**Catalytic pyrolysis of biogas digestate**

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**Highlights**

* Catalytic pyrolysis of biogas digestate.
* Optimization of operating parameters.
* The composition of pyrolysis oil is influence by catalysts presence.

**1. Introduction**

Biogas production by anaerobic fermentation is a promising method of producing an energy carrier from renewable resources [1].The digestate resulted from biogas production is widely used as a fertiliser in farm land[2,3]. However, there is a concern about land spreading of digestate due to the possible heavy metals and pathogen content if not controlled properly. Alternative uses of digestate such as incineration, pyrolysis and gasification of the biogas digestate have been investigated by several researchers[3]. The objective of this study was to investigate catalytic pyrolysis of biogas digestate in order to obtain liquid fractions with potential as fuels components.

**2. Methods**

The pyrolysis of the digestate was carried out in a continuous system, using a quartz tubular reactor positioned in the central area of ​​a vertical furnace provided with temperature control system. To perform pyrolysis tests, the digestate was conditioned. The preliminary pyrolysis experimental program was performed at the following operating parameter values: I) atmospheric pressure; II) temperature in the isothermal reaction zone: 420°-550° C; III) bulk velocity: 0.1-1 h-1.

**3. Results and discussion**

The tests of biogas digestate pyrolysis were carried out in presence or absence of catalysts, at different operating parameters. The catalytic pyrolysis was done over nanostructured metal catalysts, prepared by precipitation of copper and iron precursors in presence of various anti-agglomeration additives. The analysis of bio-oil resulted from catalytic pyrolysis of biogas digestate indicates a composition suitable as fuel components. The main compounds identified were linear and branched aliphatic hydrocarbon components, unsaturated compounds, alcohols, carbonyl compounds.

**4. Conclusions**

The results indicated superior performance for the pyrolysis process in the presence of nanostructured metal catalysts compared with the non-catalytic process.

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