

Many countries in the World, including UE countries have declared to become climate neutral in the nearest tens of years. To achieve that goal fossil fuels should be substituted by renewable energy sources not only for power and heat generation but in many industrial processes as well. Among different renewable energy sources biomass plays special role. From the one hand it is less economically attractive than solar panels and wind turbines, however it allows to achieve not only zero CO₂ emission but even negative as well. Additionally in case of biomass usage it should be taken into account that it should not be competitive to food production. One of the CO₂ emission reduction method which can be used in case of biomass is storage of biocarbon which result from thermochemical conversion of biomass. In case of biomass which is planted on a contaminated land such approach allows to simultaneous soil quality improvement and the negative CO₂ emission. However biochar produced out of biomass processing has to be safe for environment.

The aim of the present project is to increase fundamental knowledge on the thermochemical conversion of biomass leading to formation of environmental neutral biochar containing metal compounds origin from biomass. The research aim has been divided to five work packages. The first package is oriented for the thermal decomposition of biomass which results in solid, liquid and gaseous products. It will be found what should be the process parameters to promote metal compounds retention in solid phase. Second of research package is investigation of partial oxidation of biochar and production of gas for energy purposes. In this case as well research will be oriented to finding conditions which promote retention of metal compounds in solid phase. Third work package will be concentrated on liquid compounds conversion on the surface of biochar. It is expected that liquid will create coke layer on the surface of char and thus will passivate biochar against oxidation and washing. Fourth wokrpackage will be devoted to chemical and physical characterization of biochar particles encapsulated in passive layer of coked liquids. The fifth, last workpackage will be dedicated to environmental assessment of the carbon storage in a form of encapsulated biochar particles. Life cycle analysis will be used for that.