



Research at the University of Kassel

Results on the technical feasibility of the Integrated Generation of Solid fuel and Biogas from Biomass conversion system (IFBB) as a first conditioning step for activated carbon production

In 2017, six residual biomass types were collected in Belgium and Germany and analysed for their usage as a substrate for activated carbon production.

These biomass types were roadside cuttings from city roads in Belgium, samples of an invasive plant species, the Japanese Knotweed, from park areas in Belgium in a young fresh state and a mature old state, and city green cut from park

areas, horse manure and nature conservation grass from the city of Baden-Baden.

These biomass types were ensiled and sent to the University of Kassel. After ensiling for at least 6 weeks the biomass samples were opened, analyzed and then treated according to the improved IFBB system (Figure 1). This means a first washing step of the biomass with cold water, followed by a second aqueous mashing step in warm water (40 °C). The warm mash is then put into a screw press for mechanical separation. This results in a press fluid, containing volatile elements of the biomass, such as Cl, K, sugars and acids. The press fluid can be used as a fertilizer or in biogas plants for energy recovery.

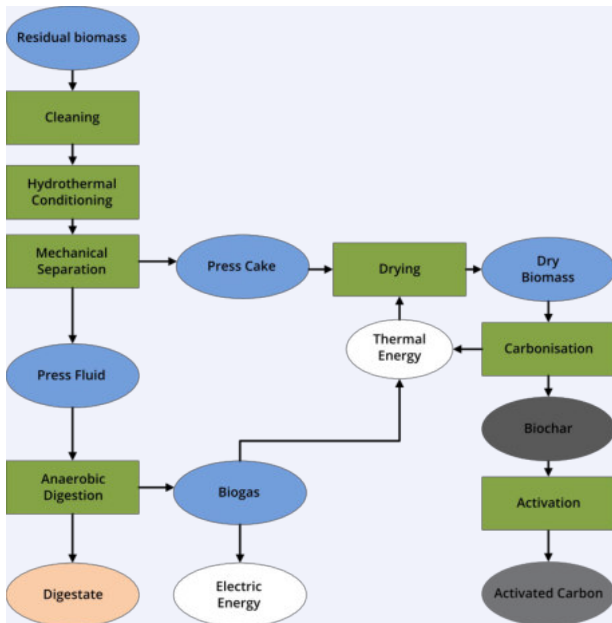


Figure 1: Scheme of the improved IFBB System

The other product of the IFBB, the press cake can be used as a solid fuel, but in the RE-DIRECT project we investigate the idea of using that press cake for a higher value purpose: to produce activated carbon. For this aim, the press cake will have to undergo further treatment, especially a drying step followed by a car-

bonization and activation.

To determine if the press cake is better suited for activated carbon production than the biomass, both were analyzed for their chemical composition. The results are very reassuring. For all investigated biomass types, the IFBB press cake has a lower ash



Pictures of the biomass samples: a barrel of young Japanese Knotweed (left) and the washing process (right).

concentration and a slightly higher carbon concentration (Figure 2). With lower ash concentration and higher carbon concentration, a better quality of the activated carbon is possible.

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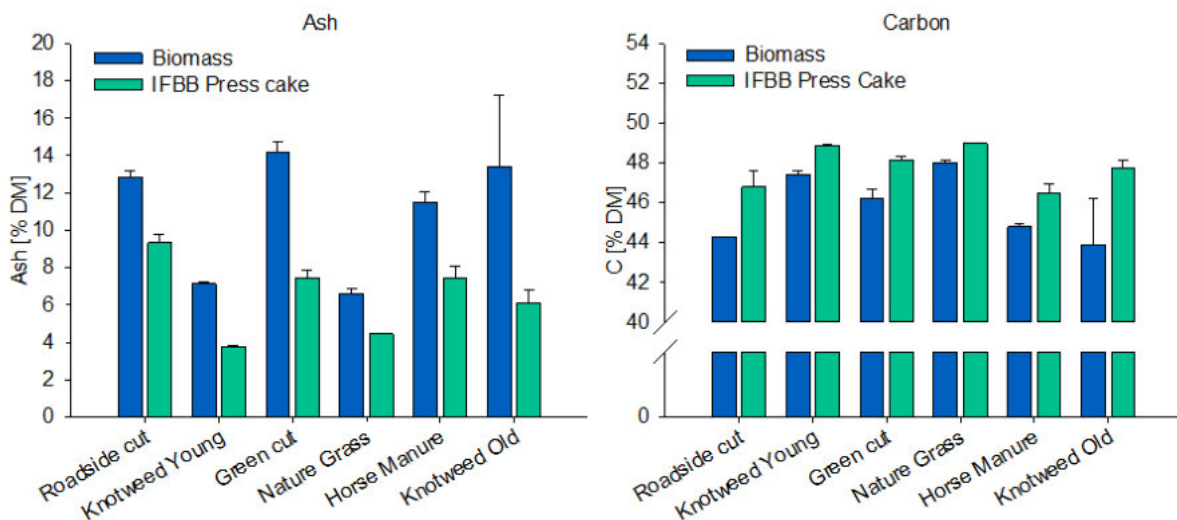


Figure 2: Concentration of Ash and Carbon in Residual Biomass and IFBB Press Cake