

Springer Proceedings in Energy

Marek Wróbel
Marcin Jewiarz
Andrzej Szlęk *Editors*

Renewable Energy Sources: Engineering, Technology, Innovation

ICORES 2018

 Springer

Modeling of the Dynamic Modes of the Bioreactor, as an Object of Automatic Control



Boris Kotov , Taras Hutsol , Yuriy Pantsyr ,
Ihor Garasymchuk , Ivan Gordiychuk  and Michael Torchuk 

Abstract The mathematical model of the dynamics of thermal processes in a bioreactor was proposed and time of the transition process was determined. The results of theoretical research were presented. The obtained results can be further used for the synthesis of the automatic temperature control system.

Keywords Bioreactor · Heat carrier · Substrate raw materials · Biomass · Dynamic modes

B. Kotov · T. Hutsol (✉) · Y. Pantsyr · I. Garasymchuk · I. Gordiychuk · M. Torchuk
State Agrarian and Engineering University in Podilya, Str. Shevchenko 13,
32300 Kamianets-Podilskyi, Ukraine
e-mail: pro-gp@pdatu.edu.ua

© Springer Nature Switzerland AG 2020
M. Wróbel et al. (eds.), *Renewable Energy Sources: Engineering, Technology, Innovation*, Springer Proceedings in Energy,
https://doi.org/10.1007/978-3-030-13888-2_18

References

1. M. Korchemnyy, V. Fedoryko, V. Scherban, Energy saving in the agro-industrial complex, *Monograph. Ternopil. Textbooks and Manuals* (2001), 974 p.
2. S. Tkachenko, D. Stepanov, *Heat Exchange and Hydrodynamic Processes in the Elements of Energy Supply of Biogas Plant: Monograph* (UNIVERSUM, Vinnytsya, 2004), p. 132
3. V. Dubrovin, M. Korchemnyy, I. Maslo, Biofuels: (technologies, machines and equipment), in *Monograph Power Engineering and Electrification*, Kyiv (2004), 256 p.
4. Y. Pantsyr, I. Garasymchuk, T. Hutsol, I. Gordiychuk, Energy parameters' calculation of a hybrid heat supply system for a private house in the conditions of western part of Ukraine, in *Renewable Energy Sources: Engineering, Technology, Innovation*, ICORES 2017 (2018), pp. 765–780, https://doi.org/10.1007/978-3-319-72371-6_75
5. K. Dziedzic, K. Mudryk, T. Hutsol, B. Dziedzic, Impact of grinding coconut shell and agglomeration pressure on quality parameters of briquette, in *Engineering for Rural Development* (2018), pp. 1884–1889
6. A. Cherenkov, T. Hutsol, I. Garasymchuk, J. Pancyr, D. Terenov, V. Dubyna, Analysis of broadband antenna radiation pulses. *Agric. Eng.* **22**(1), 15–28 (2018). <https://doi.org/10.1515/agriceng-2018-0002>
7. O. Kucher, T. Hutsol, K. Zavalniuk, Marketing strategies and prognoses of development of the Renewable Energy market in Ukraine, in *Scientific Achievements in Agricultural Engineering, Agronomy and Veterinary Medicine*, (Krakow, Poland, 2017), pp. 100–121
8. S. Ratushniak, V. Dzhezdzhula, *Energy-Saving in Systems of Bioconversion* (VNTU, Vinnytsia, 2006), p. 83