**Advances and future directions of biochar characterization methods and applications**

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Biochar is a carbon-rich by-product of the thermal conversion of organic feedstocks and is primarily used as a soil amendment. Identification and quantification of biochar properties are important to ensure optimal outcomes for agricultural or environmental applications. Advanced spectroscopic techniques have recently been adopted in biochar characterization. However, biochar characterization approaches rely entirely on the user’s choice and accessibility to the new technology. The selection of proper methods is vital to accurately and consistently assess biochar properties. This review critically evaluates current biochar characterization methods of proximate, ultimate, physicochemical, surface and structural analyses, and important biochar properties for various applications. The abstract is adapted from the author’s previous publication at the Critical Reviews in Environmental Science and Technology, 47 (23), 2275-2330.