7,000 years (El-Shabrawy et al. 2014). The lake is currently experiencing severe water pollution. As a result of uncontrolled disposal practices of solid and liquid household and industrial waste, as well as pesticide contamination and lack of long-term sewage treatment (Shaaban, Hanafi, and Ibrahim 2016). The Egyptian Company (EMISAL), located on the Lake's southern shore, causes the water to be concentrated up to ten times its natural salinity (A. Mageed 1998). The increase in salinity is also due to such factors as high temperatures and changes in water evaporation rate over the last few hundred years (Al-Afify et al., 2019). Furthermore, increasing contamination of Lake Qarun water resources, as well as the resulting effects on the aquatic environment and human health, is a large source of concern. Therefore, the study of microbial communities in Lake Qarun in Egypt

is critical because wailed life, aquatic life and humans all rely on water for their survival. Microbiome is the study of microbial communities collected directly from their natural environment without prior culture. Because of recent breakthroughs in Next Generation Sequencing (NGS) technologies, there has been tremendous development in this field of research (Schuster 2008). Because over 99.8% of microorganisms in some situations are unable to be cultivated (Shah et al. 2011) The development of amplicon and shotgun genome sequencing technologies allowed for a better knowledge of the microbiota-host connection. This study provides important insight into the bacterial community structure under the influence of various types of pollution, using 16S rRNA high throughput amplicon sequencing to investigate the bacterial abundance and diversity in Lake Qarun. Thus, bioinformatic analytic techniques were employed to better understand the bacterial community function in the lake under diverse sources of contamination.

## The Use of Phosphorus-Containing Waste and Algae to Produce Biofertilizer for Tomatoes

Assel Tleukeyeva<sup>1\*</sup>, Nuradin Alibayev<sup>1</sup>, Akmaral Issayeva<sup>2</sup>, Lyazzat Mambetova<sup>2</sup>, Aygul Sattarova<sup>3</sup>, Yerzhan Issayev<sup>1</sup>

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### ABSTRACT

The current state of phosphorus-containing waste and the methods of its disposal remain relevant. The storage of phosphorus-containing waste sludge is carried out in sludge collectors, which occupy large areas. With the disposal of slags and sludge, as well as the elimination of sludge collectors, the harmful effect of waste on the soil will cease, and the possibility of using these areas for economic land use will appear. Many studies show the movement of phosphorus in soil and water, thus proving the difficulty of disposing of this waste. Of course, phosphorus slags and sludge are used in small quantities in the production of building materials, but this does not solve all the problems. In the south of Kazakhstan, there are warehouses for the waste from the production of phosphorus-containing fertilizers, which also require disposal. One of the ways of modern utilization of these wastes is their use in fertilizers for agriculture. However, since the phosphorus-containing waste has a high content of phosphorus, compared to nitrogen and potassium, this ratio can be changed with the addition of chlorella biomass. The purpose of the conducted study was to investigate the possibility of using a complex of phosphorus waste and algae, that is, the cultivation of chlorella at various concentrations of phosphorus-containing waste for further use of the suspension in watering the test plant. In the form of a test plant, tomato seeds were chosen, the cultivation of which in agriculture is economically profitable. When cultivated in closed ground, tomatoes lose their taste, which can be restored with the use of organic fertilizers. This article shows the results of the influence of various concentrations of phosphorus waste and green microalgae on the growth and development of *Solanum lycopersicum*.

**Keywords:** phosphorus-containing waste, chlorella, biofertilizers, *Solanum lycopersicum*, phosphorus slags, phosphorus sludge.

### INTRODUCTION

Nowadays, synthetic fertilizers are often used in agriculture, including phosphorus-containing fertilizers, which are often obtained by mining from phosphorite ores. One of the largest phosphorite ores is located in Kazakhstan, which enriches the entire market of the republic. Of course, there are also side effects from such methods of obtaining fertilizers, i.e. a large amount of waste with a low content of essential elements. A small amount of this waste is used in the production of building materials, such as building blocks. However, the main problem of disposal of

a large volume of phosphorus-containing waste is relevant not only for Kazakhstan, but also for the whole world.

The cultivation of agricultural crops is highly dependent on phosphorus, which is widely recognized as an important macronutrient [Zayadan, 2014]. In most cases, phosphorus fertilizers are produced from mineral rocks, economically justified reserves of which may be depleted in the coming decades [Nabors, 2000]. In this regard, it becomes necessary to introduce innovative methods of processing the phosphorus-containing waste [Madireddi, 2014]. In Switzerland, for example, the amount of phosphorus-containing waste (i.e.

## Treatment of Coking Wastewater Using Sorption Processes

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### ABSTRACT

Adsorption is one of the basic surface phenomena involving saturation of the adsorbent surface with adsorbate molecules located near the adsorbent-adsorbate interface. The processes that are accompanied by the accumulation of adsorbate molecules on the surface are different from absorption, which is related to absorbing molecules into the whole mass and requires diffusion into the interior. If both processes can occur simultaneously, this phenomenon is called sorption. The aim of the present study was to characterize the sorption properties of selected sorbents and to assess the possibility of their application to support the treatment of coking wastewater from ammonium nitrogen, phenol, and TOC. The scope of the study included the examinations of sorption properties of selected sorbents (coal dust, coke dust, biochar), physicochemical tests of coking wastewater after biological treatment, as well as the examinations aimed to determine the dose of adsorbents and time needed to establish the equilibrium state of the process. The results obtained were analyzed for the effect of dose and contact time on the pollutant removal efficiency. The literature describes the efficiency of ammonium nitrogen removal from wastewater using chemical processes. However, there is a lack of studies on the removal of ammonium nitrogen, phenol, and TOC from industrial (coking) wastewater. The conducted study aimed to develop an alternative solution to the currently used conventional methods of removing high concentrations of pollutants from wastewater.

**Keywords:** coking wastewater, wastewater treatment, sorption, biochar.

### INTRODUCTION

The dynamic development of coke production in Poland requires the application of effective methods for the treatment of coking wastewater. Due to the high content of many chemical compounds, the treatment of coking wastewater poses a number of problems. Therefore, the process is usually divided into several stages [Zhou et al. 2018]. The varied composition of coke wastewater is a major problem in selecting effective treatment methods [Lia et al. 2018]. The main task of industrial process water treatment installations is to reduce the pollutant load to the limits specified in national and European legal regulations [Mielczarek et al. 2011].

Currently, the aim is to implement modern methods of wastewater treatment to obtain the wastewater that meets legal requirements, while at the same time being environmentally

friendly [Sizmur et al. 2017]. At present, adsorption processes draw the greatest interest among the techniques used to treat coking wastewater [Mushtaq et al. 2019]. A wide range of adsorbents of inorganic origin, such as porous glasses, zeolites, and organic materials such as activated carbons, dust, and biochar, and to a lesser extent activated carbon fibers, carbon soot, and ordered mesoporous carbons have been used in this type of processes [Ali et al. 2012]. Dusty and granular adsorbents are most commonly used for the adsorption of pollutants from water [Yaashikaaa et al. 2019]. They are made using charcoal, lignite, anthracite, peat, fruit seeds and stones, nut shells, etc. [Tan et al. 2015].

Phenolic coking wastewater is generated during the process of coal coking and obtaining coal derivatives [Abussaud et al. 2016]. It has a very complex chemical composition. The main substances found in coke wastewater

## Concentration of Toxic Metals in Agricultural Land and Wheat Culture (*Triticum Aestivum* L.)

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### ABSTRACT

Concentrations of heavy metals in the soil such as: (Pb, Cd, Zn and Cr), play a role in contamination of agricultural crops such as wheat (*Triticum aestivum* L.). Roads in the Republic of Kosovo are congested with traffic; in addition, over 55% are more than 20 years old. The agricultural land near roads in Kosovo is cultivated with agricultural products, especially wheat. This study aimed to investigate the concentration of toxic metals in soil and wheat crops due to vehicle emissions. In this research are examined the physico-chemical factors that affect the mobility of metals in the soil of the research area as: pH, concentration of organic carbon and heavy metals such as: (Pb, Cd, Zn and Cr). Analytical research shows that the content of toxic metals decreases with increasing distance or along highways. The concentration tests of toxic metals near roads and lands planted with analyzed agricultural crop of corn showed that heavy metal deposits also depend on atmospheric conditions and emissions from vehicle traffic.

**Keywords:** toxic metals, national roads, wheat, and vehicle pollution.

### INTRODUCTION

The level of environmental pollution in the Republic of Kosovo significantly exceeds the norms of the European Union. Recent measurements show a high level of air pollution from dust particles. The pollution exceeds the EU norms by 19% (Andrade et al., 2013). Environmental experts claim that the increase in the level of pollution in the cities of Kosovo affects: vehicle traffic, construction without urban plans and ways of cleaning cities. As the level of pollution increases, so does the level of health concern of citizens, as they are non-essential metals that are not required for any vital function, neither by plants nor by animals (Ahmadpour et al., 2012). Heavy metals are transported or released during various road transport operations such as: combustion of petroleum products, leakage of liquids and corrosion of metals (Bartkowska, 2015). Heavy metals such as: (Pb, Cd, Zn and Cr), are the main pollutants in the environment; they impact food

products, are released from fuel combustion, tire wear, oil leakage, corrosion of industrial batteries, as well as metal parts, etc. Kosovo's roads are overloaded with a high percentage of old vehicles. All roads in Kosovo are characterized by heavy traffic load, while vehicles use low quality diesel fuel, with high amounts of lead in gasoline. Excess metal contaminants deposited in the soil, can be transported to vegetation by plants, passing to animals and human beings. Soil pollution with heavy metals on the sides of highways, along the roads as well as accumulation of heavy metals on the side land near the highways, have impact on the quality of agricultural crops. Due to high urban development accompanied by an exponential increase in the number of vehicles on highways that do not have effective pollution control standards, the emission of emissions from vehicle traffic increases the environmental uncertainty (Bryzzhev et al., 2015). Inadequate public transport system has led to an increase in the concentration of heavy metals from public transport