In addition, banana juice used by Carvalho et al. also proved to be viable as a partial substitute for an all-malt wort. The group recorded volumetric productivity in ethanol of approximately 0.60 g/L·h [10]. This value is close to that obtained by Nunes et al. after 84 h of fermentation with both strains.

Functional beers are a viable and little-explored option within food science to provide human health benefits. The production of these non-traditional beers requires a combination of the added adjunct and an addition step.

Although the transfer of bioactive substances from the adjuncts to the final beer is proven, the direct benefits to human health are substantial. From the technological perspective, state-of-the-art techniques such as LC-MS must be employed to profile the bioactive compounds incorporated into the beverage. Furthermore, it is necessary to establish a circular work, addressing how and which adjunct will be added taking into account the physicochemical, sensory, and physiological terms as bioavailability. Then, the functional claim on these beverages will be completely supported. However, as a new frontier in beer science, the field of functional beers offers a valuable and rich path for new studies.

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ASSESSING THE RISK OF THE ANIMALS NUMBERS OUTBREAK BY SYSTEM PARAMETERS OF THEIR PROTECTIVE COLORS

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Assessing the risk of the fast increasing of the animal's numbers (carriers of dangerous infections or agricultural pests) is an important aspect of biosafety. A common cause of such

outbreaks is the weakening of the population-stabilizing effect of predators. In extreme situations of global climate change, the time allocated for diagnosing such weakening over large areas will be significantly less than that provided by traditional environmental methods. Because of this, remote diagnostics with computer analysis of system colorometric parameters (SCP) of digital photos seems promising. We are talking about digital photos that can be obtained using equipment included in the standard supply package for widespread and relatively inexpensive modifications of drones. The works [1–4] show the role of such SCP which characterizes the role of diversity and evenness in the adaptive strategies of the animal's protective coloration (APC) functioning. The diversity of this coloration (DAPC) provides the effect of destroying the holistic visual perception of the silhouette. This requires the color merging of at least one spot of APC with the background at any point in space and time of the plant community development, described by the well-known [5] Margalef model of succession (MMS). The work [6, 7] shows that the values of the SCP present at different phases of the MMS can be obtained by computer analysis of the RGB model's components of a digital photo of the plant community.

The purpose of this work is to study the influence of predators on the systemic effects of the influence of its pressure on APC of different animals.

Material and methodology. An analysis of the components of the RGB model of freely available digital photos of animals was carried out using a program written in Python, which allows you to determine the values of the components R, G and B for each pixel of the photo. Next, using standard statistical methods, the values of the corresponding SKP are determined based on the values of these components. In this work, the value of the Pearson correlation coefficient between the parameters G/(R+G+B) and R/G is used as a measure of DAPC. In accordance with the principle of optimal diversity [8], the value of DAPC can be limited by the scarcity of a certain resource. In particular, the angular size of the animal's silhouette observed by the predator. Works [1, 2] show that this can be compensated by the evenness of the red and green components of the animal's protective coloration (EAPC). As a measure of EAPC, we propose to use the value of the Pearson's correlation coefficient between parameters G/(R+G+B) and R/(R+G+B). Along with DAPC and EAPC, the effectiveness of APC can also be determined by the ratio (RAPC) of the red and the sum of the red and green components. In this work, the value of the Pearson's correlation coefficient between the parameters (R+G)/(R+G+B) and R/G, as well as between the parameters (R+G)/(R+G+B) and R/(R+G+B) is used as a measure of RAPC).

As a result of this work, systemic effects of the influence of predators on the DAPC, EAPC and RAPC of different animals in different situations were found. Changes in the values of the Pearson's correlation coefficient were chosen as a sign of the significant influence of predators: with a change in the sign of the correlation or a change of no less than fifty percent of the absolute value of its coefficient. The cases described below of different influences of predators are considered.

1. The effect of predators on adults is weaker than on juveniles.

1.1. In the case of the wild boar (lat. Sus scrofa), when comparing APC of an adult male and four piglets, all four comparisons gave significant differences in the DAPC, or EAPC, or RAPC.

1.2. When comparing an adult male lion (lat. Panthera leo) with a lion cub, significant differences were obtained in the DAPC and EAPC.

1.3. When comparing a sexually mature individual of carp (lat. Cyprinus carpio) with juveniles, significant differences were obtained in the DAPC and EAPC.

2. Comparison of domesticated and wild animals.

2.1. A comparison of the eland (lat. Taurotragus oryx), from a reserve in the Serengeti, where these animals live in the wild and are exposed to predators, with the domesticated eland from Askania Nova, yielded significant differences in the RAPC.

2.2. A comparison of the common carp (lat. Cyprinus carpio) living in a natural reservoir and the silver carp (Hypophthalmichthys molitrix) from the pond yielded significant differences in DAPC, EAPC and RAPC.

The presented results allow us to formulate a working hypothesis with the following content.

The elimination of their predators, which can cause an outbreak in the number of animals that these predators eat, should have its own markers in the APC. Such markers may be significant changes in DAPC, EAPC and RAPC. This working hypothesis is confirmed by the results of the comparison APC of house mice (lat. Mus musculus) living in the reserve, the number of which is regulated by predators, and mice living in the war zone in Ukraine. Foxes, ferrets and owls were observed leaving there in 2023. These animals are predators that control the growth of the mouse population. The elimination of these predators caused of mice numbers outbreak in the said war zone. The markers of this, according to the results of this work, are significant differences in the APC of these two populations of mice in such parameters as DAPC, EAPC and RAPC. The results obtained, according to the authors, are purely preliminary. They should be further developed using much wider factual material. But these results, in our opinion, have a certain significance. From the point of view of fundamental biology – as describing some aspects of the processes of stabilizing selection. And applied – for the development of systems for forecasting the outbreaks numbers of animals (carriers of dangerous infections and agricultural pests).

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ВПЛИВ ОСВІТЛЕННЯ НА РІСТ МІКРОВОДОРОСТЕЙ *CHLORELLA VULGARIS*

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Вступ. Світло відіграє ключову роль у регулюванні росту та розвитку мікроводоростей, зокрема *Chlorella vulgaris*. Різні види мікроводоростей поглинають лише певні частини сонячного спектру, що стимулює фотохімічні перетворення [1]. Для *Chlorella vulgaris* характерно поглинання спектру світла у діапазонах синього та червоного [2]. Інтенсивність світла напряму визначає швидкість фотосинтезу, але висока інтенсивність може спричинити фотоінгібування [3]. Це призводить до синтезу антиоксидантів та змін у фотосистемах. Регулюючи спектр освітлення, інтенсивність та фотоперіод світла, можна досягти оптимального балансу між ростом та біохімічним складом мікроводоростей.

Мета – вивчення впливу різного спектру та джерела освітлення на приріст біомаси *Chlorella vulgaris*.

Методика. Для дослідження була використана культура мікроводоростей *Chlorella vulgaris,* взята з колекції кафедри біоенергетики, біоінформаики та екобіотехнології КПІ ім.