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**METHODS OF DANGEROUS DETERMINATION FOR POPULATION HEALTH IN THE STAGE OF USE OF INDUSTRIAL PRODUCTS BASED ON SURFACE ACTIVE SUBSTANCES**

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**Summary**: Based on the analysis of information on the assessment of the real situation in the industrial metropolis with the use of population products based on surfactants to make calculations on the problem of determining the health risks of the population. The degree of techno-anthropogenic loading of surfactants in the metropolis depends on the volume of use of the following products based on surfactants - a means of cosmetics and hygiene and building materials for the decoration of apartments. A close correlation between the use of population of products based on surfactants and the risk of incidence of chronic hepatitis, diseases of the nervous system and malignant tumors is revealed.

**Key words:** surfactants, methods of dangerous determination, population health

Today, in Ukraine, the use of surfactants is increasing rapidly due to their use, in virtually all sectors of the country's economy to provide technological processes in the production of a wide range of products from the release of drugs, cosmetics and detergents, construction materials, products for apartment decoration , offices, gyms for use in areas such as aviation and space. As a result, in this period, surfactants has actively penetrated into all areas of human habitation: domestic, industrial, environmental [1-2].

Today, the essence of the urgency and severity of the hygienic and environmental problem of surfactants lies in the fact that for many years these substances have been regarded by experts as indifferent, almost safe, because they belong to the 4th class of toxicity. Today, scientists have shown that surfactants in the conditions of chronic exposure to the body of experimental animals in small doses can lead to varying degrees of severity of complex pathological changes [3]. An analysis of the increase in the use of surfactants in Ukraine shows the severity of the situation regarding the real danger to public health, which has already created the ideal conditions for the formation of new dangerous ecological pathology of chemical genesis in the regions of the country.

According to the results of more than fifty years of comprehensive research of new surfactants, scientists of the KhNMU have scientifically substantiated, developed and approved the Ministry of Health of the USSR and the Ministry of Health of about 130 official state hygiene standards for water in reservoirs - concentration limits.

According to the results of these studies, it is determined that the surfactants in the body of warm-blooded animals create conditions for deep restructuring of the systems of regulation of intracellular metabolism, impaired exchange of neurotransmitters, change the kinetic characteristics of the parameters of the receptor binding of radioligatoglycans and activating and considerable voltage of adaptation mechanisms of the organism.

This publication deals with the problem of conducting biomedical research in the industrial metropolis, whose purpose and objectives are to determine the process of increasing techno-anthropogenic load of surfactants and to assess the degree of risks to public health on the basis of a risk assessment methodology.

**The aim of the study.** Based on the analysis of information on the assessment of the real situation in the industrial metropolis with the use of population products based on surfactants to make calculations on the problem of determining the health risks of the population.

**Material and methods of research.** A wide arsenal of methods and laboratory techniques was used in the process of research and development in accordance with the tasks set. In particular, the systematic approach and analysis were applied at all stages of work; historical and biblio-semantic - used to study world and domestic experience in the field of surfactants, environmental pathology, use of risk assessment methodology, etc .; hygienic - used to study the spread of surfactants in the metropolis; medical and statistical - in the problem of risk assessment for the population of the metropolis to characterize the main indicators of health; conceptual and organizational design - to justify the circulation of surfactants in the metropolis; statistical; laboratory; spectrophotometric; morphological; statistical.

**Research results.** Identifying the health risks of the metropolitan metropolitan area's use of products based on surfactants. Methodological basis for calculating the levels of risk to public health was the patent for the invention "A method for predicting the expected level of environmental pathology" [4].

Hygienic studies have established that the largest percentage of the surfactants products use accounts for building materials, cosmetics and hygiene products.

Based on the initial statistical data at the research first stage, the coefficients of excess (СE) of maximum permissible concentrations (MPC), maximum permissible discharges (MPD) of surfactants (SF) were calculated taking into account their hazard class (K) according to the formula (tab. 1) :

KE = Concentration SF/(MPC(MPD) \*К).

**Table 1**

**Coefficients of excess of maximum permissible concentrations values for the Kharkiv population**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| The name of the product containing MPC | Kharkiv region | | | Kharkiv | | |
| 2011 | 2013 | 2015 | 2011 | 2013 | 2015 |
| Polyethylene glycol | | | | | | |
| Paints and varnishes based on acrylic or vinyl polymers | 192,50 | 154,22 | 130,58 | 101,8 | 82,16 | 69,94 |
| Detergents and detergents, whether or not containing soap | 7,23 | 13,31 | 9,61 | 3,82 | 7,09 | 5,15 |
| Soap | 0,72 | 0,74 | 0,69 | 0,38 | 0,39 | 0,37 |
| Make up or skin care cosmetics | 0,37 | 0,41 | 0,28 | 0,20 | 0,22 | 0,15 |
| Shampoos | 0,08 | 0,06 | 0,05 | 0,04 | 0,03 | 0,03 |
| Lotions and hair care products | 0,03 | 0,02 | 0,05 | 0,02 | 0,01 | 0,03 |
| Oral and dental hygiene products | 0,010 | 0,012 | 0,009 | 0,005 | 0,006 | 0,005 |
| Shaving means | 0,16 | 0,17 | 0,15 | 0,09 | 0,09 | 0,08 |
| Polypropylene glycol | | | | | | |
| Paints and varnishes based on acrylic or vinyl polymers | 56,15 | 44,98 | 38,09 | 29,71 | 23,96 | 20,40 |
| Detergents and detergents, whether or not containing soap | 12,39 | 22,81 | 16,48 | 6,56 | 12,15 | 8,83 |
| Soap | 5,16 | 5,26 | 4,92 | 2,73 | 2,80 | 2,64 |
| Make up or skin care cosmetics | 0,53 | 0,58 | 0,40 | 0,28 | 0,31 | 0,22 |
| Shampoos | 0,22 | 0,18 | 0,15 | 0,12 | 0,10 | 0,08 |
| Lotions and hair care products | 0,05 | 0,03 | 0,07 | 0,03 | 0,02 | 0,04 |
| Oral and dental hygiene products | 0,004 | 0,005 | 0,004 | 0,002 | 0,003 | 0,002 |
| Shaving means | 0,05 | 0,05 | 0,04 | 0,02 | 0,03 | 0,02 |

In the second stage, the prognosis value of the incidence of Ycalc by a specific nosology was calculated depending on the СE MPC on the basis of regression analysis (tab. 2) [5].

**Table 2**

**Regression dependencies of the disease by specific nosology depending on the coefficients of excess of maximum permissible concentrations for the population of Kharkiv**

|  |  |  |
| --- | --- | --- |
| Nosology | Polyethylene glycol | Polypropylene glycol |
| Chronic hepatitis | Y=9019+20X1+38X2 | Y=7215+56X1+754X2 |
| Diseases of the nervous system | Y=80008+277X1-804X2 | Y=118007+1204X1-15891X2 |
| Malignant neoplasms | Y=4398+2X1-17X2 | Y=4398+9X1-10X2 |

On the predicted basis value of the incidence of Ycalc, the expected rate of morbidity was calculated (tab. 3).

**Table 3**

**The value of the coefficients of the expected level of morbidity for the population**

|  |  |  |
| --- | --- | --- |
| Nosology | Polyethylene glycol | Polypropylene glycol |
| Chronic hepatitis | 0,98 | 0,94 |
| Diseases of the nervous system | 0,89 | 1,00 |
| Malignant neoplasms | 1,05 | 1,05 |

It is established that the level of morbidity determined for Kharkiv due to the effects of surfactants shows that there is a significantly increased risk of chronic hepatitis, diseases of the nervous system and malignant neoplasms among the population.

**Conclusions:**

1. The degree of techno-anthropogenic loading of surfactants in the metropolis depends on the volume of use of the following products based on surfactants - a means of cosmetics and hygiene and building materials for the decoration of apartments.

2. A close correlation between the use of population of products based on surfactants and the risk of incidence of chronic hepatitis, diseases of the nervous system and malignant tumors is revealed.

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