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ADMISSION TO PHD STUDIES FOR THE YEAR 2021

DOCTORAL RESEARCH TOPIC:

Modification of energy plant seeds by low temperature plasma for growth and energy properties improvement

RESEARCH FIELD:

Energetics and Power Engineering (T 006)

BRIEF DESCRIPTION OF RESEARCH TOPIC:

The development of energy production technologies based on renewable energy sources contributes to environmental sustainability, meets the increasing environmental requirements related to the reduction of greenhouse gas emissions and waste, and promotes the use of local renewable energy sources- energy crops that can be used for biofuels, biogas, solid biofuels. Short-term (several minutes) biochemical and thermal treatment of seeds with low temperature or cold plasma (CP) is a modern organic agricultural technology that increases the agronomic quality of seeds, plant resistance to diseases, the quality of crop production and biomass. The effects of CP can significantly improve plant properties important for energy, ecological and economic parameters of plants: CP remarcably increases dry biomass content, plant height, branching, protein content, photosynthetic activity, and secondary metabolites content, that ensures the resistance of plants to diseases and adverse growth conditions. Seed treatment by CP would increase the biomass of energy crops, ensure their resilience, adaptation to different conditions, reduce the use of fertilizers or pesticides.
However, the thermal and biochemical mechanisms of CP exposure processes has not been studied in details, the rules of CP conditions selection and systematic studies of complex long-term response have not been elucidated, therefore fundamental knowledge of the response to CP treatment of different plants species used for energy purposes and CP regimes is essential for targeted process manipulation, prediction and achievement of better quality or amount of biomass. Therefore, the aim of doctoral study is to select the conditions for the modification of energy plant seeds by different kinds of low-temperature plasma, which can remarcably improve the growth and energy properties in controled and field conditions.

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