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РОЗДІЛ 7

ТОВАРОЗНАВСТВО Й ЕКСПЕРТИЗА ТОВАРІВ

EVALUATION OF THE RADIATION SITUATION ON THE GRAIN PROCESSING ENTERPRISES OF KYIV

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Introduction. The risk of being people in the environment with high levels of radiation is determined by the duration, the type and intensity of radiation action on the body. Elevated background radiation is dangerous environmental factors that can lead to serious chronic diseases and death. The biggest threat is that radiation has no visible or noticeable manifestations that cannot establish its presence or excess – only measure with special measuring instruments. In places of people stay constant systematic measurements of radiation background is the only way to find out about the radiation threat.

Materials and methods. Measurement of radiation background is carried out by the exploration scintillation radiometer ЦПИ-88Н, which is designed to locate and identify the sources of gamma rays, as well as indirect measurements of radioactivity [1]. The device measures the natural gamma background from 10 to 3×10^4 mR/h and has a high sensitivity and reliability compared with more modern counterparts.

Dosimeter evaluates radiation background by the magnitude of the ionizing radiation power (gamma radiation and stream of beta-particles). The detector is a scintillation NaI crystal. Principle of the operation of device is that the particle enters the detector and causing a glow cathode material (scintillator), with the formation of the front beam of photons, which are recorded as further indicators of falling particles in matter. The system records not the same share but its "footprints" in the form of light.

Results and discussion. Question protect people from radiation emissions arising simultaneously with the discovery of radiation. This is due to the complex negative effects on the human body [2].

Radiometric control in enterprises is carried out to timely establishment of the fact and a degree of contamination of equipment, production and support facilities, finished goods, transport and other objects that can cause receiving high doses of radiation by employees of enterprise. Kyiv has undergone increased influence of radiation after ChNPP accident in 1986. Natural background radiation of Kyiv is the highest compared to the other cities in Ukraine, but it does not exceed the normative value (norm of radiation background is 20 mR/h, and natural radiation background – 10-16 mR/h). Daily measurements of radiation background can detect radiation levels increase and to take in time the necessary steps to eliminate the dangerous consequences.

Possible sources of radiation on grain processing enterprises are a building materials of industrial and domestic premises, iron structures (tracks, fire stairs, etc.), railway transport, road transport, industrial and technological equipment, raw materials, and sources of ionizing radiation are in the radiological lab and are used in devices for radiological research of materials and products of grain processing. Value radiation levels can range depending on weather conditions (the amendment eliminated) [3].

Measuring of the total radiation background at an enterprise for a month has established the following average values (in terms of mR/h): room of radiological laboratory (source of radiation contained in the lead safety deposit box) – 11,0; chemical laboratory facilities – 12,2; granite stairs in a mill-plant – 17,5; open area – 14,6; railway wagon on railway tracks – 16,7; 1st of mill-plant – 13,0; 7th mill-plant – 14,1; undersilo floor of elevator – 12,4.

In all in other premises of buildings, as well as in the territory and around equipment or transport experienced the same average level of radiation background does not exceed the maximum permissible standard values.

The value of measurements of the radiation background in different parts of territory of enterprise and in industrial and auxiliary facilities are shown in Table 1.

Table 1 – Results of measurements radiation background in grain processing enterprise of Kyiv

Place of investigations	The value of radiation background, mR/hr
Radiological laboratory	11,0 ± 2
Chemical laboratory	12,2 ± 2
Stairs of mill-plant	17,5 ± 3
The territory of the enterprise	14,6 ± 2
Wagon unloader	18,5 ± 3
The rail lines	16,7 ± 2
1 st floor of mill-plant	13,0 ± 1
7 st floor of mill-plant	14,1 ± 2
Under silo floor elevator	12,4 ± 2
Floor of heads of the elevators	14,8 ± 2
Administrating building	9,8 ± 1

Results obtained by converting the resulting value of a stream of gamma radiation (s^{-1}) in units of exposure dose (mR/h), given the magnitude of the sensitivity of detection unit by the formula (1):

$$R = \frac{SGR \times 1000}{3,9}, \quad (1)$$

where SGR – value of a stream of gamma radiation, s^{-1} ;

1000 – conversion factor;

3,9 – sensitivity of device with detecting.

Analysis of the data showed that no value exceeded the normal radiation background, but there was a slight excess of natural background radiation, which is within acceptable error and caused building materials (granite and iron).

To reduce radiation levels can be offered wet cleaning using detergent, replacement of building materials, eliminate the source of radioactive radiation, the use of personal protective clothing and the like.

Conclusions. Thus, at the grain processing enterprises in Kiev there is normal average background radiation, which does not threaten to the health and lives of workers even with permanent residence in the area.

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РОЗДІЛ 7 – ТОВАРОЗНАВСТВО Й ЕКСПЕРТИЗА ТОВАРІВ

МАРКЕРИ ЯКОСТІ І ТРИВАЛОСТІ ВИТРИМКИ КОНЬЯКІВ І МЕТОДИ ЇХНЬОГО ВИЗНАЧЕННЯ Стоцька А.П.	229
ОПРЕДЕЛЕНИЕ ОРГАНИЧЕСКИХ АРОМАТООБРАЗУЮЩИХ ВЕЩЕСТВ С ПРИМЕНЕНИЕМ МУЛЬТИСЕНСОРНЫХ СИСТЕМ Очкурёва А.Ф.	230
ДОСЛІДЖЕННЯ КОНКУРЕНТНОГО СЕРЕДОВИЩА УКРАЇНСЬКОГО РИНКУ КОНЬЯКІВ ТА БРЕНДІ Філоті К.М.	232
ПРИМЕНЕНИЕ МУЛЬТИСЕНСОРНЫХ СИСТЕМ ТИПА «ЭЛЕКТРОННЫЙ ЯЗЫК» В АНАЛИЗЕ ПИЩЕВЫХ ПРОДУКТОВ Пукас А.С.	235
ЛАНТАНИДНЫЙ ЛЮМИНЕСЦЕНТНЫЙ МАРКЕР ДЛЯ ОПРЕДЕЛЕНИЯ ПИЩЕВОЙ ДОБАВКИ Е 300 Деречина А.В., Комарницкая Ю.В.	237
СРАВНИТЕЛЬНАЯ ОЦЕНКА МЕТОДОВ ОПРЕДЕЛЕНИЯ СУММЫ ФЕНОЛЬНЫХ СОЕДИНЕНИЙ Король В.А.	238
ЗАСТОСУВАННЯ МЕТОДУ КОМП'ЮТЕРНОЇ КОЛОРИМЕТРІЇ ДЛЯ ОЦІНКИ КОЛЬОРУ МАЙОНЕЗУ Пугаєва С.А.	240
EVALUATION OF THE RADIATION SITUATION ON THE GRAIN PROCESSING ENTERPRISES OF KYIV Marharyta Labzhynska, Natalia Volodchenkova, Olexandr Hivrich	242
ОПРЕДЕЛЕНИЕ НИТРАТОВ В РАННИХ ОВОЩАХ Стахурская Ю.А., Крыжановская А.Ю., Бабич М.В.	244
ANALYSIS OF GROUND COFFEE QUALITY BY USING COFFEE CUPPING Sorokina K.	246
QUALITY AND FOOD SAFETY Stiba A.V.	247
СУЧАСНІ МЕТОДИ ДОСЛІДЖЕННЯ ЯКОСТІ РИСОВОГО СОЛОДУ Сорокін А.С.	248
ОЦІНКА ЯКОСТІ СИРУ КИСЛОМОЛОЧНОГО Махлай А.І., Золотоверх К.В.	249
ОРГАНОЛЕПТИЧНА ОЦІНКА КОВБАСНИХ ВИРОБІВ Зяблова Ю.С.	250
ДОСЛІДЖЕННЯ ЯКОСТІ ТА ПОВНОТИ МАРКУВАННЯ ДЕЛІКАТЕСНОЇ СОЛОНОЇ РИБОПРОДУКЦІЇ НА ПРИКЛАДІ СЪОМГИ СЛАБОСОЛЕНОЇ Болгірева К.С.	252

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