Interreg North-West Europe
RE-DIRECT
European Regional Development Fund

NEWS
October 2018

Turning waste into activated carbon

First results on the use of fruit stones and IFBB press cake for activated carbon production

Within the framework of the RE-DIRECT project a master thesis was investigating two residual biomass types from the Eigenbetrieb Umwelttechnik in Baden-Baden. The chosen biomass types were fruit stones, which are a leftover from the production of alcohol and IFBB press cake which is produced in Baden-Baden out of grass, leaves and horse manure. The IFBB press cake is treated with a mashing step with warm water and a screw press before it is dried on a band drier. The master thesis was carried out by University of Kassel together with the Ithaka Institute and the Agroscope Zurich. The press cake material was pelletised, the fruit stones were used without compaction. The carbonisation and activation step was performed using a PYREKA (Picture 1), the laboratory carbonization unit from the company PYREG (https://www.pyreg.de/).
Several parameter settings were tested, especially a comparison between one step (Carbonisation and activation in one step) and two step activation (separate carbonization and activation). After the production of the activated char it was analysed for char yield, BET surface area, UV- and DOC reduction capacity and finally adsorption tests with waste waters were carried out to answer the question of how well the resi-

Picture 1: the Pyreka Laboratory Unit

Picture 2: Activated Carbon from fruit stones

dual biomass activated carbon is able to reduce micropollutants in waste water in comparison to a conventional activated carbon such as the Norit SAE Super. For this purpose the activated carbon was added to waste water in a dosage of 1.75, 3 and 7 mg per L. The reduction of micropollutants was measured by using 15 substances taken from the swiss water protection act. The residual biomass activated carbons performed well in comparison to the standard activated carbon from the market (Figure 1). While the commercial activated carbon had the highest cleaning efficiency in all dosage treatments the residual biomass activated carbons still received a mean reduction rate of micropollutants of 50 to 80% with a dosage of 7 mg per L. The cleaning potential is increasing with increasing dosage and in real life applications a dosage of 10 – 20 mg per L is advised. At these dosage levels the RE-DIRECT residual biomass activated carbon can be expected to adsorb a high percentage of micropollutants, high enough to fulfill legal requirements and provide cleaner water.

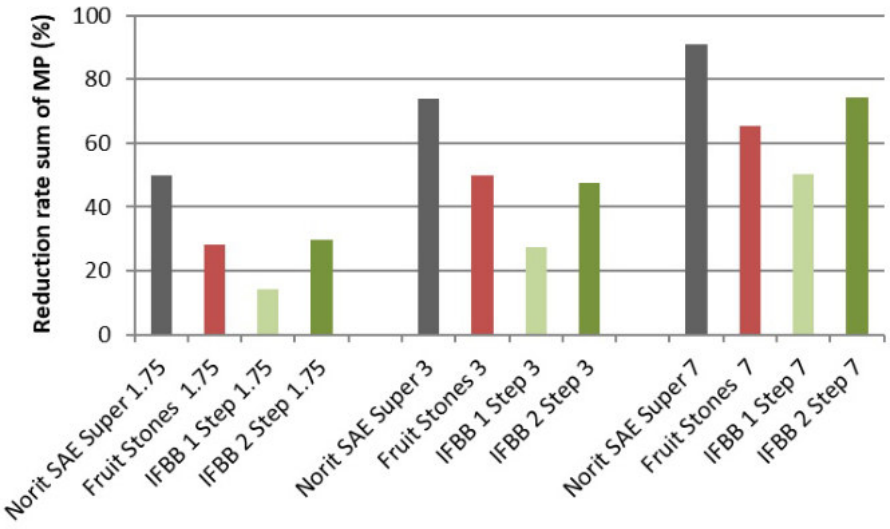

Figure 1: Result of micropollutant elimination tests with residual biomass activated carbon and waste water from Baden-Baden. MP = Micropollutants.

Contact
University of Kassel

Faculty of Organic Agri-cultural Sciences
Department of Grassland Science and Renewable Plant Ressources

Dr. Frank Hensgen
Steinstr. 19
D-37213
Witzenhausen

phone:
+ 49 5542 98 1245
email:
hensgen@uni-kassel.de