УДК 677.21.051
DOI 10.47367/0021-3497_2023_2_63

ANALYSIS OF ENVIRONMENTAL INNOVATIVE TECHNOLOGIES PRIORITY AND THE MULTIDIMENSIONALITY OF MONITORING FOR ENVIRONMENT AND SECURITY OF CONSUMER GOODS

АНАЛИЗ ПРИОРИТЕТА ЭКОЛОГИЧЕСКИХ ИННОВАЦИОННЫХ ТЕХНОЛОГИЙ И МНОГОМЕРНОСТЬ МОНИТОРИНГА ОКРУЖАЮЩЕЙ СРЕДЫ И БЕЗОПАСНОСТИ ПОТРЕБИТЕЛЬСКИХ ТОВАРОВ

N.O. MAMMADOVA, V.H. MUSAYEVA, U.V. NEYMATOVA

Н.О. МАММАДОВА, В.Х. МУСАЕВА, У.В. НЕЙМАТОВА

(Azerbaijan State Economic University UNEC)

(Азербайджанский государственный экономический университет UNEC)

E-mail: efendiyev.nigar@mail.ru

The process of transformation of scientific achievements into production which increases the competitiveness is innovation. The main present time requirement is implementation of environmentally safe innovative techniques that ensure the creation of economically profitable low-waste and waste-free technologies with high environmental safety acts as a modern need on the enterprises.

Процессом трансформации научных достижений в производство, повышающим конкурентоспособность субъектов предпринимательской деятельности, являются инновации. Потребностью нынешнего времени является внедрение на предприятиях экологически безопасных инновационных технологий, обеспечивающих создание экономически выгодных малоотходных и расширение безотходных технологий с высокой экологической безопасностью для окружающей среды и людей.

Keywords: innovative technology, multidimensionality, environmental safety, consumer goods, ecological indicators.

Ключевые слова: инновационная технология, многоаспектность, экологическая безопасность, потребительские товары, экологические индикаторы.

Introduction

With the expansion of global production, there is an increase in environmental pollution, which is a must in order to track environmental safety and prioritize the introduction of environmental innovative technologies.These are projects that aim to protect the environment from the harmful effects of pollution, as well as the ones that we implement in the form of new products and technological processes in order to minimize the release of harmful substances into the environment.

It stands to mention that the main innovative technologies in ecology relate to the development of waste processing methods. As an example of eco-innovation technologies, we can present biodiesel - a fuel on the basis of rapeseed oil that helps to reduce carbon emissions and does not harm the environment; electric vehicles that do not emit exhaust gases; wood fuel briquettes that are able to heat boilers with minimal smoke emission; robot Dustbot that cleans and monitors the level of air pollution and removes garbage; synthetic trees to absorb carbon dioxide, etc.

On the basis of global trends, we can highlight the next priority markets for innovative environmental goods such as economical use

of raw materials; the use of non-waste and low-waste technology; environmental transport; bio plastics and polymers.

It is not secret that recently, the countries that have significant development in the field of industry represent bigger requirements for the environmental safety of goods, which is not effective on a global scale.

The possibility to reduce the level of damage to the environment that appears in the process of production, use, consumption, storage, disposal of consumer goods by humans determine the aspect of environmental safety of consumer goods.

It is appropriate to note that the greatest negative impact on the environment cause such consumer goods and processes of their production, which create emissions into the atmosphere, soil and water by chemicals in various phase-dispersion states, as well as formation of noise, thermal, electromagnetic pollution during storage, transportation, operation, consumption and disposal. However, it is worth to note that commodity producers are not interested in the creation of environmentally friendly consumer goods, since this requires additional costs for their development and introduction into production.

In turn, continuous monitoring of ecological indicators of the environment, parameters and properties that cause environmental safety of consumer goods implement the United Nations Organisation, International Atomic Energy Agency, International Organization for Standardization, International Electrotechnical Commission, GREEN PEACE, WWF, as well as state organizations for control and supervision in the fields of ecology and technical regulation. The purpose of monitoring the environmental properties of consumer goods is to reduce the flow of pollution into the natural environment, preserve, rational consumption and reproduction of resources. To preserve the gene pool of rare and endangered species of flora and fauna [1].

The degree of harmful effects of chemical, physical, and biological properties on the environment characterize environmental indicators. We can systematize them by the nature of the impact, as well as the main indicators of product safety.

For example, significant environmental hazards, the goods that have the most negative environmental properties include packaging materials, disposable tableware, hygiene items, household goods on the basis of plastics (polyethylene, polyethylene terephthalate, polystyrene, polypropylene), which came into use in the 60-70s of the last century.

It is worth to note that packaging materials, non-repair goods, goods with rapid moral age form household garbage.

Methodology

To reduce the amount of waste, we need modern technologies for recycling waste and materials. We assess the determination of the waste disposal method by the chemical composition, humidity, thermal conductivity, solubility of the components in water and density. They vary in a fairly wide range in relation to the fractional composition of the waste. So, the highest content of carbon, nitrogen, hydrogen, oxygen, sulfur in household waste is paper, cardboard and food waste. Discarded personal computers represent 2.5 billion kg of plastics, 0.5 billion kg of lead, 0.25 million kg of mercury per year. Methods of industrial waste disposal are liquid-phase oxidation, heterogeneous catalysis, pyrolysis of industrial waste; fire procession [2].

Table 1

Types of waste	Recycling method		
Metal waste	Sorting (separation of scrap and waste by type); cutting (removal of non-metallic inclusions); mechanical processing (cutting, crushing, bagging, briquetting), remelting, storage, burial		
Wood waste	Pressing, cutting, burning, storage		
Plastic waste	Pressing, incineration, burial		
Highly toxic Waste	Packing in special containers and disposal		
	Organic combustible substances	Crushing, pressing, incineration, burial	

Continuation of Table 1

Faulty bulbs	Demercurization of lamps, disposal of mercury	
Sand pollute with petroleum products: molding earth	Incineration, burial	
Damaged cylinders with residues of substances	Undermining of cylinders in special chambers, burial	
Radioactive waste	Packing in special containers and disposal in special plants	

A serious environmental problem and an aspect of environmental safety is the disposal of goods from plastics, which practically do not decompose naturally. We show some methods of waste of different types and origins procession in table 1.

In the process of burning, there is a large amount of toxic substances that pollute the environment. The most acceptable methods to prevent the accumulation of plastic waste are recycling and the use of biodegradable polymer materials (materials that the nature destroys to harmless compounds under the influence of natural factors).

We can recycle homogeneous (polyethylene waste) and mixed plastics (thermoplastics). One of the most modern methods to solve the problem of plastic waste and improve the environmental properties of plastic products is the creation of *biodegradable plastics*, which we create by synthesis with the help of microorganisms (biopolyesters, biopolysaccharides) or make on the basis of natural substances (natural polysaccharides, a mixture of polyethylene and starch). In addition, synthetic polyesters that we produce by chemical synthesis methods are biodegradable (table 2).

Table 2

Product type	Environmental requirements in accordance with the standards
1. Substances and materials	
Fuel (coal, gas, diesel) Gasoline, dyes	The sulfur content
Detergents	Lead content
Pesticides Mineral fertilizers	The content of the sodium tripolyphosphate, the rate of decomposition in natural environments
Disinfectants	MPC, environmentally hazardous classes, decomposition rate in natural environments, storage and application rules
Solvents, paints, varnish	Reduce of the production of PCFCS, improvement of the method of use
Ozone-depleting substances, together with per chlorofluorocarbons (PCFCS)	PCFCS in cooling and aerosol devices and in fire extinguishers
2. Transport	
Internal combustion engines in motor transport, aircraft and ships	Concentration of pollutants in exhaust gases, noise level, vibration

The enterprises that implement environmentally hazardous technologies cause hazardous effects as well as enterprises that serve goods, such as dry cleaning and Laundry facilities, car washes, etc.

Due to the global nature of the impact of electromagnetic fields, the world health organization (who) created the term "electromagnetic pollution".

Numerous toxic compounds that come from building materials, furniture coverings and various consumer goods are most often in a gaseous state. However, they also take a dust-like form, and sometimes evolve in the form of an aerosol. In General, we identify about 1,000 chemical and biological agents in the air of the places where people spend most of their lives. Some of them we already know, and a number

of them are yet to know, in particular their presence in the body and the release of compounds or their metabolites. This is an important component in order to assess the impact on the body of toxicants and long-term results.

Another aspect of ecological and hygienic assessment is the study of cumulation processes in different tissues. The damage to the health of the population relates primarily to an increase in the number of diseases of the upper respiratory tract with subsequent damage to the lower respiratory tract. Even relatively low concentrations of a large number of toxic substances are not indifferent to a person and can affect his well-being, performance and health. Studies of indoor air make it possible to identify a number of anthropotoxins in them, the distribution of which in accordance with hazard classes is as follows: dimethylamine, hydrogen sulfide, nitrogen dioxide, ethylene oxide, benzene (2nd hazard class, highly hazardous substances); acetic acid, phenol, methyl styrene, toluene, methanol, vinyl acetate (3rd hazard class, moderately hazardous substances); acetone, methyl ketone, butyl acetate, butane, methyl acetate (4th hazard class).

For most anthropotoxins, we conducted studies with regard to their effects on the human body. So, *hydrogen sulfide* (H_2S) is a colorless gas with a characteristic smell of rotten eggs, is a strong nerve poison that can cause death from respiratory arrest. The threshold for the smell of hydrogen sulfide is 0.000012-0.00003 mg/l. Slight but clearly noticeable odor in 0,0014-0.0023 mg/l; a strong smell, but for the ones used to it not painful - when 0,003 mg/l; a significant smell when 0,004; if 0,007-0,011 mg/l - odor painful even for people used to it. At higher concentrations, the smell is less strong and unpleasant. Prolonged inhalation can lead to bronchitis or inflammation and swelling of the lungs[3].

High concentrations of *benzene* vapors - a colorless gas-affect mainly the Central nervous system (narcotic and partly convulsive effect). Very high concentrations of benzene lead to almost instantaneous loss of consciousness and death within a few minutes. This situation can occur in production when we work with benzene. At lower concentrations-excitement, similar to alcohol, then drowsiness, general weakness, dizziness, nausea, vomiting, headache, loss of consciousness.

Lead (PB) affects protein synthesis, the energy balance of the cell and its genetic apparatus. Children are more sensitive to lead than adults. Lead whitewash, lead sulfate, and lead oxide are more toxic than other lead compounds.

*Nickel, chrom*ium in the industries that associate with their use, provoke the occurrence and development of cancer (primarily lung and nose cancer).

Cobalt acts on carbohydrate metabolism, increases blood sugar level in the blood, selectively damages the endocrine part of the pancreas it also affects the cardiovascular system, dilates blood vessels, lowers blood pressure, and selectively affects the heart muscle. We can divide the harmful effects of construction materials, structures and products on human health into four components:

- exposure to toxic substances-compounds (often of a protein nature) of bacterial, plant or animal origin, which can cause disease when they ingest in the human body, and death at high concentrations;

- exposure to carcinogens (radon, asbestos, formaldehyde, benzapyrene, benzene, vinyl chloride, cadmium and its compounds, coal and petroleum resins and lacquers, household soot, etc.) - chemicals whose impact on the human body under certain conditions causes cancer and other tumors;

- exposure to electromagnetic radiation (reinforced concrete structures);

- microbial air pollution (as a result of the appearance of fungi in bathrooms, etc.).

Harmful effects of construction materials, structures and products on human health through the air environment of premises can happen as a result of:

- direct release of harmful substances during operation;

- chemical reactions with other compounds in the indoor air;

- the influence of natural and climatic conditions - increase in air temperature, direct sunlight, etc.;

- destructions.

The greatest danger to human health represent carcinogenic substances, the influence of which is irreversible:

• first group: asbestos, benzene, vinyl chloride, cadmium and its compounds, radon, soot;

• the second group: benzapyrene, acetataldehyde, N-nitrosodimethylamine, polychlorinated biphenyls (PCBs), styrene, pentachlorophenol, dichloroethane, formaldehyde, chloroform, polycyclic aromatic hydrocarbons [4].

Harmful effects on human health produce mainly volatile substances that the material releases. These substances mainly include low-molecular-weight products that come from polymer materials (plastics):

- residual monomers: formaldehyde, phenol, styrene, etc.;

- organic solvents: acetone, benzene, toluene, esters, etc.;

- volatile plasticizers, such as dibutyl and dioctyl phthalate.

There are maximum permissible concentrations (MPC) for them. Heavy metals (chromium, mercury, lead, cadmium, etc.) are also dangerous substances for humans. They can exist in the form of salts and other compounds in paints, cement materials and especially in materials that we produce from industrial waste (this is a paradox of the usage of waste: it is useful from an environmental frame of reference, but can be dangerous for human health). A compound of heavy metals and some others in the form of dusty particles can be in the air of premises and with them enter the lungs of a person or, dissolve in water, affect the skin and mucous membranes [5].

The most harmful chemicals for human health, the main source of which in the air environment of residential buildings are construction and finishing materials that include formaldehyde, phenol, styrene, benzene, acetone, ethyl acetate, butyl acetate, ethylbenzene, xylene, toluene, butanol, lead, chromium, Nickel, cobalt.

Results and discussions

During the environmental monitoring of building materials, structures and products we us in construction or repair, it is advisable to follow the following

requirements, such as:

- construction materials, structures and products should not create a specific smell in the premises at the time of settling the houses;

- the construction materials, structures and products used should not release volatile substances into the environment in such quantities that can have a direct or indirect adverse effect on the human body (in accordance with the current action of all the substances);

- as one of the criteria for monitoring the quality of the environment of premises, there is an MPC of harmful substances of atmospheric air, where their accumulation, as wellas the ability to cause long-term consequences, should be excluded;

- construction materials, structures and products should not stimulate the development of microflora (especially pathogenic) and should be available for wet disinfection;

-construction materials, strutures and products must not accumulate static electricity on its surface, worsen the microclimate of premises, and the color and texture of construction materials must meet aesthetic and physiological and hygienic requirements.

CONCLUSION

Thus, the analysis of eco-innovative technologies and the complexity of monitoring the environmental safety allows us to conclude that the priority of reducing the level of damage that we cause to the environment in the process of production, consumption, storage, disposal of consumer goods by people perform as the introduction of eco-innovative technologies. In order to improve environmental safety and obtain products with high environmental performance, we encourage enterprises to implement a strategy of environmentally friendly production, and to take as a priority the purpose of construction demand for environmental innovation.

REFERENCES

1. Life safety: a Textbook / Ed. by E.A. Arustamov. M.: Publishing and trading Corporation "Dashkov and Co.", 2003. 496 p.

2. Hwang T.A., Hwang P.A. Safety of life. Rostov n/A: Phoenix, 2000.

3. Grinin A.S., Novikov V.N. Environmental safety. Protection of the territory and population in

emergency situations: a Textbook. M.: fair-PRESS, 2002.

4. Tupikin E.I. General biology with the basics of ecology and environmental protection. Textbook. M.: IRPO-Academy, 1999.

5. Bobkov A.S., Blinov A.A., Rozdin I.A., Khabarova E.I. Labor protection and environmental safety in the chemical industry. M.: Chemistry, 1997.

Рекомендована кафедрой инженерии и прикладных наук Азербайджанского государственного экономического университета. Поступила 20.02.23.