

## ***Biochar From Posidonia Oceanica As Adsorbent Material Of Hydrocarbons From Wastewater: Batch And Column Experiments***

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### ***Abstract***

In this work, new activated carbons were tested as adsorbent materials of oil / hydrocarbons from wastewater. In particular, low concentration of this kind of pollutants can compromise the life of animals and plants of aquatic ecosystems (Yu, 2017).

The current legislation provides that wastewater produced by boats can be discharged directly into the sea only if the total hydrocarbon concentration not exceeds 15 ppm.

The new activated carbons were obtained from bio-oil production waste, a biochar produced by pyrolysis of *Posidonia oceanica*, a marine plant widespread in the Mediterranean sea.

The biochar has been characterized and adsorption experiments were carried out with the not activated biochar and with two chemically activated biochars by means of acid or alkali treatments. Moreover, a commercial activated carbon has been used for comparison purpose. Synthetic wastewater (bilge waters) were prepared following reference standards (MEPC, 2003) containing MGO (marine fuel) and SDS (sodium lauryl sulfate).

Batch adsorption isotherms were carried out without ionic medium and at different concentrations of NaCl in order to evaluate the effect of salinity on the adsorption ability of adsorbent materials. The same adsorbents were tested by column experiments. In particular, a bench pilot system was built and breakthrough curves were obtained changing amount of adsorbent material in column, flow rate, initial MGO and surfactant concentrations.

Several instrumental techniques (turbidimetry, TOC, HPLC-FLD) have been used to measure surfactant and hydrocarbon concentrations in experimental samples.

The experimental data were fitted with Langmuir, Freundlich and Sips models and important considerations were made on the breakthrough curves of column experiments.

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