Water Hyacinth: from threat to value-added product via HTC

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Water Hyacinth (WH, Eichornia crassipes) is universally regarded as one of the more serious world's invasive plants. Native from the Amazon river basin and introduced as an ornamental plant for water gardens, its rapid spreading has made this plant to be a major weed in many areas such as southern US states from Florida to California. WH tends to form mats on the water surface and can quickly dominate aquatic systems because of fast growing rate. WH causes problems for humans (navigable waterways obstruction, hydroelectric device fouling, blocking of irrigation channels…) and ecosystems (signi cant deterioration of water quality and severe harm to wildlife). In this work WH (leaves and stem) were subjected to hydrothermal carbonization (HTC) under varying experimental conditions (temperature, time and biomass/water ratio). is process has proven to be a cost e ective green route to produce carbonaceous materials and o ers many advantages including the possibility of using high moisture materials. e resulting hydrochars were characterized in terms of solid yield (SY, %), Heating Value (HHV, MJ kg-1) and surface properties (porosity, surface morphology and functionalities). It was found that SYs were very low owing to the high moisture content of the biomass (>99%). In general, longer HTC times, lower temperatures and greater biomass loads (even without water addition) involved greater values of SY. Temperature had the highest in uence on HTC reactivity, promoting numerous degradation reactions. N2 adsorption analyses at 77 K indicated that all HCs had an incipient porosity, mainly located in the mesopore range, with low values of SBET (20-45 m2 g-1). Moreover, microspheres were observed from SEM analyses, as a result of polymerization of cellulose degradation products. e investigation of this invasive specie is of high interest; these results suggest that WH might be investigated for biofuel applications as well as for other used in the materials eld, such as adsorption, energy storage or soil remediation. We are grateful for nancial support provided by the Ministry of Economy and Competitiveness (MINECO) via project CTM2016-75937-R

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