

## СЕКЦІЯ 16. ПРИРОДООХОРОННІ ТЕХНОЛОГІЇ, ПРОФЕСІЙНА БЕЗПЕКА ТА ЗДОРОВ'Я

### JUSTIFICATION OF A UNIFIED GENERALIZED MODEL OF SUBSTRATE INHIBITION KINETICS IN BIOLOGICAL TREATMENT UNITS

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For hydrogen sulfide, sulfur dioxide, methane, ammonia, and formaldehyde, the effect of substrate inhibition on the biodegradation process has been experimentally proved [1]. The need for practical calculations of biological treatment plants determines the relevance of adequate consideration of this factor. To confirm the possibility of using a single formula [2] in the description of biooxidation processes with substrate inhibition of applications, a method of numerous experience are used. Mutual description of specific velocity formulas from the minimum inhibition intensity  $V_2$  to the maximum possible  $V_e$  is carried out using the least squares method. From the data obtained it follows that the formula  $V_e$  describes the dependence of  $V_2$  with five percent accuracy in the real range of concentrations of harmful substances. At the second stage of numerous experience, the influence of a random error on the possibility of using a single formula is simulated.

The presence of a random error leads to a distortion of the results when describing the dependence of  $V_2$  on experimental data with order  $n=2$ . The results of numerous experience indicate that with an increase in the non-systematic error, the statistical difference between the descriptions of  $V_2$  and  $V_e$  is continuously reduced to zero. The results of numerous experience prove the possibility of using the formula  $V_e$  as a single kinetics of the biodegradation process with substrate inhibition of various intensities in practical calculations.

#### **References:**

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