

Marek Wróbel
Marcin Jewiarz
Andrzej Szlek *Editors*

Renewable Energy Sources: Engineering, Technology, Innovation

ICORES 2018

Perspectives of Fennel (*Foeniculum Vulgare* Mill.) Use for Energy Purposes



Vasyl Stroyanovsky, Veronika Khomina, Taras Hutsol,
Kolosiuk Iryna, Krzysztof Mudryk, Marcin Jewiarz,
Marek Wróbel and Adrian Knapczyk

Abstract The presented work involves the issues of analysis of physical properties of residues from the production of fennel for grain. The basic properties essential for the quality assessment of solid biofuels such as pellets and briquettes were determined. The results of laboratory tests confirmed the preliminary assumptions that these raw materials are a good material for the production of solid biofuels. The quality of pellets and briquettes.

Keywords Fennel · Technology of cultivation · Biomass · Biofuel

V. Stroyanovsky · V. Khomina · T. Hutsol · K. Iryna
State Agrarian and Engineering University in Podillya, Street Shevchenko 13,
32300 Kamianets-Podilskyi, Ukraine
e-mail: pro-gp@pdatu.edu.ua

K. Mudryk (✉) · M. Jewiarz · M. Wróbel · A. Knapczyk
Faculty of Production and Power Engineering, University of Agriculture in Krakow,
Street Balicka 116 b, 30-149 Krakow, Poland
e-mail: Krzysztof.Mudryk@urk.edu.pl; krzysztof.mudryk@ur.krakow.pl

References

1. M.I. Bakhmat, O.V. Kvaschuk, V.Y. Khomina, M.V. Zagorodniy, M.M. Suchek, Ether-oilplants: a manual, in *Medobory-2006* (Kamyanets-Podilskyi, 2012), 312 p.
2. E.V. Gorbunova, Technological features of complex processing of whole plants of fennel. *Tech. Technol. Food Prod.* **3**, 9 (2013)
3. V. Ivanyshyn, U. Nedilska, V. Khomina, R. Klymyshena, V. Hryhoriev, O. Ovcharuk, T. Hutsol, K. Mudryk, M. Jewiarz, M. Wróbel, K. Dziedzic, Prospects of growing Miscanthus as alternative source of biofuel, in *Renewable Energy Sources: Engineering, Technology, Innovation: ICORES 2017* (2018), pp. 801–812. https://doi.org/10.1007/978-3-319-72371-6_78
4. V.Y. Khomina, Substantiation of elements of cultivating technology of coriander (*Coriandrum sativum*) in the conditions of the western Forest-steppe. *Sci. Prod. Mag. Techn. Technol. APK —BilaTserkva* **3**(54), 16–19 (2014)
5. M.I. Fedorchuk, O.V. Makukha, Biological peculiarities of growth and development of fennel in arid conditions of Kherson region. *Tavricheskii Sci. Bull.—Kherson* **80**, 138–142 (2012)
6. V. Stroyanovsky, Optimization of technological measures in growing of fennel in the terms of forest steppes of Ukraine. Scientific Achievements in Agricultural Engineering, Agronomy and Veterinary Medicine. Scientific monograph, vol II, Krakov (2017), pp. 122–136
7. K. Mudryk, J. Frączek, M. Wróbel, M. Jewiarz, K. Dziedzic, Agglomeration of ash-based fertilizer mixtures from biomass combustion and digestate, in *Renewable Energy Sources: Engineering, Technology, Innovation*, Springer Proceedings in Energy, ed. by K. Mudryk, S. Werle (Springer, Cham, 2018). https://doi.org/10.1007/978-3-319-72371-6_80
8. M. Wróbel, J. Frączek, S. Francik, Z. Ślipek, K. Mudryk, Influence of degree of fragmentation on chosen quality parameters of briquette made from biomass of cup plant silphium *Perfoliatum L.*, in *12th International Scientific Conference on Engineering for Rural Development - Proceedings*, vol. 12, ed. by L. Malinovska, V. Osadcuks, L. Malinovska, V. Osadcuks (2013), pp. 653–657. http://tf.llu.lv/conference/proceedings2013/Papers/121_Wrobel_M.pdf
9. M. Kuboń, A. Krasnodębski, Logistic cost in competitive strategies of enterprises. *Agric. Econ.* **56**, 397–402 (2010). <http://www.agriculturejournals.cz/publicFiles/25303.pdf>