Additional file for:

Application of biochar-coated urea controlled loss of fertilizer nitrogen and increased nitrogen use efficiency

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**Fig. S.1** SEM images of biochar used for biochar-coated urea.



**Fig. S.2** FTIR spectra of biochar used for biochar-coated urea.

The band at 1570 cm−1 correspond to keto C=O stretching vibrations in esters or C=C stretching vibrations in alkene and aromatic compounds;

The band at 1030 cm−1 correspond to C–O stretching vibrations in lignin derivatives or alcohols and phenols.”



**Fig. S.3** 13C NMR spectra of biochar used for biochar-coated urea.

Resonance region at 110–150 ppm indicated aromatic carbon.



**Fig. S.4** Schematic plot of ammonia volatilization collection.