

synthesize PHA of a homopolymer nature. Thus, the main component of the studied compound was butanoic acid. However, the levels of biosynthesis varied greatly among the strains. The highest amount of PHA was produced by *P. endophytica* CHAES 2₃ (0.99 g/l). The strains *P. endophytica* BZ3, Tr 1₈, and 7515 also produced a significant amount of PHA, which amounted to 0.94, 0.93, and 0.88 g/l, respectively. The strain *P. endophytica* A synthesized the least amount of PHA (0.13 g/l).

Thus, the research confirmed the *Bacillaceae* family bacteria's ability to synthesize PHA polymers. The results indicated PHA accumulation levels vary in different *Bacillaceae* strains. However, their capacity to synthesize polyhydroxyalkanoates offers a vast area of research into the use of bacilli-produced bioplastic in both agriculture and medicine. Future research could study the effect of the cultivation conditions on the PHA production rate by bacteria of the *Bacillaceae* family.

REFERENCES

Mohandas, S. P., Balan, L., Jayanath, G., Anoop, B. S., Philip, R., Cubelio, S. S., & Bright Singh, I. S. (2018). Biosynthesis and characterization of polyhydroxyalkanoate from Marine *Bacillus cereus* MCCB 281 utilizing glycerol as carbon source. *International Journal of Biological Macromolecules*, 119, 380–392. <https://doi.org/10.1016/j.ijbiomac.2018.07.044>

THE INCIDENCE OF FOOD-FOOD BOTULISM IN UKRAINE

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Introduction. Human foodborne botulism is a dangerous but relatively rare disease caused by the toxin of the bacterium *Clostridium botulinum*. The reproduction of bacteria and the accumulation of toxins is possible in anaerobic conditions, which are created in canned food products if the canned food production technology is not followed. Spores of *C. botulinum* can be neutralized by sterilizing the product at a temperature of 120°C, which is maintained in food processing plants but is difficult to achieve in home canning. The lethal dose of botulinum toxin when consumed is 1000 ng/kg, making it one of the most powerful natural poisons. For the development of the disease, the entry of the toxin into the body is critical, and not the bacteria as such. In this work, only cases of foodborne botulism are considered, without considering other forms of human botulism (wound botulism, infant botulism, inhalation botulism and botulism as a complication after Botox injections).

Materials and methods. For the work, the data on infectious diseases of the population of Ukraine of the Public Health Center of the Ministry of Health of Ukraine for 2017–2020 were used.

Results. In the structure of food products as factors of botulism transmission, the share of botulism cases caused by meat products, which began to decrease in the 2000s, remains at the level of 33.15% compared to 48.02% in 1955-1985. Accordingly, the share of botulism cases caused by fish products is increasing, but not their absolute number. Botulism caused by mushroom preservation has wide fluctuations, 4-5 cases per year in 2017-2018, 10 cases in 2019, only 2 cases in 2020,

and 15 cases in 2021. The number of botulism cases associated with vegetable preservation decreased from 7-8 in 2018-2019 to 1 case in 2020-2021. The percentage of botulism cases with an established type of toxin decreased from 50.8% in 1955-1985 and 43.41 in 2017-2019 to 18.37% in 2021, which does not allow for a reliable assessment of the distribution of pathogen types. Among the cases with an established type of toxin, type E associated with fish products prevails.

The infamous outbreak of botulism in 1933 in the city of Dnipropetrovsk, where 230 people fell ill, of which 94 people died (fatality rate - 41%) due to canned zucchini caviar produced at a food industry in the city of Odessa, led to increased control over the processing of factory canning by many ten years. During the years 1955-2016, almost 100% of botulism cases in Ukraine were due to canned food products made at home. But during the period of 2017-2018, the share of food products produced in factories that caused botulism increased sharply to 32.56% (84 cases), and the Case-Fatality Rate of botulism from food products purchased by consumers in retail chains in 2017- in 2018, was 8.06% or 5 deaths. In 2019, the percentage of botulism due to purchased factory products was 10.15%, in 2020, it was 13.85%, but it decreased to 9.18% in 2021.

Conclusions. In Ukraine, there is a trend towards a decrease in the total number of botulism cases, in particular, those caused by meat products, and an increase in the share of botulism caused by fish products. Cases of botulism due to factory-made products continue to be registered.

The state of war in 2022-2023 is likely to lead to an increase in the consumption of canned products by both the civilian population under evacuation and the personnel of the Armed Forces. Moreover, preservation can come both factory, collected by volunteers, and possibly homemade, which does not exclude the risk of complicating the epidemic situation regarding botulism.

THE STRUCTURE OF TOTAL AND EXCESS MORTALITY OF THE POPULATION OF UKRAINE

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According to WHO estimates, almost 3 million deaths worldwide were directly or indirectly related to COVID-19 in 2020, which is 1.2 million more than officially reported deaths from COVID-19. Both the direct and indirect effects of the COVID-19 pandemic on population mortality are of concern. Total excess mortality is one indicator that shows the indirect impact of the COVID-19 pandemic on mortality.

According to WHO, from January 1, 2020 to December 31, 2021, global excess deaths related to COVID-19 were 14.91 million, which is 9.49 million more deaths than worldwide directly attributable to COVID-19.

We compared the registered number of deaths in 2020-2021 in Ukraine and the expected mortality for this period. The research used data from the State Statistics Service of Ukraine, Institute of Demography and Social Research named after M.V. Birds of the National Academy of Sciences of Ukraine. Data analysis was carried out in Microsoft Office Excel.