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► **To cite this version:**

Frédéric Rees, Jean-Louis Morel. Mechanisms of soil pH regulation by biochar amendments and consequences for biochar long-term effects. 10. ISMOM 2015: Soil interfaces for sustainable development, Association Québécoise des Spécialistes en Science du Sol (AQSSS). CAN., Jul 2015, Montréal, Canada. hal-02792592

HAL Id: hal-02792592

<https://hal.inrae.fr/hal-02792592>

Submitted on 5 Jun 2020

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Abstract for ISMOM 2015

DESCRIPTION: Abstract submitted for an **oral presentation** at ISMOM 2015 within symposium S15 *Biochar in Agriculture and Environment* chaired by Dr. Suzanne Edith Allaire.

STATE: The abstract has just been submitted online. Information about its acceptance for oral or poster presentation will be provided on March 28th 2015.

TITLE: Mechanisms of soil pH regulation by biochar amendments and consequences for biochar long-term effects

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Soil amendments of biochar, *i.e.* the solid product of biomass pyrolysis, have been increasingly investigated over the last few years as a way to store stable C in soils, to improve crop production and to remediate degraded and contaminated land. Many short-term effects of biochar on soil chemical and biological properties may be explained by the observed increase of soil pH, largely reported in the recent scientific literature for acid or neutral soils. However, both the mechanisms by which biochar is affecting soil pH and the duration of pH changes remain unclear. Using batch reactors and column leaching experiments, we examined the response of a wood-derived biochar pyrolyzed at 450 °C to the addition of various quantities of HNO₃ or NaOH. Our results enable to identify both the dissolution of biochar's mineral phases, *e.g.* calcite and Si/Al oxides, and cation exchange at the surface of biochar as the two major mechanisms explaining biochar's buffering capacity. The importance of these mechanisms vary in dependence with time and pH evolution. Observation of old charcoal amendments at various sites suggest however that, depending on initial soil pH and soil buffering capacity, the effects of biochar caused by the modification of soil pH may not last more than a few years.