

Biochar from phosphorus-enriched bacterial biomass waste: Characterization and its potential as a fertilizer

김정애, 윤영상†

전북대학교

(ysyun@jbnu.ac.kr†)

A huge amount of bacterial biomass wastes are generated from large scale fermentation processes for production of amino acids, nucleic acids, etc. These wastes contain considerable concentration of nutrient elements including phosphorus and nitrogen. This study attempted to convert the biomass waste to biochar and to utilize the biochar as fertilizer. Dried feedstock mainly consisting of *Escherichia coli* biomass was pyrolyzed at 600 °C for 2 h, 3 h, and 4 h, resulting in the pyrolysis yield of $14.6 \pm 2.1 \%$, $8.43 \pm 1.3 \%$, and $5.18 \pm 0.7 \%$, respectively. Study on phosphorus release to water for 24 h revealed that the phosphorus release depended on their pyrolysis yield, ranging from 15.8 ± 4.8 mg/g to 38.7 ± 7.2 mg/g. In the case that citric acid was used instead of water, the phosphorus release was enhanced. Contents of inorganics were measured by ICP-OES and ICP-MS. In addition, TGA were conducted to check the pattern of thermo-degradation of the biomass at different heating rates. Furthermore, lettuce culture with the biochar showed that the biochar significantly enhanced early growth of lettuce during 12 days and could have a beneficial influence on the growth of plant.