



SAF Production using Co-pyrolysis of Food and Palm Wastes

Elevator Pitch

Saudi Arabia wastes over 4 million tons of food yearly—but what if that waste could fuel the skies? Our project transforms food and palm waste into sustainable biofuel for the aviation industry, cutting CO₂ emissions while powering a greener future.

Objective

To design and develop a portable system that utilizes food waste and palm waste as feedstock for biofuel production through co-pyrolysis. This project aims to reduce CO₂ emissions in Saudi Arabia while creating a solution that is scalable, adaptable for industrial use, and accessible to users at various levels of expertise.

Why Food Waste?

We chose food waste as a focus because Saudi Arabia ranks among the highest in food waste per capita, far exceeding the global average. Islam forbids wastefulness, as the Qur'an states:

{وَكُلُوا وَاشْرَبُوا وَلَا تُسْرِفُوا إِنَّهُ لَا يُحِبُّ الْمُسْرِفِينَ} سورة الأعراف 31

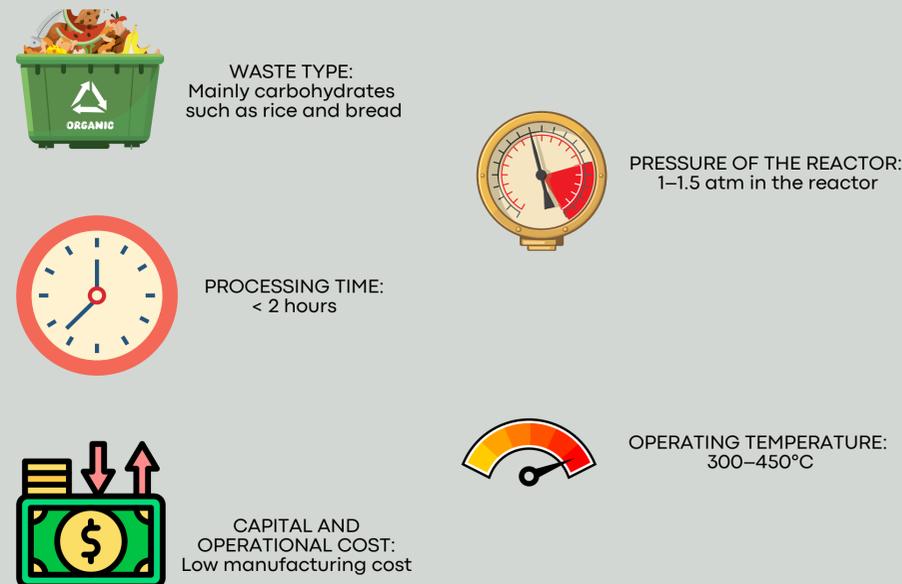
"Eat and drink, but do not waste. Indeed, He does not love the wasteful." (7:31)

Our project aligns with Saudi Vision 2030 by promoting sustainability and advancing the Kingdom's commitment to a greener future.

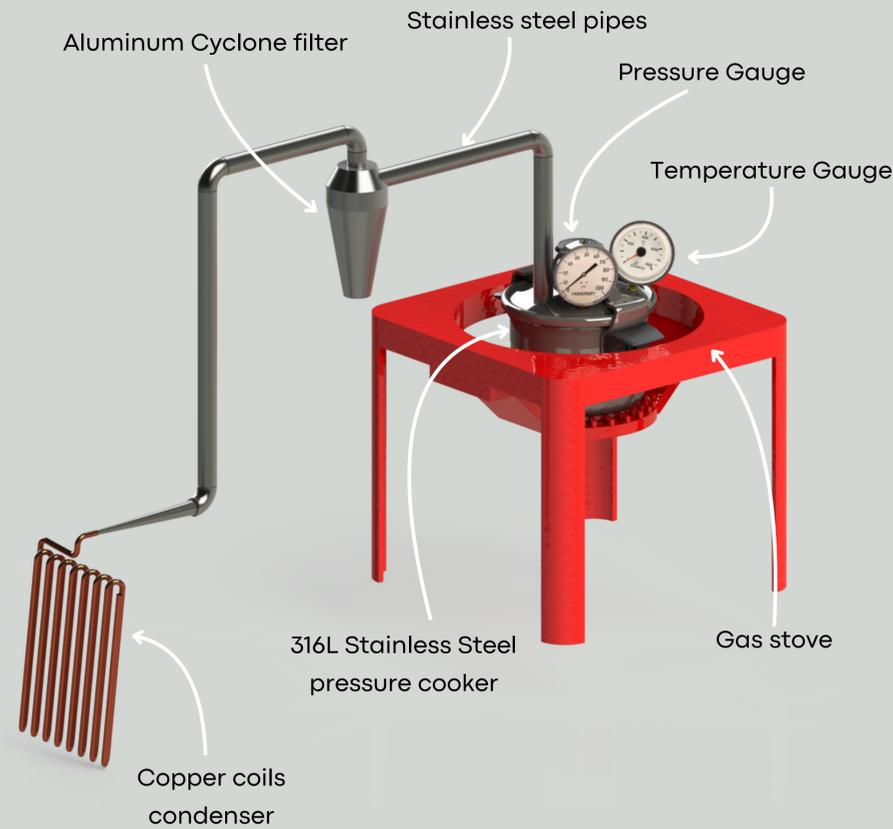
Constrains



Specifications



Prototype

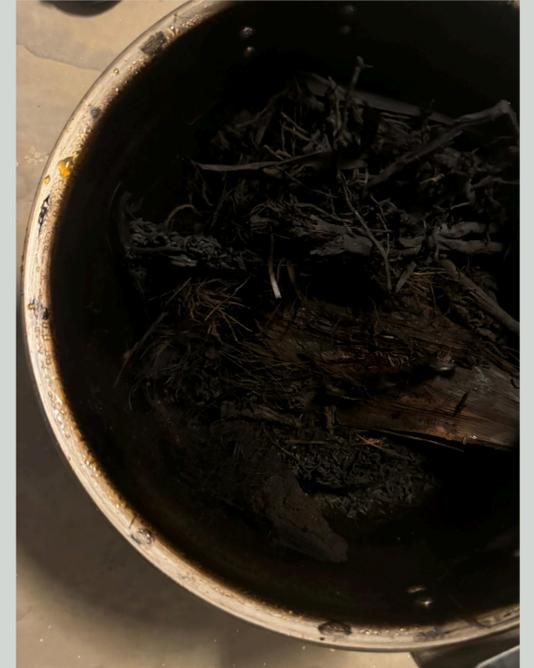


Validation and Verification

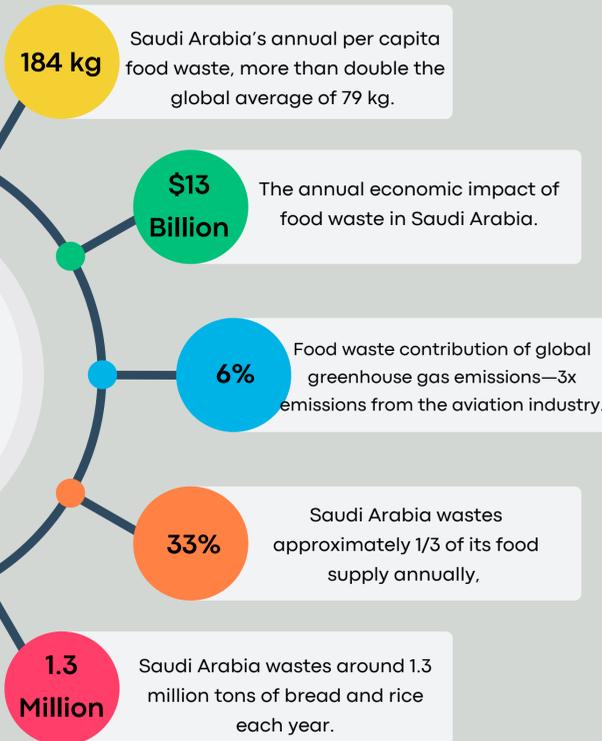
The experiment resulted in the production of three distinct outputs:

- Bio-char,
- Syngas,
- Bio-oil.

These outputs were observed and measured after the process was completed. Below are the outputs along with their respective details and visual representation.



Food Waste in Saudi Arabia



Project Impact

The initiative to convert food waste into Sustainable Aviation Fuel (SAF) through pyrolysis offers substantial benefits. It supports Saudi Arabia's goal of reducing carbon emissions by 278 MtCO₂ by 2030 as part of the Green Saudi Initiative. By addressing 4 million tons of annual food waste, the project reduces environmental degradation and promotes a circular economy. This transition to SAF could reduce aviation CO₂ emissions significantly, contributing to global efforts like the Paris Agreement's target of halving emissions by 2050.