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Hydrothermal carbonization of olive mill waste: Effect of the olive oil load on the hydrochar properties

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The Mediterranean region is currently responsible for a large proportion of the olive oil production worldwide. The main process used to produce olive oil (OO) is a two-phase centrifugation method which generates a waste locally known as 'alperujo' or two-phase olive mill waste (TPOMW). This is a high polluting by-product with high moisture content (>65%) and variable olive oil loading depending on the origin. In this work the influence of the initial OO loading on the physicochemical properties of HTC-chars produced from TPOMW was evaluated. Fresh TPOMW was dried and the remaining OO was totally extracted by accelerate solvent extraction with hexane. Afterwards, mixtures of dry and extracted TPOMW (DE-TPOMW), olive oil (OO) and deionized water (DW) were prepared with different ratios. Experiments of HTC were conducted in a high pressure reactor at 225°C during 2 hours. Finally, several analysis techniques were used to characterize the HTC-chars. It was found that after the HTC treatment the olive oil mainly remains in the HTC-char and, consequently, contributes to enhance the global heating value of the solid by approximately 12%. Other characteristics like the solid yield (%) and the hydrophobic properties also improved as the OO content in the previous mixtures increased. As a result, the moisture content of the HTC-chars after filtration considerably decreased. Therefore, it could be concluded that HTC is deemed to be an effective treatment of TPOMW, which will be more beneficial to produce bioenergy feed stocks as the amount of olive oil retained in the raw TPOMW increases.

Biography

Verónica Benavente obtained her degree in Chemical Engineering from University of Alicante in 2012. She received a master of Materials Science from the University Materials Science Institute of Alicante (IUMA) in 2013 and recently, a master of Renewable Energies form the Miguel Hernández University of Elche in March 2015. Currently, she is a PhD student in Chemical Engineering at University Institute of Chemical Process Engineering of Alicante (IIPQ), where she has been working since 2010; First, conducting research in the field of polymer processing at the research group "Polymer, Pyrolysis and Combustion"; lately, conducting research toward the doctoral degree in the field of waste treatment at the research group "Waste, Energy, Environmental and Nanotechnology" (REMAN). Her research focuses on the upgrading of agro-industrial wastes via torrefaction and hydrothermal carbonization to make them suitable for energy generation.

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