

оцінка кількісних методик з визначенням операційних характеристик і розроблені стандартизовані методики виконання вимірювань концентрацій мікроорганізмів-продуцентів однокомпонентних мікробних препаратів в повітрі робочої зони.

Ключові слова: мікроорганізми-продуценти *Pseudomonas fluorescens S32* та *Bacillus subtilis M-22*, мікробні препарати «Стимул» та «Бетапротектін», методи визначення концентрації мікроорганізмів-продуцентів в повітрі робочої зони.

Summary

DEVELOPMENT AND VALIDATION OF METHODS FOR MEASURING SINGLE-COMPONENT MICROBIAL PREPARATIONS BASED ON STRAIN BASED STRAINS *BACILLUS* AND *PSEUDOMONAS* IN THE WORKING AREA

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For the first time experimental modeling of microbial aerosols have been carried out to develop technology of quantitative determination and hygienic

regulation of microorganisms-producers in the working area. Based on the set of regular concentration dependences of the growth of microorganisms-producers of the genera *Bacillus* and *Pseudomonas* dynamics methods for their quantification in the working area have been developed. The first algorithm is justified and executed metrological evaluation of quantitative methods to determine the operating characteristics and developed a standardized method of measuring the concentration of microorganisms-producers of single-component microbial agents in the working area.

Keywords: producing microorganisms *Pseudomonas fluorescens S32* and *Bacillus subtilis M-22*, the microbial preparations "Stimulus" and "Betaprotektin", methods for determining of concentration producing microorganisms in the air of the working area.

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DEFINITE FEATURES OF DIETARY INTAKE OF INTERNATIONAL STUDENTS FROM INDIA

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The number of foreigners who are educated in Ukraine increases every year. The amount of studies comparing nutritional quality of food intake of foreign students who live in Ukraine is limited. Data on Indian students' nutrition and eating patterns are especially lacking. It was the aim of the present study to compare the ethnic differences in food consumption and the contributing main components of Indian students' diets. Macronutrient (proteins, fats, carbohydrates) dietary intake was estimated using food frequency questionnaire. Data were obtained to analyze food intake and compare it with the recommendations of the Ministry of Health of Ukraine (MHU) and the World Health Organization (WHO). After analyzing the data of food frequency questionnaire the following results were obtained: most of 119 students generally follow the daily diet regime; total energy intake in males' and females' daily diet below the standards of MHU. Furthermore, the nutrient ratio of P: F: C (proteins, fats, carbohydrates) has differences with the recommendations of WHO. The imbalance primarily caused by the

selective food intake of international students *siffernada* (deficiency of fish, seafood, local and seasonal fruits, vegetables and berries in the diet of respondents), excessive consumption of mono-, disaccharides and accordingly polysaccharides deficiency in students' diet; insufficient consumption of proteins and fats with animal origin. Such selective diet is a prerequisite for the formation of nutritional disorders and alimentary diseases caused, leading to reduced quality of life and learning.

Keywords: *diet regime, eating patterns, calorific value, macronutrient ratio, ethnic*

Rational nutrition is full in quantity and balanced in quality nutrition pattern for normal height, physical and psychophysiological organism development, its high work capacity, active longevity and adverse environmental natural, man-caused, social environment factors resistance. The rational nutrition has to be full in quantity. The dietary intake food calorific value must correspond to the organism energy consumption including the undigested part of the dietary intake. It also has to supply the dietary intake quality (balance) which means that all nutrients must be contained in optimal quantities and ratios. Food intake hours must correspond to the organism biological rhythms. The daily intake distribution must correspond to the organism physiological needs. Food must be cooked in accordance to the digestive system enzymic abilities. Food must be non-toxic and harmless in epidemiological aspect [10]. The study of the nutrition of the individual or organized collective allows the objective nutrition assessment for timely detection of the alimentary caused health disorders and diseases (energy-protein, vitamin, macro-, microelement deficiency and etc.). Energy and nutrient consumption is one of the first and basic control methods of different sex and age, social and professional groups of people [10]. The number of foreigners who are educated in Ukraine increases every year. According to the Ukrainian State Centre of International Education in the 2013/2014 number of foreign students in educational institutions of Ukraine were about 70 thousand students from 145 countries. Multifactorial environment of new

residence country influence these students' life. Food intake of foreign students needs special attention as a factor affecting the health, adaptation to new climatic, social conditions and new foods. It noted in particular that a significant proportion of foreign students follow the traditions of their religious or ethnic group in the nutrition. Such selective food intake in a new region of residence and range of food consumption are preconditions for the formation of nutritional disorders and nutritional diseases. The study of food intake of students from India has multi-direction and hygienic value and is relevant for the prevention of alimentary-caused disease, formation of scientific ways of correcting nutritional disorders, improving adaptation processes and efficiency of this group. The aims of the present study are describing the eating patterns of the Indian students of Odessa National Medical University and determining the macronutrient (proteins, fats, carbohydrates) and energy intake of students, as compared with the Ministry of Health of Ukraine (MHU) and World Health Organization (WHO) recommendations to make the international students' diet more rational and healthy.

Material and methods.

The research was performed during the November, 2016. Nutrient and energy intake of 119 students from India was estimated using food frequency questionnaire. The dietary information was analyzed with STATISTICA 12.5 (StatSoft Inc., USA) software.

Research results

In total were examined 119 persons, including 70 males (59%) and 49 females (41%) and 119 questionnaires were administered. Ages of the respondents ranged from 19 to 24 years. The length of time the international students had been in Ukraine was from 3 to 4 years. The most commonly consumed food origin by male students were chicken, potato, rice, bread, cheese, beans and chocolate. For females, there were milk, chicken, cheese, different vegetables, sweets and rice. However, there were deficiency of meat, fish, seafood, Ukrainian local and seasonal fruits, vegetables and berries in their diet. According to the questionnaire, 82% of students avoided consumption of unfamiliar food. 72% of respondents consume the fast food (burgers, fries, pizza) more than once a week. 83% of students follow the daily diet regime though 68% of women and only 41% of men have breakfast before classes, rest of the students eat their breakfast in the breaks. The main reference used to determine reported macronutrient (proteins, fats, carbohydrates) intakes from this survey were the standards of MHU and WHO recommendations. Analysis of the daily intake of male students showed actual protein intake averages 77,1±1,2 g, including 38,6±1,1 g of animal protein. Actual protein intake of female students averages 61,4±1,4 g, including 30,6±1,2 g of animal protein. The total protein content in the diet is almost in line with the standards of MHU in both groups. However, according to the WHO recommendations animal protein deficiency in males' diet is 8,10 ±0,24%, in females' diet is 10,0 ±0,15 %. Daily

consumption of fat of male students averages 78,9±1,3 g, including 33,8±1,6 g of plant origin. Actual fat intake of female students averages 60,3±1,3 g, including 28,9±1,8 g of plant origin. The total fat content in the diet is almost complies with the standards of MHU for all students. Nevertheless, according to the WHO recommendations shortcoming of fat from animal origin in males' diet is 18,14±1,37 %, in females' diet is 26,9 ±1,44 %. Analysis of the daily intake of male students showed actual carbohydrates intake averages 359,1±1,8 g, including 113,4±1,3 g of monosaccharides and disaccharides. Actual carbohydrates intake of female students averages 290,1±1,7 g, including 91,7±1,2 g of mono- and disaccharides. The total carbohydrates content in the diet is almost in line with the standards of MHU in both groups. Even so, according to the WHO recommendations polysaccharides deficiency in males' diet is 31,37±1,16 %, in females' diet is 24,27±0,95 %. The ratio of proteins, fats and carbohydrates (P: F: C) is 1:1:4,7 in males' diet and 1:1:4,8 in females' diet (according to the WHO ratio is recommended 1:1:4). Diet of men and women have the total energy intake averages 2467,4±2,3 kcal and 1965,8±1,5 kcal, respectively (See Table 1) Deficiency of calories in males' diet is 11,9±0,8%, deficiency of calories in females' diet is 12,2±0,5% compared to MHU standard.

Conclusion:

The imbalance could be caused by the selective food intake of international students from India (deficiency of fish, seafood, Ukrainian local and seasonal fruits, vegetables and berries in the diet of respondents). Over time, excessive

Table 1

The actual daily consumption of macronutrients by international students from India ($p \leq 0,01$)

Sex	Total daily energy intake, kcal (M±m)	Daily protein intake, g (M±m)		Daily fat intake, g (M±m)		Daily carbohydrate intake, g (M±m)		Ratio of P : F : C
		animal origin	plant origin	animal origin	plant origin	mono- and disaccharides	Polysaccharides	
Male	2467,4±1,3	38,6±1,1	38,5±1,2	45,1±1,4	33,8±1,6	113,4±1,3	245,7±1,1	1:1:4,7
Female	1965,8±1,5	30,6±1,2	30,8±1,9	31,4±1,3	28,9±1,8	91,7±1,2	198,4±1,4	1:1:4,8

consumption of mono-, disaccharides can cause glucose tolerance disturbance. Insufficient intake of complex carbohydrates leads to the depletion of intestinal microflora, since complex carbohydrates are a substrate for normal development of probiotic microflora. It can cause a malabsorption of nutrients, deterioration of motility and peristalsis. Insufficient consumption of proteins and fats with animal origin may result in deficiency of essential amino acids, protein synthesis disorder, malabsorption of fat-soluble vitamins, vitamin deficiencies. Energy malnutrition can cause weight loss and deceleration of the basal metabolism. Such selective diet is a prerequisite for the formation of nutritional disorders and alimentary diseases, leading to reduced quality of life and learning. Therefore it is necessary to raise the level of international students' awareness of rational nutrition for the prevention of nutrition-related diseases in their social group.

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Резюме

НЕКОТОРЫЕ ОСОБЕННОСТИ ФАКТИЧЕСКОГО ПИТАНИЯ ИНОСТРАННЫХ СТУДЕНТОВ ИЗ ИНДИИ

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Число иностранцев, которые получают образование в Украине, ежегодно растет. Количество исследований, изучающих фактическое питание иностранных студентов, которые живут в Украине, ограничено. Особенно недоста-

точно данных о структуре питания студентов-выходцев из Индии. Целью настоящего исследования было изучение этнических особенностей структуры питания и фактического потребления макронутриентов индийскими студентами. Потребление макронутриентов (белков, жиров, углеводов) оценивалось с помощью анкетно-опросного метода. Полученные данные были сравнены с рекомендациями Министерства здравоохранения Украины и Всемирной организации здравоохранения. После анализа данных были получены следующие результаты: большинство из 119 студентов в целом соблюдают режим питания; суточная энергетическая ценность рациона мужчин и женщин ниже норм МЗ Украины. Кроме того, соотношение Б: Ж: У (белков, жиров, углеводов) не соответствует рекомендациям ВОЗ. Дисбаланс вызван, в первую очередь, селективным питанием иностранных студентов из Индии (дефицит рыбы, морепродуктов, местных и сезонных фруктов, овощей и ягод в рационе респондентов), чрезмерным потреблением моно-, дисахаридов и, соответственно, дефицитом полисахаридов в рационе студентов; недостаточным потреблением белков и жиров животного происхождения. Такое избирательное питание создает предпосылки для формирования алиментарно-обусловленной патологии, что приводит к снижению качества жизни и обучения.

Ключевые слова: режим питания, структура питания, энергетическая ценность, соотношение макронутриентов, этнические особенности.

Резюме

ДЕЯКІ ОСОБЛИВОСТІ ФАКТИЧНОГО ХАРЧУВАННЯ ІНОЗЕМНИХ СТУДЕНТІВ З ІНДІЇ

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Кількість іноземців, які здобувають освіту в Україні, щороку зростає. Число

досліджень, що вивчають фактичне харчування іноземних студентів, які живуть в Україні, обмежене. Особливо недостатньо даних про структуру харчування студентів-вихідців з Індії. Метою цього дослідження було вивчення етнічних особливостей структури харчування і фактичного споживання макронутриентів індійськими студентами. Споживання макронутриентів (білків, жирів, вуглеводів) оцінювалося за допомогою анкетно-опитувального методу. Отримані дані були порівняні з рекомендаціями Міністерства охорони здоров'я України та Всесвітньої організації охорони здоров'я. Після аналізу даних були отримані наступні результати: більшість з 119 студентів в цілому дотримуються режиму харчування; добова енергетична цінність раціону чоловіків і жінок нижче за норми МОЗ України. Крім того, співвідношення Б: Ж: В (білків, жирів, вуглеводів) не відповідає рекомендаціям ВОЗ. Дисбаланс викликаний, в першу чергу, селективним харчуванням іноземних студентів з Індії (дефіцит риби, морепродуктів, місцевих і сезонних фруктів, овочів і ягід в раціоні респондентів), надмірним споживанням моно-, дисахаридів і, відповідно, дефіцитом полісахаридів в раціоні студентів; недостатнім споживанням білків і жирів тваринного походження. Таке виборче харчування створює передумови для формування аліментарно-обумовленої патології, що призводить до зниження якості життя і навчання.

Ключові слова: режим харчування, структура харчування, енергетична цінність, співвідношення макронутриентів, етнічні особливості.

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