

Biochars from animal wastes as alternative materials to treat colored effluents containing Basic Red 9

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Abstract

Bovine bones (BB) and fish scales (FS) were used as alternative precursors to produce biochars, which in turn, were applied for the removal of Basic Red 9 (BR9) from aqueous solutions. BB and FS were pyrolyzed generating a solid (biochars), a liquid (pyrolytic oils) and a gas fraction. All fractions were characterized to evaluate the pyrolysis process. The biochars presented different functional groups and a mesoporous structure with surface areas around $90 \text{ m}^2 \text{ g}^{-1}$. Both biochars demonstrated potential to adsorb BR9, with maximum adsorption capacities of 49.5 (BB–biochar) and 52.3 mg g^{-1} (FS–biochar). Pyrolytic oils were composed mainly by palmitic acid (BB) and imidazolidinedione (FS), which are compounds with biological and antioxidant activity. Pyrolysis of BB generated CO_2 while pyrolysis of FS generated H_2 . In summary, bovine bones and fish scales are promising precursors to concomitantly produce biochars with great adsorbent potential and oils with interesting characteristics.

Keywords

Adsorption, Biochar, Bovine bone, Fish scale, Fuch sine