



МАТЕРІАЛИ
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Pathway of microplastics in MBT

- In Lithuania, the percentage of plastic in mixed MSW municipal waste reach up to 35 % depends on season and region.
- shedding and screening can lead to the formation of new microplastics
- after screening, microplastics get into the biological fine fraction, go through bioprocessing and end-up in organic stabilizer
- together with organic stabilizer microplastics then get into landfill.

pic. 3. Pathway of microplastics in MBT

Матеріальний баланс на підставі обліку різних утворюваних у процесі розсортування відходів різноманітних фракцій

ПОПУЛЯЦІЙНА ГЕНЕТИКА ХХІ СТОЛІТТЯ

Др. Тетяна Шаблій
КПІ ім. Ігоря Сікорського

Візнавлення Cu^{2+} to Cu_2O за допомогою мікробіоу Екзозору

400 мкг Cu^{2+}

ФУНКЦІОНАЛЬНІ ВЛАСТИВОСТІ ПОВЕРХНІ

Елементний склад
ЯМР
ІЧ

Екологія. Людина. Суспільство.

XXI Міжнародна науково-практична конференція - 2020 -

Частина 1. <https://youtu.be/0GUKiaLbt04>
Частина 2. https://youtu.be/WGo_Zlr0OHM

Prokaryotes Markeri 16S
Phytoplankton Markeri 18S
Zooplankton Markeri COI
Fish Markeri 12S

Др. Валерія Вембер
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Introduction

- 350 million tonnes of plastics were produced globally in 2018
- 62.8 million tonnes of plastics were produced in Europe in 2018
- In Europe, 25% of collected post-consumer plastic waste is still landfilled
- 9.2 Mt of plastic is lost to the environment on different stages of life cycle, 3 Mt is microplastic

pic. 1. Global plastic life cycle

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завдань Національного плану управління відходами – розроблення регіональних планів управління відходами та поділ областей на території охоплення.

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ECOLOGY AND ITS ROLE IN SUSTAINABLE DEVELOPMENT

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Introduction. The overall effect of technological and economic growth resulted in an unhealthy physical and mentally environment. Global warming, decrease in forest reserves and biodiversity, polluted air, water and soils, merciless destruction of ecosystems are consequences of capitalism's credo "growth at any cost". Capitalism sustains continuously growing consumption. For example, in the North American consumption cycle, 99% of the goods that are collected, mined and produced are used for only 6 months and after that they turn out to be garbage. It is now the best time to ask a question: is the global environmental crisis real? Deeply looking at the nature and principles of modern types of capitalism it becomes clear that mankind must set another direction than the development of the consumer community. What needs to be done to avoid environmental collapse and to ensure sustainable development of mankind?

Ecology, capitalism and sustainable development. An ecosystem is all components within one area. The river in the forest is an ecosystem, the forest is an ecosystem, the city is an ecosystem, the planet as a whole is an ecosystem. People can affect ecosystems using different resources. The main driver of human actions is economic growth. Economic growth is defined as an increase in production and consumption of wealth. It is a fact, wenn economy grows, natural capital is being consumed as a nonrenewable resource or reallocated between humans as man-made capital.

Humanity experiences an environmental decline due to the huge expansion of economic activities that started in the XX century. The problem is that humanity consumes vast amounts of resources and returns waste products. Modern capitalism defines the global economy for unstoppable growth. Main characteristics of capitalism are competitive markets, a corporation as



principal institution and price mechanism and governments promoting economic growth. Last but not least, the material values of consumer society is a vital component of capitalism.

In the meantime, almost 1.1 billion people have less than \$1 per day at their disposal. These people do not have neither access to drinking water nor basic sanitation. Poverty and environmental changes are interconnected. The reason is that people living in poverty begin to overuse natural resources. For instance, hunger makes people harvest trees in order to make additional income. Deforestation causes erosion of the soil. It is common that waste is not being taken away, which makes rivers polluted. Also poverty supports population growth. People tend to have more children because they can obtain some money from the government. It is a fact, population growth creates more poverty and more poverty destroys more environment.

In the 1970th evolutionary ideas appeared. Meadows and other MIT researchers used models in global population growth, resource consumption and global pollution. They predicted population collapse in 2050. Scientists called to stop the growing population and to maintain the industrial output per capita at the same level.

Some years later the concept of “Sustainable development” has evolved. It is such a development that meets the needs of the present generations without compromising the ability of the future ones to meet their needs. The world is being considered as a united system connected in space and time. Such mindset provides an opportunity for humanity to realise the higher purpose of life. Even though experts on sustainable development share the same concerns about the directions of the future of global development, they are not united on the approach of how the problem should be solved. The overwhelming majority of economists and politicians intend to control economic growth using large international agencies. Based on detailed research or well constructed models they aim to quantify environmental impacts, to regulate private industry, to adjust market incentives. Others, spiritual writers or ethicists, believe that capitalism and sustainable development are incompatible. From their perspective in order to achieve sustainable development, the human race must firstly realize that a planet is an united and interconnected system.

Modern capitalist system has many negative aspects considering from the sustainability perspective:

- Capitalism assumes continuous increase in productivity, what conflicts with limited resources
- Corporation propagate permanent increase in consumption using advertising
- Interest fees in capitalism maintain the principle rich become richer and poor become poorer
- Large corporations destroy small businesses resulting in unemployment and poverty
- Economic decision-making do not often take into account social and environmental factors
- Due to international trading consumers often can not fully realise all the consequences of economic decisions on far-distant countries.

Alternatives, renewal cycle and the role of science. The american economist Herman Daly promoted the idea of “Steady-State Economics”. Under a steady-state economical model human population and consumption will be held at the same level. The moral evolution should replace growing material consumption. In order to reach the steady state progressive resource depletion should be implemented. The government will set a fixed amount of non-renewable resources. In this case prices would be regulated by the market promoting conservation of natural resources and substitution of alternative materials.

Another prospect idea was proposed in the 1960s. Local self-reliance should be implemented. Bill McKibben in his book “Deep Economy” calls to promote local businesses rather than multinational corporations. He recommends to pay more attention to the development of prosperity of farmers’ markets, community-based radio stations and mercantile cooperatives.



The Ithaca Hours are an alternative currency used in the locality Ithaca, New York to promote local self-reliance. The value of currency is being defined by hours of labor instead of dollars.

According to system theory, any system evolves rather than being static. During evolution a system undergoes the renewal cycle: the growth, the conservation, release or collapse and renewal again. The phase of release does not mean that all components should be destroyed but the components ought to perform new different functions. A good example of a renewal cycle is bankruptcy of a company. Wenn the business can no longer maintain conservation state, the release phase begins. Laid off employees and sold assets will then recombine in a new system, the phase of renewal begins. Putting many efforts to maintain a system beyond its conservation state, so as to prevent the release phase, causes negative influence on a system of higher hierarchical level. Sustaining inefficient businesses by providing human and material resources decrease the adaptive capacity of a system. The good example is the collapse of Soviet Union.

Economic growth not only ignores ecological and social costs but also puts individuals and families under pressure. Current capitalism totally neglects the fair distribution of wealth resulting in most people living in debt. Each person from Latin America owes \$1,600 to foreign countries. The debt of Southern countries was about \$ 567 billion in 1980. Since then, \$ 3,450 billion have been paid because of interest principle. Logically to assume that six times the original amount of debt repaid by poor countries has resulted in tremendous increase in consumption of natural capital.

Wenn sustaining the present setup of the economic system, collapse of higher hierarchical levels is inevitable. In order to save humanity and the biosphere as a whole, a usury based capitalist economic system must undergo the release phase.

There are many people who believe science will save humanity and will provide a safe future. Although in reality the science has been limited by its shortsightedness and commercial greed. People define happiness as an opportunity to afford to accumulate newly produced gadgets. The technological progress also brought the idea that everything on the planet was made to be used. Nowadays people are considered not as personalities but as consumers and workforce. Basically in the XXI century technological advances rule the world. Furthermore, humans can not fully anticipate all of the consequences of technologies, both environmental and social. No one could predict the negative influence of DDT, plastic and televisions. For example, there are studies which provide empirical evidence that the greater access of TV correlates with a tendency to maintain household debts.

One of the astonishing features of technology is that wenn it is there, it will never be forgotten or abandoned. Importantly, the solutions to the global environmental crisis will not be provided by science but are political and economic decisions. Therefore, science and technology should adopt new directions, such as research on green technologies in order to provide life in harmony with the environment.

Alternative approach while investing. Despite many destructive aspects of capitalism, nowadays the concept of sustainable development draws more and more attention. In the world of investment, the environment which decides what businesses will arise and which will go bankrupt, socially responsible investment(SRI) has gained popularity. Socially responsible investing is an approach in investing, concentrating on decreasing negative externalities. Its beginnig dated in 1960th, when investors started excluding tobacco companies and business involved in the South African apartheid regime from their portfolios.

One of the most popular types of SRI is ESG. ESG investing is the consideration of environmental, social and governance factors alongside financial factors in the investment decision-making process.

Environmental and social factors, technological innovation and institutional governance have led to a large-scale re-allocation of capital. According to Global Sustainable Investment Alliance, ESG capitalisation reached more than \$30 trillion in 2018: Europe contributed



\$ 14.1 trillion, USA \$ 12.1 trillion, Japan \$2.2 trillion, Canada \$1.7 trillion and Australia/New Zealand made \$ 0.7 trillion. Bank of America predicts next capitalisation of \$20 trillion in the following decades. Consequently, these changes in distribution of capital will significantly influence the pricing of financial assets, the risk and returns of investments.

An American finance company located in New York, The Morgan Stanley Capital International (MSCI) delivers an index to track the influence of socially responsible investment on the global economy. The index is called “ESG index” and is calculated considering environmental, social and managerial aspects of activities of a company.

Environmental factors which are taken into account when calculating the index are climate changing factors: carbon emissions, product carbon footprint, financing environmental impact, climate change vulnerability. The use of natural resources: water stress, biodiversity and land use, raw material sourcing. Contribution to pollution/waste: toxic emission and waste, electronic waste, packing waste. Environmental opportunities: in clean energy, in green building, in renewable energy.

To the category of social factors counts human capital development, labor management, health and safety, supply chain labour standards; product liability: product safety and quality, chemical, financial product safety, privacy and data security, responsible investment, health and demographic risk; social opportunities: access to communication, finance, healthcare and opportunities in health and nutrition.

Last but not least, the ESG index evaluates a company from the point of governance. Board diversity, executive pay, ownership and control, accounting, business ethics, anti competitiveness, tax transparency, corruption and instability, financial system instability contributes to the value of the index.

Investors use the ESG index in a different way to achieve investment objectives. MSCI defines three main approaches used by investors:

- Value based investment approach where investors make decisions based on shared ethical values with companies. In other words investors exclude companies, its moral, religious or environmental values contradict investors’ convictions.
- Impact investing aims to have a positive environmental or social influence accomplishing investors’ missions. Sometimes investors value positive impact more than financial returns.
- ESG integration aims to build a resilient portfolio to provide long-term risk-adjusted financial returns.

Recent studies showed that companies with higher ESG ratings are associated with higher profitability (have lower costs per capita, less volatile earnings, less systematic volatility), lower systematic risk and lower tail risk. Drawing the conclusions MSCI strongly recommends all investors to incorporate ESG consideration in investment strategies, portfolio management and investment research. There should be no specialized “ESG Investing” and “Non-ESG Investing”. For all investors, it is the right time to integrate ESG, it is the smart thing to integrate ESG and it is the right thing to integrate ESG.

Conclusions. In order for humanity to achieve sustainable development first of all changes in the economic system should be made. The leading politicians and economists ought to take initiative and to start acting. The current negative influence on the environment should be stopped. This decrease of environmental pressure is possible when implementing the new economic concept “Fair distribution instead of economic growth”. In reality either governance does not have power or the desire to change the devastating influence of capitalism. Thus it is now the responsibility of everyone to make a valuable and urgent contribution for the sake of future generations. Individual consumptions must be reduced. The material values should at least partially contain the idea of living in harmony with nature.

When looking optimistically at the problems, first important steps have been made. All over the world local self-reliance is being developed. There is also the tendency to alter the dollar



with an alternative currency. Another promising fact is that wenn investing, investors consider ecological, social and governance aspects of the company. The time passes and in the next decades completely new generations will take control under corporations and governments. I hope more and more people will take seriously all possible consequences of the ecological and social crisis in order to maintain sustainable development of the biosphere.

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ПРОБЛЕМА ЕКОЛОГІЧОЇ ОСВІТИ У ПІДГОТОВЦІ СТУДЕНТІВ МЕДИЧНИХ ЗАКЛАДІВ

Б.Д. Семенюк

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У зв'язку з реаліями нинішнього життя суспільство повинне приділяти особливу увагу екологічній культурі, екологічному вихованню та формуванню екологічної свідомості у молоді. На жаль, поінформованість підростаючого покоління, зокрема стосовно екологічної ситуації у світі, регіоні, їх обізнаність з можливими шляхами вирішення різноманітних екологічних проблем є недостатньою.

Ми розуміємо, що екологічна освіта повинна бути синтезом поєднання таких компонентів: екологічні знання, екологічне сприймання, екологічний світогляд, екологічне виховання, екологічна культура. Стратегії екологічної освіти має відповідати певний рівень екологічної зрілості. Місією медичного закладу є створення умов для глибокого усвідомлення і практичної реалізації цілей підготовки висококваліфікованого фахівця.

Екологічна освіта у закладі медичної освіти – це результат якісної, ґрунтовної, теоретичної і практичної підготовки фахівців на основі взаємозв'язку міждисциплінарних наук із проблем людського суспільства та біосфери. Лише, коли зміст освітніх компонентів міститиме знання з природничо-наукових та професійно-орієнтованих дисциплін, екологічні знання студентів будуть сформовані лише на міцній біологічній основі.

Метою екологічної освіти у медичних закладах є формування особистості медичного фахівця, який володіє компетентностями та компетенціями, які передбачають володіння сучасними екологічними знаннями та уявленнями, новим ставленням до природи, розумінням