

# VII SYMPOSIUM OF RESEARCH AT FGV



**Production of sustainable aviation fuels  
precursors from urban waste**

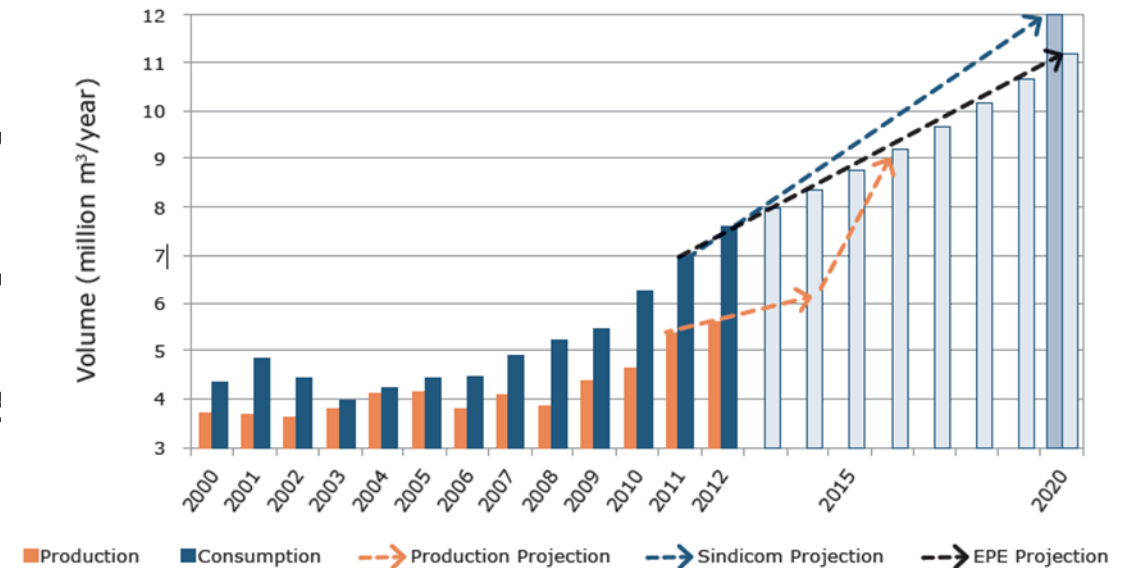
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## Fluminense Federal University /Sustainable Fuels

The research focuses mainly on producing sustainable aviation fuels (SAFs) from urban waste commonly found in Rio de Janeiro, such as sewage sludge. In this context, sewage sludge-derived biochar will be catalysts for these chemical conversions.



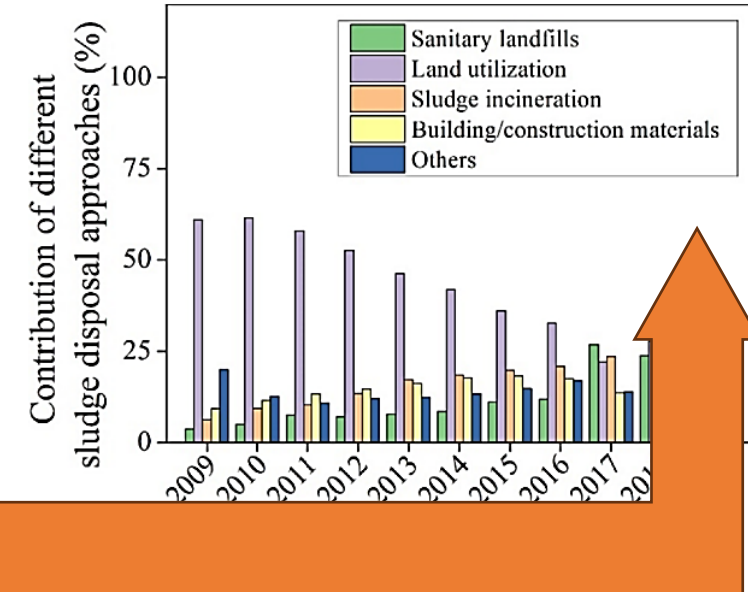
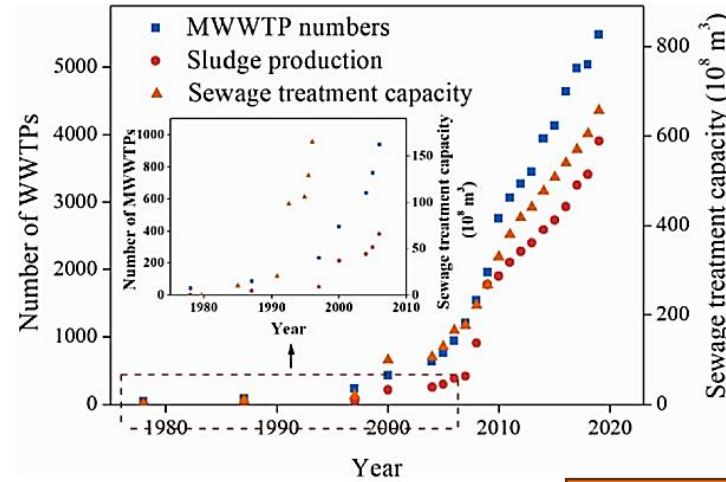
**Figure 1.** Production and demand for aviation fuels in Brazil [7]

# PROJECT PROPOSAL DESCRIPTION

The global production of sewage sludge from municipal wastewater treatment plants is

45 million dry tons per year

## PROJECT PROPOSAL DESCRIPTION



These might not be eco-friendly solutions:

- Heavy metal contamination
- CO<sub>2</sub> increase during incineration

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- In Brazil, sewage sludge is a significant issue because of its **incorrect disposal and causes environmental contamination** with several metals. In that way, we had the insight into using this inorganic/organic source as catalyst feedstock for the pyrolysis process.
- In this context, **sewage sludge-derived biochars might act as potential catalysts** for SAFs production using platform molecules derived from lignocellulosic biomass.
- Lignocellulosic biomass is a rich source of inexpensive and widely available commercially available platform molecules such as furfural and 5-hydroxymethylfurfural. These molecules can be converted into molecules with high added value, which are SAFs precursors through catalyzed condensation reactions. However, conventional catalysts contribute significantly to increasing the **carbon footprint** (for metal extraction and purification) in addition to producing **large amounts of waste** for final material production.

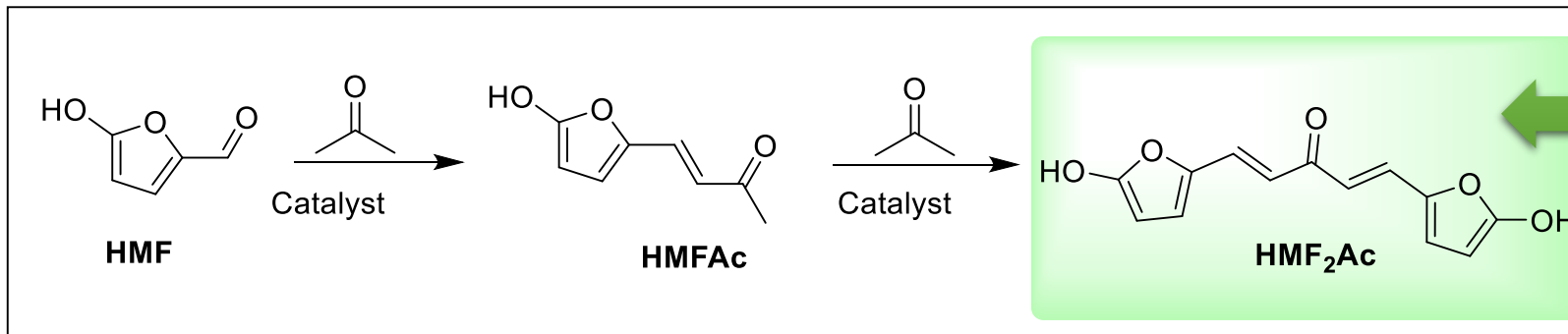


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Under pyrolysis conditions, the sewage sludge might yield quite efficient material for lignocellulosic biomass (using platform molecules) conversion into biofuels and value-added building blocks such as SAF precursors. Several of these reactions use high-cost catalysts; **here we can use a material that would be an environmental issue.** Our research group tested these materials for several reactions, and highly satisfactory results were obtained.

SAF precursor



# PROJECT PROPOSAL DESCRIPTION

For the execution of this project, some crucial factors are needed:

- Research grant, especially as a fellowship for post-graduation students;
- Partnership with sewage treatment plants from other states;
- Evaluation on a pilot scale;
- Mentorship in a possible product with economical value;

## PROJECT PROPOSAL DESCRIPTION

## NEXT STEPS

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- With a proper research grant, this project has the potential to become a product or patented process for the preparation of SAFs.
- **So far, this project has been solely performed by a master's student, and no specific grant or fellowship is involved.**
- **I firmly believe this project has a high potential to move toward a more sustainable future and circular economy. With my expertise acquired so far, I can manage these possible funding sources and coordinate this project.**





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# THANK YOU



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