Effects of biochar coupled with chemical and organic fertilizer application on physicochemical properties of common buckwheat (Fagopyrum esculentum Moench) starch

Jincai Tao[1], Chenxi Wan[1], Jiajun Leng[1], Shuangrong Dai[1], Yixin Wu[1], Xinhui Lei[1], Jiale Wang[1], Qinghua Yang[1], Pengke Wang[1], Jinfeng Gao[1,*]

(*[1]Northwest A & F University, Yangling 712000, China)*

Abstract: 【Objective】 The aim of the study was to assess the effect of varied combinations of chemical fertilizer, organic fertilizer, and biochar treatment on the physicochemical properties of starch. 【**Method**】 Here, a field experiment was conducted to investigate the effects of combinations of chemical fertilizer, organic fertilizer, and biochar treatment on the physicochemical properties of starch. 【**Result**】 Results showed that the combined chemical and organic fertilizer applications increased the amylose content of starch and reduced its light transmittance, solubility, swelling potential, and relative crystallinity and gelatinization enthalpy compared with chemical fertilizer alone. The optimized co-application of chemical fertilizer, organic fertilizer, and biochar significantly increased amylose content, transmittance, solubility, and swelling power of starch and decreased starch granule size, relative crystallinity, pasting temperature, and gelatinization enthalpy of starch compared with the combination of chemical fertilizer and organic fertilizer. 【**Conclusion**】 Overall, the combination of 80% nitrogen from chemical fertilizer, 10% nitrogen from organic fertilizer, and 10% nitrogen from biochar produced common buckwheat starch with desirable physicochemical properties for food and non-food applications.

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Jinfeng Gao, E-mail: gaojf7604@126.com