AL-FARABI KAZAKH NATIONAL UNIVERSITY

Bolatkhan Zayadan
Almira Saparbekova

ENVIRONMENTAL BIOTECHNOLOGY

The study guide

Zayadan B.K., Saparbekova A.A.

Z 38   Environmental biotechnology: the study guide / B.K. Zayadan, A.A. Saparbekova. – Almaty: Qazaq University, 2020. – 203 p.
ISBN 978-601-04-4411-9

The study guide intended for students of specialty 5B070100 "Biotechnology" includes 9 main chapters. This study guide describes environmental problems related to contamination of soil, water and atmosphere, paying special attention to the environmental problems of the Republic of Kazakhstan. The second chapter describes the role of microorganisms in circulation of substances in nature; the third chapter tells about classification of wastes, xenobiotic types of environment and Ecotoxicity. The possibility of microorganisms to decompose oil hydrocarbons and technologies for bioremediation of soils polluted by heavy metals and oil products are considered in the fourth and fifth chapters. The questions concerning sewage and methods of their treatment are fully described in the seventh chapter; the system of methane fermentation from sewage deposits is described in details. The eighth chapter presents information about agricultural and industrial waste utilization. The ninth chapter presents information about bioenergy and biofuels.

Study materials are prepared according to the State Compulsory Education Standards of the Republic of Kazakhstan.

INTRODUCTION
· · · · · · · · · · · ·

The years 2018-2019 were the years of the worst environmental situation in Asia and Africa.

China is one of the largest countries in the world, with the enormous population – almost 1.4 billion people. To provide such a huge number of people with the necessary agricultural products and industrial goods, huge production capacities are required, which also supply more than half of the world with cheap products. In general, they have a terrible impact on the environmental conditions of the country.

India is another highly populated country, the number of inhabitants in which is slightly lower than in China, and the area almost tripled. There 70% of population live in dirty slums and have access only to the basic benefits of civilization (but not always). Cities and areas around them are a huge dump; almost all the rivers in the country are heavily polluted.

Bangladesh has the same problems as India. About 170 million people live on the territory of Bangladesh (while, in Kazakhstan the population is only 18 million). However, unlike India, the country has a very low potential for economic development, because they do not have enough land even to establish the production of agricultural and industrial products in the required amount for the local population.

However, Kazakhstan and Russia are also included in the list of unfavorable countries in terms of the environment. (Source: https://visasam.ru /emigration/vybor/ekologiya-v-stranah-mira.html).

Nowadays, the environmental situation in the Republic of Kazakhstan is characterized by significant violations of the environment which cause negative impacts.

Environmental problems in the national policy of the Republic of Kazakhstan have not yet acquired an independent status, the pre-