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Article type: research article

**Effect of heavy metals on microorganism growth**

**G.M. Ospanov\*1Изображение выглядит как круг, Графика, символ, логотип

Автоматически созданное описание, B.S. Akhmetova2Изображение выглядит как круг, Графика, символ, логотип

Автоматически созданное описание**

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Received: XX.XX.XXXX. Accepted: XX.XX.XXXX. Available online: XX.XX.XXXX.

**Introduction**

This section briefly outlines the issue's history, with mandatory consideration of works in which similar or related studies have already been conducted. It also formulates the purpose of the study.

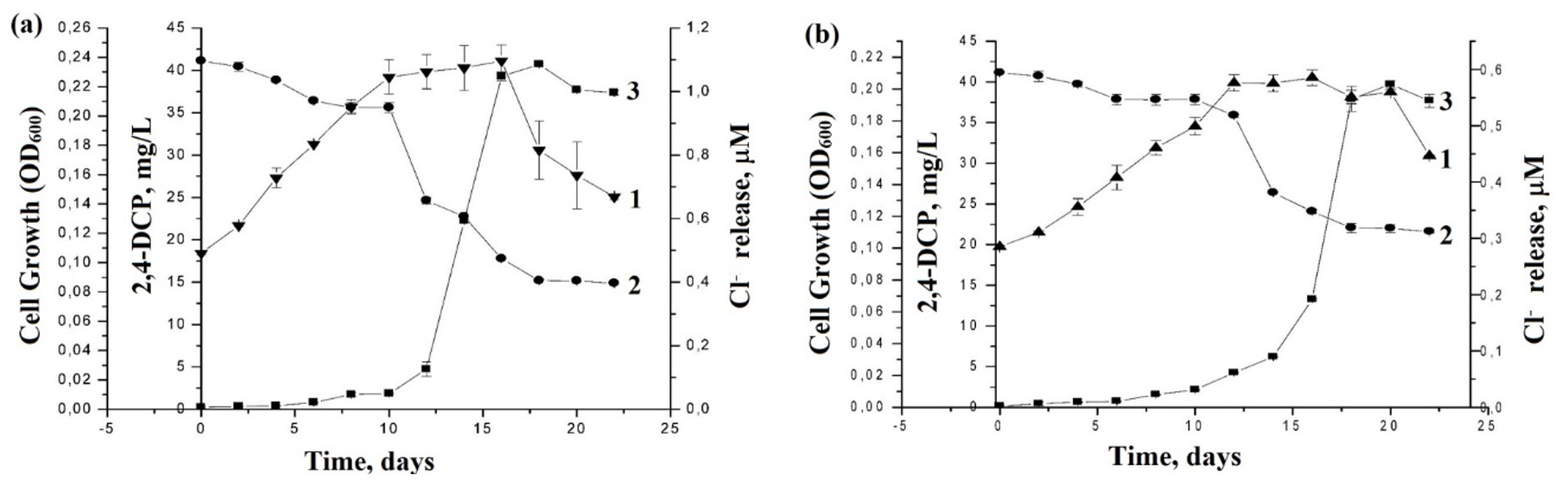
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The main requirement for the presentation of research materials and methods is that the procedures should be described as briefly as possible, but the description should allow the experiments to be reproduced. Only new methods should be described in detail; previously published and well-known ones should be referred to in the list of references, indicating the author and/or the method name. Experimental articles should contain statistical processing methods.

**Results**

The results should contain a brief description of the experimental data obtained (tables and figures are numbered sequentially with Arabic numerals and included directly in the text of the article, they should have a sequential number and title, accompanied by a reference to them in the text of the article. Figures and graphs should be presented in standard formats: PS, PDF, TIFF, GIF, JPEG, BMP, and PCX. Bitmaps should be made with a resolution of 600 dpi. All details should be clearly shown in the figures. This section should not include a discussion of the results; it is possible to limit yourself to an explanation of the cause-and-effect relationships between the experiments described.

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**Figure 1.** This is a figure. Schemes follow the same formatting. If there are multiple panels, they should be listed as: **(a)** Description of what is contained in the first panel; **(b)** Description of what is contained in the second panel. Figures should be placed in the main text near to the first time they are cited. The description in the figure must be in the language of the article.

Tables should be placed in the main text next to their first mention.

**Table 1**

**Physicochemical characteristics of starch** [14]

|  |  |  |  |
| --- | --- | --- | --- |
|  | Crambe kotschyana | Warty cabbage | Potato |
| Amylose, % | 18,5±0,8 | 26,5±1,4 | 22,3±2,5 |
| Amylopectin, % | 81,5±2,9 | 73,5±3,0 | 77,7±5,4 |
| AM/AP ratio | 0,23±0,04 | 0,36±0,02 | 0,29±0,03 |
| Ash content, % | 0,31±0,01 | 0,25±0,04 | 0,28±0,03 |
| Protein mass fraction, % | 0,18±0,001 | 0,29±0,0009 | 0,22±0,002 |
| Fat mass fraction, % | 0,1±0,005 | 0,12±0,004 | 0,07±,001 |

Note: compiled based on data from [14]

**Discussion**

This section should contain an interpretation of the results (but not their repetition) and a comparison with previously published data. At the end of the section, it is recommended to formulate the main conclusion containing the answer to the question posed in the introductory part of the article.

**Conclusion**

If necessary, the manuscript ends with **a conclusion.**

**Author Contributions**

The contribution of each author (in the form of initials of first and last name) to the work and preparation of the manuscript should be described (section “Authors’ Contributions”). For example: A.B. – concept and supervision of the work; V.G. – conducting the experiments; V.D. – discussion of the research results; E.Zh. – writing the text; A.B. and E.Zh. – editing the text of the article.

**Funding**

If the work was carried out with the support of any organization, in the “Funding” section, you should indicate which fund and grant supported this research, indicating the grant number.

**Acknowledgments**

In the “Acknowledgments” section, at the authors’ request, information about any assistance in carrying out the work and preparing the article is provided.

**Conflicts of Interest**

In the section "Conflict of Interest" the authors declare the presence or absence of a conflict of interest in the financial or any other sphere. This section is mandatory.

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The section “Compliance with Ethical Standards” is also mandatory. If the studies were conducted on animals, this section states: “All procedures performed in studies involving animals complied with the ethical standards of the institution where the studies were conducted and the approved legal acts of the Republic of Kazakhstan and international organizations.” If the studies were conducted with people, the section “Compliance with Ethical Standards” states: “All procedures performed in studies involving people comply with the ethical standards of the National Committee on Research Ethics and the 1964 Helsinki Declaration and its subsequent amendments or comparable ethical standards. Informed voluntary consent was obtained from each of the participants included in the study.” If the articles do not contain a description of studies involving people or using animals and performed by any of the authors, the section “Compliance with Ethical Standards” states: “This article does not contain a description of studies performed by the authors involving people or using animals as objects.”

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2. Brown K, White P, Green R. Advanced Drug Discovery: Methods and Applications. London: Springer; 2018.  **– Books, several authors.**

3. Jones M. Enzyme kinetics in drug metabolism. In: Black P, editor. Handbook of Pharmacokinetics. New York: Academic Press; 2015. p. 45-67. doi.org/10xxxxxxxxxxxxx **– Books, chapter in a book.**

4. Johnson TR. The role of protein interactions in neuropharmacology. J Neurochem. 2021;150(4):245-56.doi.org/10xxxxxxxxxxxxx **– Articles in journals, one author.**

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6. Wong J, Smith L, Cooper R, et al. Macromolecular transport across cellular membranes. Mol Biol Cell. 2020;31(5):1123-35. doi.org/10xxxxxxxxxxxxx **– Articles in journals, six or more authors (after three we indicate “et al.”).**

8. World Health Organization. Global health estimates 2023 [Internet]. Geneva: WHO; 2023 [cited 2025 Feb 10]. Available from: <https://www.who.int/gho>  **– Electronic sources, website.**

9. Müller T. Biochemical pathways in neurodegenerative diseases [dissertation]. Munich: Ludwig Maximilian University; 2017. **– dissertations and theses.**

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**Ауыр металдардың микроорганизмдердің өсуіне әсері**

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*2 Биология университеті, Шымкент, Қазақстан*

**Аңдатпа.** Ол 250 сөзден аспайтын бір абзацта ұсынылады. Аңдатпада мақаланың ерекшеліктерін көрсететін қысқаша мазмұны жазылдады. Аңдатпа мақаланың құрылымын сақтай отырып, жұмыстың негізгі нақты нәтижелерін және олардан туындайтын қорытындыларды қысқаша және сипаттауы қажет — туралау - ені бойынша, шрифт өлшемі - 14.

**Түйін сөздер:** 5-7сөз немесе сөз тіркесі

**Влияние тяжелых металлов на рост микроорганизмов**

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*2 Университет биологии,Шымкент, Казахстан*

**Аннотация.** Онадолжна содержать не более 250 слов и должны быть изложены в одном абзаце. Аннотация должна представлять собой краткое изложение статьи, отражающее ее особенности и сохраняющее структуру статьи, сжато и ясно описывающим основные конкретные результаты работы и вытекающие из них выводы. Выравнивание – по ширине, кегль – 14.

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**References**

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2. Tokaev K-Z. Ezhegodnaja avgustovskaja konferencija s uchastiem glavy gosudarstva [Annual August conference with the participation of the head of state]. *Zakon.kz* [Internet]. 2019 Aug 16 [cited 2023 Jul 25]. Available from: <https://www.zakon.kz/redaktsiia-zakonkz/4981834-polnyy-tekst-vystupleniya-tokaeva-na.html> [in Russian] – **In the absence of an official translation of the title of the article**
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