Вестник ВГУИТ/ Proceedings of VSUET ISSN 2226-910X E-ISSN 2310-1202
DOI: http://doi.org/10.20914/2310-1202-2022-1-35-39 Оригинальная статья/Research article
УДК 640 Open Access Available online at vestnik-vsuet.ru

Пищевые добавки и их влияние на организм студентов

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Аннотация. Мир не стоит на месте. Мы ежедневно сталкиваемся с достижениями современной науки: мы способны связаться с человеком с другого континента посредством Интернета, мы беспрепятственно минуем любые расстояния благодаря разным видам транспорта. И все же существуют вещи, которые автоматизировать, улучшить, ускорить пока нельзя. Человеку все также нужно спать, иметь некоторую физическую активность в течение дня и, конечно, есть. Весь день человека может легко подчиниться ритму: завтрак, обед, ужин, а еще, конечно, перекусы, полдник, бранч, поздний ужин. И отказаться от еды все сложнее и сложнее, так как полки магазинов ломятся от товаров, которые готовы лежать там годами, пока мы с Вами их не купим. Так происходит потому, что большинство продуктов, которые мы потребляем, содержат в своем составе различные пищевые добавки. Главная цель которых состоит в том, чтобы они были вкуснее, дольше хранились и т. д. Несомненно, питание всех групп населения может быть подвержено воздействию пищевых добавок, однако в этой статье мы рассмотрим молодежь: студентов 2 и 3 курса. Конечно, учеба, написание курсовых проектов, большое количество практических и других занятий лишает возможности, а точнее сил и желания, питаться правильно. Поэтому эта возрастная группа представляет особый интерес. Насколько студенты осведомлены о наличии пищевых добавок в их пище? Сколько из респондентов опроса следят за своим рационом? И вообще: настолько ли вредны пищевые добавки, как пишут в средствах массовой информации? В этой статье мы проанализируем данные опроса студентов, а также разберемся в том, что такое пищевые добавки и как они влияют на организм.

Ключевые слова: пищевые добавки, студенты, организм, влияние, питание, рацион

Dietary supplements and their effect on the body of students

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Abstract. The world does not stand still. We are daily confronted with the achievements of modern science: we are able to communicate with a person from another continent via the Internet, we easily bypass any distance thanks to different modes of transport. And yet there are things that cannot be automated, improved, accelerated yet. A person still needs to sleep, have some physical activity during the day and, of course, eat. The whole day of a person can easily obey the rhythm: breakfast, lunch, dinner, and, of course, snacks, afternoon tea, brunch, late dinner. And it's getting harder and harder to give up food, as store shelves are bursting with goods that are ready to lie there for years until we buy them. This is because most of the foods we consume contain various dietary supplements in their composition. The main purpose of which is to make them tastier, stored longer, etc. Undoubtedly, the nutrition of all population groups can be affected by food additives, but in this article we will consider young people: 2nd and 3rd year students. Of course, studying, writing course projects, a large number of practical and other classes deprive you of the opportunity, or rather the strength and desire, to eat right. Therefore, this age group is of particular interest. To what extent are students aware of the presence of food additives in their food? How many of the survey respondents monitor their diet? And in general: are dietary supplements as harmful as they say in the media? In this article, we will analyze the survey data of students, as well as understand what dietary supplements are and how they affect the body.

Keywords: nutritional supplements, students, body, impact, nutrition, diet

Introduction

One of the main criteria for the well-being of the population is the citizens state of health of [1, 2, 3], including their nutrition. The nutrition of a modern young person – a student – is not able to meet the body's needs for many biologically active substances: proteins, fats, amino acids, dietary fibers, flavonoids, vitamins, trace elements, phenolic compounds and other vital components [4], which are the basis for maintaining health in the body. Proper nutrition is the main condition for the existence, growth and development of the human body. According to many authors, a rational and balanced diet ensures the normal functioning of the human body, increases resistance to various harmful environmental influences [5], allows a person to develop normally.

The purpose of this work is a comprehensive study of the problem of the widespread use of biologically active additives in food products and their effect on the human body (student). The age group selected for the analysis is characterized by increased mental performance. This is due to the fact that studying implies continuous assimilation of new material, which requires a lot of effort, including

Для цитирования
Еременко В.Н., Ковтун Р.И. Пищевые добавки и их влияние на организм студентов // Вестник ВГУИТ. 2022. Т. 84. № 1. С. 35–39. doi:10.20914/2310-1202-2022-1-35-39

For citation
Eremenko V.N., Kovtun R.I. Dietary supplements and their effect on the body of students. *Vestnik VGUIT* [Proceedings of VSUET]. 2022. vol. 84. no. 1. pp. 35–39. (in Russian). doi:10.20914/2310-1202-2022-1-35-39

perseverance [7], with such a load, it is interesting to find out how students eat, how their food meets the needs of the body.

Human food is a complicated complex of thousands of chemical compounds, including natural substances inherent to the food product, food pollutants, as well as food additives intentionally introduced into food. At this stage of production development, hundreds of FA (FA – food additives) are used in all branches of the modern food industry. On labels, they are sometimes indicated by the letter E with three – or four-digit numeric numbers.

FA is natural, identical to natural or artificial substances that are obtained from mineral, animal or vegetable raw materials, as well as (much less often) by microbiological or chemical synthesis. They are not consumed as a food product, but are purposefully used in food systems for technological reasons [6].

Food additives are specially introduced into food products during their manufacture in order to give them certain properties and preserve the quality of food products.

The increasing use of food additives requires their clear classification. The Food and Agriculture Organization of the United Nations (UN – United Nations), together with WHO (WHO – World Health Organization), have developed a global system of food additives codification. Assigning the status of a food additive and the E index to a substance means that this substance does not impair the quality of the product, has been tested for safety and can be used without misleading the consumer about the composition and type of food product [6]. The presence of food additives is necessarily recorded on the labels.

The addition of food additives into food has the following objectives:

– increasing the stability during storage, improving the structure of food products or their organoleptic properties;

– preservation of the natural qualities of the food product;

– improving the technology of preparation and processing of food raw materials, storage, manufacture, packaging and transportation of food.

In accordance with the technological purpose, food additives are divided into groups [6]:

– substances that improve the appearance of food products (dyes, color stabilizers, bleaches);

– substances that regulate the taste of the product (flavoring additives, sweeteners, acids and acidity regulators);

– substances that regulate the consistency and form the texture of the product (thickeners, gelling agents, stabilizer, emulsifiers, etc.);

– substances that increase the safety of food and increase their shelf life (preservatives, antioxidants, etc.).

A detailed acquaintance with the purposes of FA use, as well as with groups of FA, depending on their technological purpose, allows us to come to a simple conclusion – the goal justifies the means. The modern beauty industry dictates its own rules and people adapt to it, there are problems with understanding what physical activity is [8], it also forces many people to scrupulously assess the quality of their lives, including nutrition. This leads people to desire a new kind of food. Such foods, for example, should contain a reduced content of lipids and fast carbohydrates (for example, do not contain sugar), have a low calorie content, and also differ in a balanced chemical composition (for example, have a composition enriched with micro – and macroelements). The desires of consumers are closely monitored by food manufacturers. Wanting to expand the sale of their products, they, avoiding production losses, use a simple, cheap and easily implemented method – the use of food additives. It is thanks to the FA that it is possible to achieve satisfaction of the interests of all parties, but only at first glance.

Any medicine in the wrong dose is poison. The effectiveness and safety of FA is determined by the technological feasibility of introducing a specific substance into a food product (improving taste, color, smell, increasing shelf life, etc.).

Safety is established according to a scheme similar to that for medicinal substances. At the beginning, animal tests are carried out, then the obtained data is analyzed on a group of volunteers by transfer, which allows you to set the value of the permissible daily consumption (PDC) of this FA

A specialized scientific committee of experts, the Joint FAO/WHO Expert Committee on Food Additives and Contaminants (JECFA), is responsible for the application of FA, which is managed by: The Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO).

Quality control of FA is carried out on the basis of specifications that represent the structure of the pharmacopoeia article. FA specifications have been developed by the FAO/WHO Committee of Experts since 1956 and are published in the Compendium of Food Additive specifications (Compendium of Food additive specifications), which is periodically updated [9].

Despite the strict selection of FA acceptable in food, the general trend of their influence on the human body is disappointing. Firstly, due to the fact that almost every food product has one or another

dose of FA, we can talk about the possibility of accumulation different types of harmful effects on humans: toxic, carcinogenic, mutagenic, teratogenic.

Secondly, the desire of people to simplify life by using fast types of food, for example, frozen semi-finished products, which can both contain a large number of different FA and lose their nutritional properties due to the use of physical methods of exposure (improper freezing with the loss of important food components of the product), fast food can also be attributed to this item, makes the body get used to the consumption of destructive substances and deprives it of the ability to fight them.

So antibiotics used with food affect the gastrointestinal tract, as they can disrupt the normal ratio of microorganisms, which causes allergies, and, as a result, skin diseases. The consumption of some artificial sweeteners leads to the fact that an initially healthy body may stop producing enzymes capable of splitting natural sugars, which causes an increase in glucose in the blood and, as a consequence, leads to a prediabetic state [6].

Methods

During the analysis of the young people nutrition (students), such research methods as analysis, interpretation, generalization were used. A survey was conducted among students of the 2–3 courses of the Kuban State Technological University. The purpose of our study was to evaluate the diet of students with the establishment of a daily load of dietary supplements and to determine the possible health risk as a result of their influence.

A study conducted among students using a questionnaire on healthy eating showed that approximately 230 women and 270 men participated in the survey. The average age of students ranged from 19 to 21 years.

To the question of the importance of a healthy diet in life, 60% of students answered that it is necessary; for 25% of students, this question is important, but not the most important in life; 10% answered that it is not necessary; the remaining 5% answered that they are not interested in it.

When asked about the sources of information about a healthy lifestyle, about 35% of students answered that they receive most of the necessary information in the classroom; 45% of students receive information from the Internet, and the remaining 20% from the media.

In the next paragraph, the students had to answer the question whether their lifestyle was healthy. Only 30% of students were able to answer "yes" with confidence, 50% answered "partially", 10% – "no", 10% – "I don't know".

When asked about eating fast food, 85% of students answered that they eat fast food; the remaining 15% do not.

Then it was asked how often students eat fast food. 24% of them answered that they consume once a week; 12% replied that they consume fast food several times a week; 22% replied that they consume fast food once a month; 24% answered "other", 18% of students replied that they consume once a fortnight.

The results of this question were quite unexpected: 40% of students answered that they eat fresh food and vegetables every day; and 54% – 1–3 times a week, 6% – do not use.

The next question showed that 82% of students eat dairy products every day, and 13% – 1–3 a week, and the remaining 5% do not eat at all.

It also turned out that 63% of students eat fish or fish products once a month; 21% – 1–3 times a week; 16% – do not use.

Confectionery is consumed every day by 51% of students; 30% – consume 1–3 times a week; 11% – consume once a month, 8% – does not consume.

In the next question, 73% of students answered that they use chips, crackers and carbonated water every day, 14% – use 1–3 times a week, 11% – once a month, and the remaining 2% – do not use.

The results of further questions indicate that almost all students are aware of the existence of food additives and 80% of them do not pay attention to the label and composition of the product.

It also turned out that students are aware of the existence of useful food additives, but most students found it difficult to answer the question about adding FA to food, some still considered it correct.

The last question showed that the majority of students (60%) believe that dairy products need to be enriched with food additives, and the remaining 40% chose the option "confectionery".

Research results and discussion

It follows from the survey that most students have an idea about the content of FA in their usual food products, but they do not pay much attention to the label and are not interested in the effect of FA on their health. The question of the enrichment of FA of various food products also allows us to come to this conclusion. The opinion about enriching dairy products with FA is incorrect, since in many mass-consumption food products it is not allowed to use certain functional classes of FA, which, of course, makes one think about their safety and expediency of use. For example, it is forbidden to use preservatives in milk, butter, flour, bread (except packaged for long-term storage), baby food products, etc.

The question of whether the lifestyle of students is healthy is indicative (figure 1). Only a third of respondents were able to answer this question in the affirmative. The same conclusion can be reached when analyzing the nutrition of the respondents. 73% of students on a daily basis consume products with the highest FA content in the composition: chips, crackers and carbonated water. Thus, most of the students may be at risk due to the possible consequences of an unbalanced diet (figure 2).

However, there are a number of positive trends in a more thorough examination of student nutrition trends. Most of the respondents (more than 90%) consume fresh fruits and vegetables, 40% of them on a daily basis. In addition, more than 80% are aware of the importance of a healthy diet in human life.

Based on this questionnaire, we found out whether our students are aware of what dietary supplements are and how they affect our body. Analyzing the results of the questionnaire, we can say with confidence that most of our students monitor their health and adhere to the principles of proper nutrition.

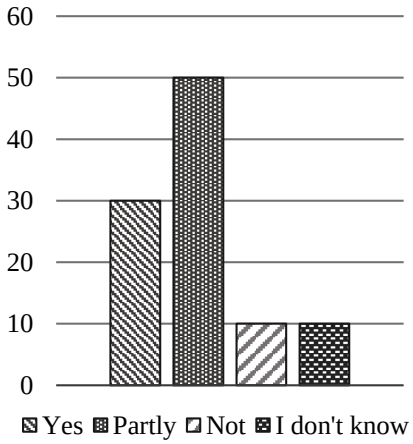

Figure 1. Is Your lifestyle healthy

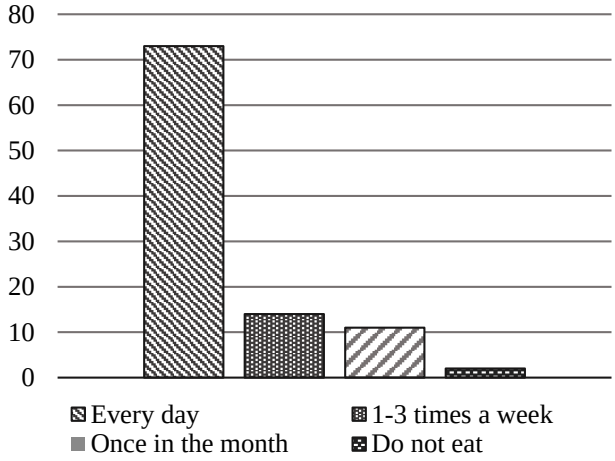

Figure 2. How often do you eat chips, crackers, carbonated water?

Conclusion

Undoubtedly, chemistry does not stand still, especially food chemistry. The use of FA has improved production in many ways, however, in order to consume such products, you should analyze your diet and bring in at least 2/3 of products that do not contain FA. The students who took part in the survey, for the most part, realize the importance of proper nutrition, which would be diverse and balanced, however, many do not know the possible impact of FA on the body, continuing to eat foods that can rightfully be called "food garbage".

Our opinion is as follows: the study of substances unknown to us should be approached comprehensively, starting with a small one, for example, reading the label of the product you are going to buy. Because health implies qualitative changes in all spheres of life: both in regular physical exertion, which would prevent the occurrence of deconditioning of the body [10], and in maintaining a stable psycho-emotional state, and, of course, in nutrition, which will strengthen the result of the above efforts made to preserve the harmonious state of the body.

Thus, today there are products on sale that contain dangerous and safe food additives. It is necessary to analyze the labels on food products, since not all of them have information about the food additives contained in them. Unfortunately, very dangerous ingredients are found in some products. But today you need to understand that you can not do without food additives, so you should not be afraid of them in the product. Always pay attention to the labeling and shelf life of the product. If you are prone to allergic reactions, exclude from your diet foods containing additives that cause allergies.

References

1 Ivanova N.G., Sinelnikova N.A. The solution of some problems in the process of achieving high results in sports through the use of biomedical technologies. Scientific notes of the P.F. Lesgaft University. 2018. no. 9. pp. 129–133.

2 Ivanova N.G., Khrebtiiv V.N. Vision security standard of living and its impact on mental and physical health of the younger generation. Baltic humanitarian journal. 2020. vol. 9. no. 3. pp. 88–90.

3 Eremenko V.N., Grinchenko V.S., Tsaava S.V., Pitkin V.A. et al. Optimization of food recipes for people of mental work and their lifestyle. IOP Conference Series: Earth and Environmental Science. IOP Publishing, 2021. vol. 659. no. 1. pp. 012136.

4 Maughan R.J., Burke L.M., Dvorak J., Larson-Meyer D.E. et al. IOC consensus statement: dietary supplements and the high-performance athlete. International journal of sport nutrition and exercise metabolism.2018. vol. 28. no. 2. pp. 104-125. doi: 10.1123/ijsnem.2018-0020

5 Eremenko V.N., Lytkin A.V., Sinko O.V., Tyupenkova G.E. et al. Physiology of digestion and the basics of rational nutrition. Proceedings of VSUET. 2019. pp.159–165.

6 Nechaev A.P., Traubenberg S.E., Kochetkova A.A. et al. Food chemistry. St. Petersburg, GIORD, 2015. 672 p.

7 Eremenko V.N., Levchenko A.A. The influence of physical exercises on the mental performance of students. Physical culture and sport in higher educational institutions: topical issues of theory and practice : a collection of articles based on the materials of the national scientific and practical conference dedicated to the 70th anniversary of the formation of the Department of Physical Education of the Kuban State University, Krasnodar, October 28–29, 2020. Krasnodar, Kuban State Agrarian University named after I.T. Trubilin, 2020. pp. 507–512.

8 Eremenko V.N., Medvedeva A.S., Levchenko A.A. The role of physical culture in human life. Azimut of scientific research: pedagogy and psychology. 2019. vol. 8. no. 3(28). pp. 353–355. doi: 10.26140/anip-2019–0803–0091

9 Shaulina L.P., Korsun L.N. Quality and safety control of food products and food raw materials: studies. manual. Irkutsk, Publishing House: IGU, 2011. pp. 63.

10 Eremenko V.N., Sinko O.V., Fedorova N.P. The role of physical education in the life of youth. E-Scio. 2019. no. 6(33). pp. 303–310.

11 Ivanova N.G., Sinelnikova N.A. The solution of some problems in the process of achieving high results in sports through the use of biomedical technologies. Scientific notes of the P.F. Lesgaft University. 2018. no. 9. pp. 129–133.

12 Ivanova N.G., Khrebtiiv V.N. Vision security standard of living and its impact on mental and physical health of the younger generation. Baltic humanitarian journal. 2020. vol. 9. no. 3. pp. 88–90.

13 Eremenko V.N., Grinchenko V.S., Tsaava S.V., Pitkin V.A. et al. Optimization of food recipes for people of intellectual labor and their lifestyle. International Conference on Engineering Research and Cooperation in Global Agricultural Production. 2020. pp. 140.

14 Maughan R.J., Greenhaff P.L., Hespel P. Dietary supplements for athletes: emerging trends and recurring themes. Food, Nutrition and Sports Performance III. 2013. pp. 65-74.

15 Bucci L.R. Dietary supplements as ergogenic aids. Nutrition in exercise and sport. CRC Press, 2022. pp. 315-368.

16 Navarro V.J., Barnhart H., Bonkovsky H.L., Davern T. et al. Liver injury from herbals and dietary supplements in the US Drug-Induced Liver Injury Network. Hepatology. 2014. vol. 60. no. 4. pp. 1399-1408. doi: 10.1002/hep.27317

17 Bagchi D. Nutraceutical and functional food regulations in the United States and around the world. Elsevier, 2014.

18 Kerksick C.M., Wilborn C.D., Roberts M.D., Smith-Ryan A. et al. ISSN exercise & sports nutrition review update: research & recommendations. Journal of the International Society of Sports Nutrition. 2018. vol. 15. no. 1. pp. 1-57. doi: 10.1186/s12970-018-0242-y

19 Santana-Gálvez J., Cisneros-Zevallos L., Jacobo-Velázquez D.A. Chlorogenic acid: Recent advances on its dual role as a food additive and a nutraceutical against metabolic syndrome. Molecules. 2017. vol. 22. no. 3. pp. 358. doi: 10.3390/molecules22030358

20 Amiot M.J., Riva C., Vinet A. Effects of dietary polyphenols on metabolic syndrome features in humans: a systematic review. Obesity reviews. 2016. vol. 17. no. 7. pp. 573-586. doi: 10.1111/obr.12409

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Вклад авторов

Все авторы в равной степени принимали участие в написании рукописи и несут ответственность за плагиат

Contribution

All authors are equally involved in the writing of the manuscript and are responsible for plagiarism

Конфликт интересов

Авторы заявляют об отсутствии конфликта интересов.

Conflict of interest

The authors declare no conflict of interest.

Поступила 17/01/2022	**После редакции** 09/02/2022	**Принята в печать** 25/02/2022
Received 17/01/2022	**Accepted in revised** 09/02/2022	**Accepted** 25/02/2022