

## Sorption of diesel from aqueous solution on biochar

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Water contaminated with petroleum hydrocarbons has become a one of the major problem worldwide. Sorption is one the most commonly used technique for treatment of contaminated water. The sorption potential of peach stone biochar (PS-B) as a sorbent for diesel fuel from aqueous solution was explored.

### Biochar preparation

Peach stones (*Prunus persica* L.) were obtained from Juice Factory "Vino Župa" Aleksandrovac, Serbia. The peach stones were washed with tap water in order to remove dirt from its surface, and dried at room temperature. Dried stones were further grinded using vibrating disk mill "Siebtechnik – TS250" (Siebtechnik GmbH, Germany), and sieved into different particle sizes. For the purposes of these investigations, class between 0.1 to 0.5 mm was used. The ground peach samples (PS) were further pyrolysed at 500 °C under oxygen-limited conditions in Nabertherm 1300 muffle furnace with heating rate of 10 °C min<sup>-1</sup>, for 1 h. Finally, the obtained biochar (PS-B) was stored in closed vials with polypropylene caps.

### Sorption batch experiments

The sorption experiments were performed in batch system with mixing, with a constant amount of sorbent of 0,1 g mixed with 100 ml of water contaminated with diesel at concentrations of 2 mg/L 4 mg/L, 8 mg/L, 12 mg/L i 16 mg/L at 25 °C, and placed at horizontal shaker where the speed was 160 rpm. The solid and liquid phases in all experiments were separated in a centrifuge at 4000 rpm. Finally, diesel concentration in the liquid phase was detected according to SRPS EN ISO 9377-2:2009 method, by gas chromatographic analyses conducted on an Agilent 7890A gas chromatograph.

### Ecotoxicity test

Bacterial strain *A. fischeri* NRRL B-11177 (Macherey-Nagel GmbH & Co. KG, and Duren, Germany) was used for the evaluation of acute ecotoxicity of water contaminated with diesel fuel before and after treatment with biochar. The test was performed according to the ISO 11348 standard, using freeze-dried bacteria and BioFix® Lumi-10 (Macherey-Nagel GmbH & Co. KG, Duren, Germany) [1].

### Results and conclusions

The application of peach stone biochar (PS-B) resulted in more than 92% removal of diesel in whole concentration range, with equilibrium reaching after 3 h of contact. After sorption process was completed, ecotoxicology tests were conducted using initial and purified water samples. Ecotoxicology tests have shown a decrease of toxicity of contaminated water on *A. fischeri* after the treatment of water by biochar sample. Therefore these forms of carbon based sorbents have great potential to be good sorbents of diesel and can be successfully applied for their removal in water treatments.

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### References

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