

## ANAEROBIC DIGESTION OF AQUEOUS PYROLYSIS CONDENSATE ENHANCED BY BIOCHAR: A CIRCULAR ECONOMY APPROACH

Neha Batta, ICFAR, Western University, London, Ontario, Canada  
nbatta@uwo.ca

Tahereh Sarchami, ICFAR, Western University, London, Ontario, Canada  
Cesar M Moreira, Escuela Superior Politécnica del Litoral, ESPOL, Ecuador  
Lars Rehmann, ICFAR, Western University, London, Ontario, Canada  
Franco Berruti, ICFAR, Western University, London, Ontario, Canada

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Pyrolysis of biomass leads to the production of bio-oil, non-condensable gas and biochar. Although all products have applications in the value chain, the aqueous phase of the bio-oil is a secondary waste of low value, acidic and with a complex chemical composition. This study focuses on the utilisation of the aqueous phase, termed aqueous pyrolysis condensate (APC) for energy generation via anaerobic digestion in the presence of biochar derived from the digestate to moderate the inhibitory effects of the phenolic components, thereby following the path of circular economy. Isotherm studies of the biochar showed that it had an adsorption capacity of  $39.8 \text{ mg}_{\text{phenol}} \cdot \text{g}^{-1}_{\text{biochar}}$ . The addition of biochar allowed for an 83% increase in the cumulative biogas production at the highest APC loading, accompanied by an increase in the  $\text{CH}_4/\text{CO}_2$  ratio. This shows that the APC can be utilized as a valuable precursor for energy generation.

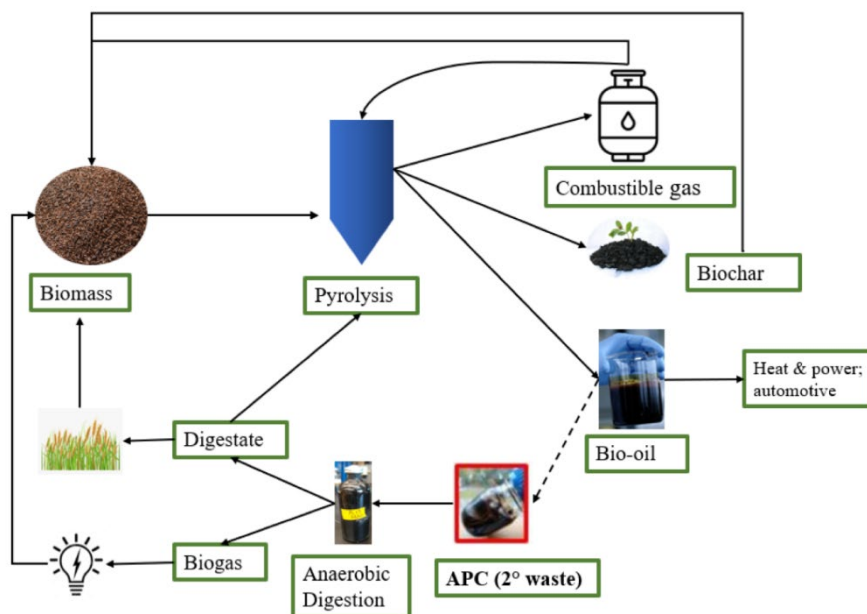


Figure 1 – Circular economy concept of APC valorization