Influence of reaction atmosphere and solvent on biochar yield and characteristics

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Influence of reaction atmosphere and solvent on biochar yield and characteristics

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Abstract

Sunflower husks were converted to biochar via thermochemical liquefaction in different solvents and reaction atmospheres. Highest biochar yields obtained was 574 $g.kg^{-1}$ husks. Surface area of the produced chars and evolution of aromatic compounds in the biochar structure increased with an increase in temperature. Volatile matter and N-content decreased and S-content decreased significantly with an increase in temperature which is favourable should the biochars be used for combustion. The HHV of the biochars were significantly higher than that of the feedstock as was also indicated by the energy densification ratio. The biochars compared favourable with coal on a Van Krevelen diagram, showing the possibility of the biochars for application in co-gasification. CO_2 performed better in retaining the energy of the feedstock in the biochar (up to 58%). It was shown that sunflower husks are a viable feedstock for the production of biochars for application in co-gasification or combustion.

Keywords: husks, liquefaction, carbonization, atmosphere, solvent