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Field experiment with liquid manure and enhanced biochar

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Field experiments with low amounts of various liquid manure enhanced biochars.

In 2016 a new machine was developed to inject liquid biochar based fertilizer directly into the crop root zone. A large-scale field experiment with corn and oil seed pumpkin was set-up on 42 hectares on 15 different fields in the south East of Austria. Three treatments were compared: (1) surface spreading of liquid manure as control (common practice), (2) 20 cm deep root zone injection with same amount of liquid manure, and (3) 20 cm deep root zone injection with same amount of liquid manure mixed with 1 to 2 tons of various nutrient enhanced biochars. The biochar were quenched with the liquid phase from a separated digestate from a biogas plant (feedstock: cow manure).
From May to October nitrate and ammonium content was analyzed monthly from 0-30cm and 30-60cm soil horizons. At the end of the growing season the yield was determined.
The root zone injection of the liquid manure reduced the nitrate content during the first two months at 13-16% compared to the control. When the liquid manure was blended with biochar, Nitrate soil content was lowest (reduction 40-47%). On average the root zone injection of manure-biochar increased the yield by 7% compared to the surface applied control and 3% compared to the root zone injected manure without biochar. The results shows, that biochar is able to reduce the Nitrate load in soils and increase the yield of corn at the same time. The nutrient efficiency of organic liquid fertilizers can be increased.