Environmentally oriented control systems

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Abstract. Environmental safety is currently gaining popularity in all areas of human activity. The release of various inorganic and organic chemicals in various industries, textile, pharmaceutical, agricultural and tanneries, is highly toxic to the environment and human health. In order to manage these impacts, it is necessary to prioritize environmental aspects in order to focus on those that will be recognized as more significant and have a greater impact on the environment. The main factors of an environmentally friendly product are production from natural raw materials, in environmentally friendly areas, away from industrial centers. The greening of agricultural activities and the transition of producers to the production of an environmentally friendly product, organic products is relevant, since it is the safety of food raw materials and food products that is one of the main factors determining people's health.

1 Introduction

In various areas of production, including manufacturing processes, food storage processes, organic compounds are widely used on a large scale. And the same sources of pollutants in the environment are pesticides used in industry, transport and agriculture, water purification by chlorination. The presence of these chemicals poses a serious threat to human health, ecosystems and organisms [1,2].

Comprehensive studies carried out by ecologists speak of the following environmental problems:

- unfavorable state of atmospheric air;
- unsatisfactory state of protection of waters from pollution by sewage, sources of drinking water supply
- critical state in the sphere of production and consumption waste management;
- lack of a waste recycling system [1,3].

Environmental protection is an important task in every production. Preservation of natural resources is the main task of the national economy. The goal is to identify sustainable and environmentally sound ways to produce an end product that uses fewer chemicals, is cost-effective and non-toxic.

The dairy industry is the largest consumer of water, the rate of water consumption for processing 1 ton of milk in milk receiving points and separator departments is 2 m3/h; at dairy plants with a productivity (t / day) up to 50 -5.6 m3 / h, a productivity (t / day) 401 and

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more 4.6 m3 / h; at factories of condensed dairy products -4.4 m3/h; at dairy canning plants for children's products 3 m3/h; Butter plants with a capacity (t/day) up to 50, with a capacity (t/day), the average annual amount of wastewater is 2.4 m3/h, and with a capacity (t/day) of 201 or more - 1.7 m3/h. Industrial water is not used at the enterprises of the dairy industry. It is used in the circulating water supply system for external washing of cars and watering the territory. These costs are up to 15% of fresh water consumption [4,5].

The main problem in the production of milk processing enterprises is that large volumes of drinking and industrial water are consumed. It is used at all stages of production:

- washing of equipment and containers;
- cooling of dairy products;
- in the work of technological equipment;
- in the process of restoring dry milk powder;
- in cleaning industrial premises and other economic purposes [5].

In order to reduce the consumption of fresh water, a direct-flow water supply system with water reuse is recommended. The consumption of recycled and sequentially used water in this way can average 20-25 m^3 per ton of raw material, which is more than 80% of water consumption.

The main source of conditionally clean water suitable for reuse is water leaving the cooling sections of serviceable plate heat exchangers. This water is allowed to be reused after heating below 80°C for washing equipment, containers, bathtubs, cisterns, milk flasks, cleaning rooms, washing overalls. Significant volumes of conditionally pure water for reuse are obtained by collecting condensate secondary milk vapors [4,6].

The drains receive a large amount of organic pollution from the washing operation of used equipment. Therefore, wastewater treatment is one of the most important tasks. Since organic and inorganic contaminants are contained in significant concentrations in wastewater, they cannot be immediately sent to centralized sewer systems. According to current regulations, plums must first undergo local cleaning. Suspended particles, fats, proteins, oils, reagents, detergents and other substances that can clog and clog sewer lines must be removed from the drains [1,7,8].

At dairy enterprises, the circulating washing system, and the enterprise only neutralizes wastewater with alkaline and acidic solutions. It is impossible to exclude acid and alkaline washings from the technology, but it is possible to minimize the costs of their neutralization by installing an equalizing tank of the required volume in front of the treatment facilities [5,7,8].

The concentration of organic substances in wastewater is due to the loss of raw materials and dairy products in the technological process. After washing the equipment and premises, they contain a significant amount of organic pollutants (Table 1) and belong to industrial wastewater that must be treated.

Table 1. Characteristics of wastewater.

Indicators	Indicator values	Indicators	Indicator values
Suspended solids, mg/l	350	Chlorides, mg/l	150
Nitrogen total, mg/l	50	BODp, mg/l	1000
Phosphorus, mg/l	7	Acidity, pH	6.8-7.4
Fats, mg/l	up to 100	–	–

When dumping 1 m^3 of untreated waste water, 40-60 m^3 of natural water is polluted.

Rinses obtained after washing process equipment (first flush water) are one of the types of waste that is currently not disposed of or used to a limited extent. According to VNIKMI, rinses are a water-and-milk mixture containing 1-4% dry matter, including up to 1% fat and protein. Collection and disposal of rinses is cost-effective. The most important result is the

prevention of the discharge of milk and dairy products residues into wastewater, which reduces the cost of their treatment. Abroad, the strips are thickened in vacuum evaporators (up to 50% dry matter) and sent to feed purposes. Purification of wastewater from proteins and fat is of great importance, since after appropriate treatment they can be used as feed additives, in the production of soap, technical lubricants. The rinsings are coagulated in a coalescer at pH 4.5 and 23°C and centrifuged. The sludge obtained after the primary treatment of wastewater is used as feed additives [4,7,9].

Whey is also the main source of wastewater pollution in dairy enterprises with organic compounds. Its collection and processing are organized at modern production facilities. The company actively uses the method of thickening and drying whey. They also use whey as a raw material for baking bakery products and bread.

In the production of environmentally friendly dairy products, it is prohibited to use GMOs, pesticides, growth hormones, antibiotics, food additives. The use of natural farming methods shows that the correct method of dairy farming is not genetic engineering, but organic production.

2 The results and discussion

It is possible to reduce the negative impact on the environment through the use of environmentally oriented management systems by the enterprise. These systems protect human health and the environment from the potential impacts of the company's activities, and also contribute to the preservation of the environment. One of the main concepts of an environmentally oriented management system is the environmental aspect of the enterprise [5,8].

The environmental aspect of the enterprise activity is directed to the activities of the organization, its products or services that interact with the environment. An important environmental aspect is one that has or is likely to have a more detrimental effect on the environment.

The process of determining environmental aspects includes 4 stages:

1. Identification of the types of activities of the enterprise that have an impact on the environment
2. Determining the nature of the impact on the environment of the selected types of activities
3. Assessment of the degree of impact on the environment
4. Determining the importance for the enterprise of selected activities.

The following factors are considered when collecting information on the impact of activities, products or services:

1. Emissions of pollutants into the atmosphere;
2. Formation of specific types of waste (taking into account the hazard class) and the conditions for their placement in the environment;
3. Pollution of land by waste, reagents;
4. Use of land for waste storage;
5. Discharge of pollutants into surface water bodies and groundwater;
6. Deformation of the earth's surface;
7. Irrational use of natural and fuel and energy resources.

The identification of environmental aspects should be guided by the following:

- Legislative acts and other regulatory documents in the field of protectionenvironment and rational use of natural resources;
- Systematized and generalized data on types of activity;
- Documents regulating the main and auxiliary production activities, types of products and services;

- The results of internal and external environmental audits, and inspections by regulatory authorities;
- Inventory data of sources of waste generation, emissions, dischargescontaminants;
- Requirements of the parties interested in the environmental aspects of the activities of enterprises;
- The process of identifying and highlighting priority environmental aspects of an enterprise includes the following steps:
- Primary identification of activities, products and services;
- Identification of specific sources of environmental impact (technologies, pieces of equipment, types of raw materials and materials, products and services).

3 Conclusion

The set of protective measures to prevent pollution of the biosphere by emissions consists of the following measures:

1. Development and application of low-waste and waste-free technological processes, which includes the processing of secondary dairy raw materials, namely whey.
2. The use of gas-cleaning and dust-collecting equipment to protect the air basin from emissions of harmful substances.
3. Training of specialists in the field of nature protection.
4. Conducting laboratory studies of raw materials and the final product
5. Preparation of information on the inventory of production and consumption waste.

To eliminate the negative anthropogenic impact on the environment at the enterprises of the dairy industry, a number of measures should be taken:

- do not use vehicles with faulty internal combustion engines, as well as ignition and power systems;
- install motion sensors to improve energy efficiency;
- environmental education and education of workers and employees of the enterprise in the performance of technological tasks;
- installacentralizedsink;
- practice «dry» assembly of premises and re-water supply;
- use product packaging - environmentally friendly, which is subject to decomposition under the influence of sunlight, heat, air and soil microorganisms;
- ensuring the negative minimum impact on the environment during the organization of the technological process (improve technological processes);
- install reserve tanks for skimmed milk and buttermilk;
- equipping existing production shops with effective water treatment systems.

To ensure environmental protection in the dairy industry, strictly follow the requirements in accordance with the following documents:

1. Sanitary norms and rules «Hygienic rules and norms for the protection of atmospheric air in hired places»;
2. Sanitary norms and rules «Sanitary rules and norms for the protection of surface waters from pollution»;
3. Sanitary norms and rules «Sanitary rules and norms of coastal waters from pollution in places of water use of the population».

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