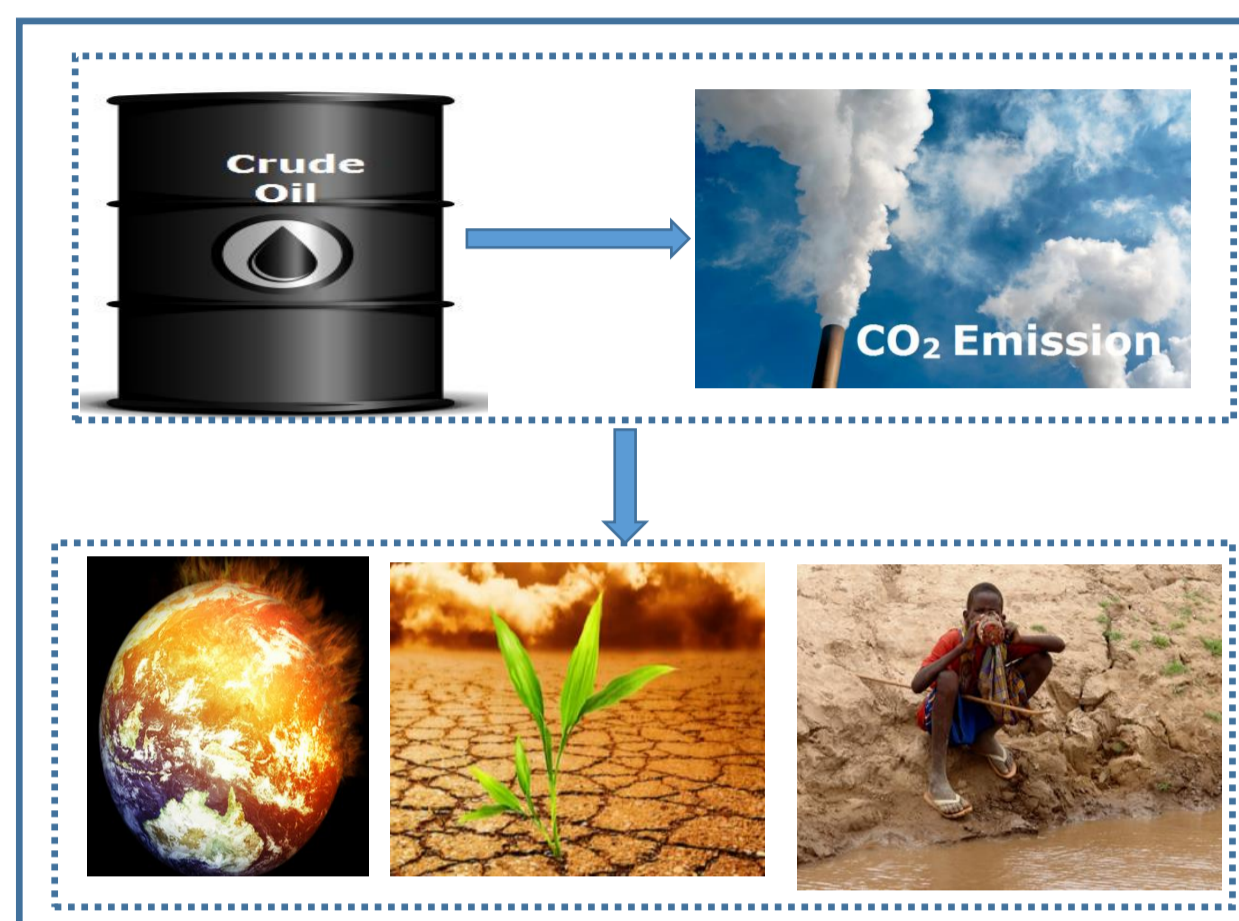
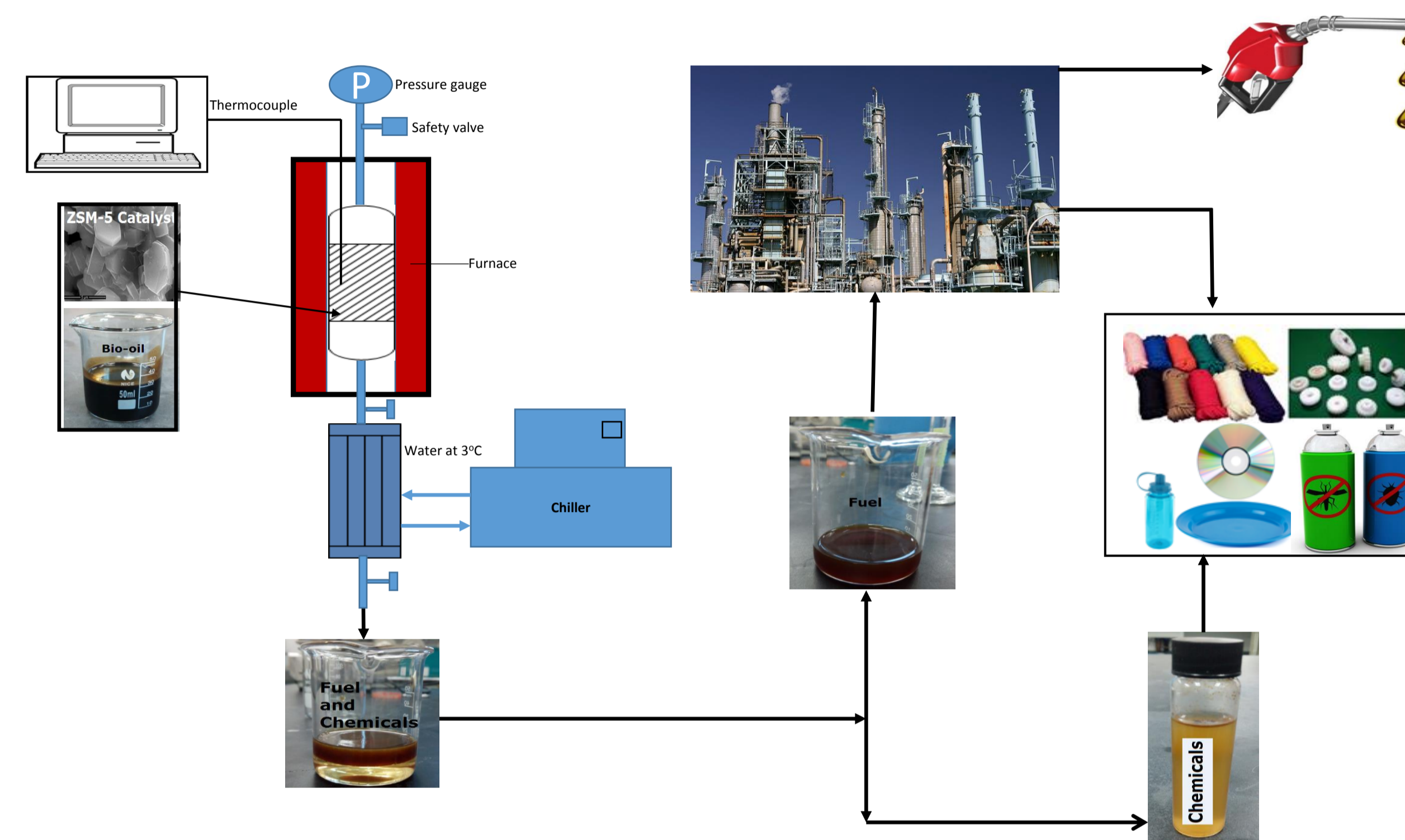


## Introduction

- World energy demand continues to grow with increasing population and industrialization which depends heavily on the fossil fuel.
- The current demand for fossil oil stands at about 94.4 million barrels per day with current known reserves at around 1477 billion barrels globally which is expected to be used up in the very near future.
- Emission of greenhouse gases and potential energy crises in future



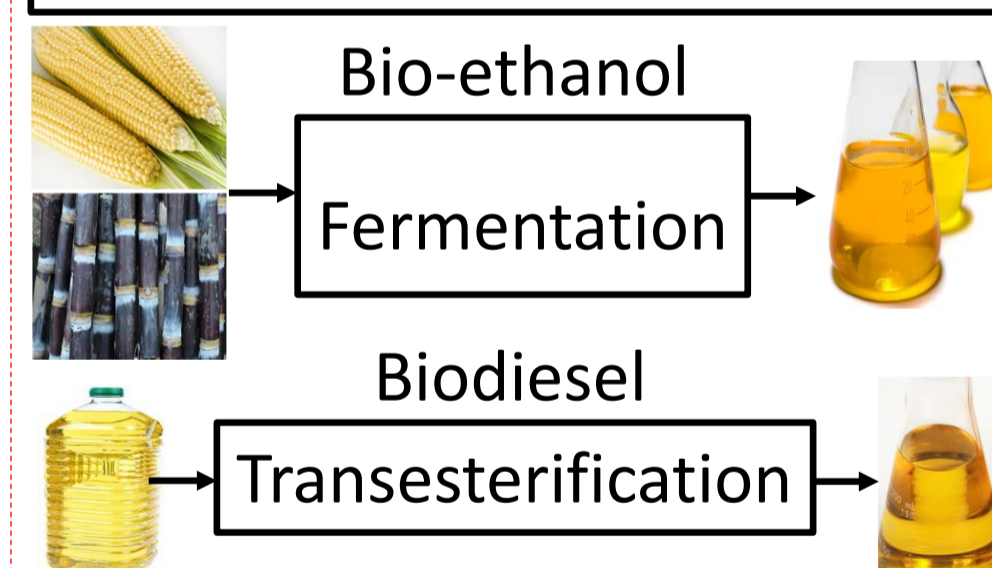
## Upgrading/Processing



## Background of Alternative Biofuels

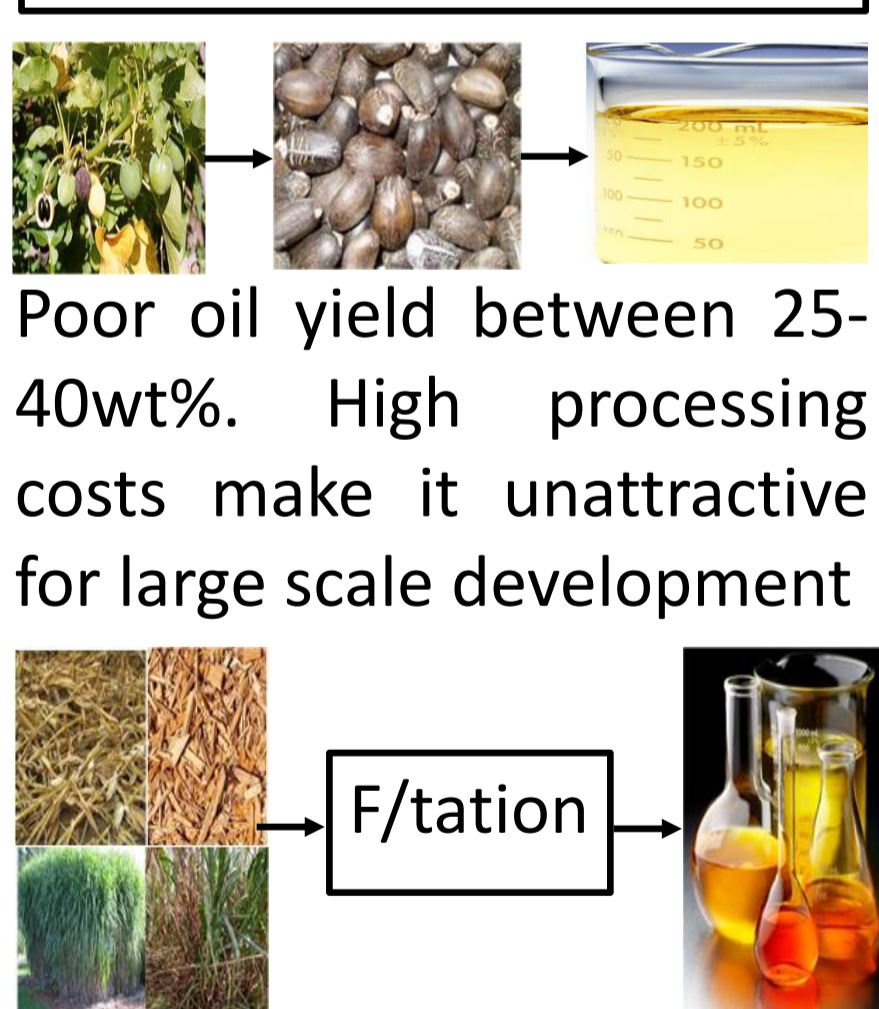
### Biofuels

#### 1<sup>st</sup> generation



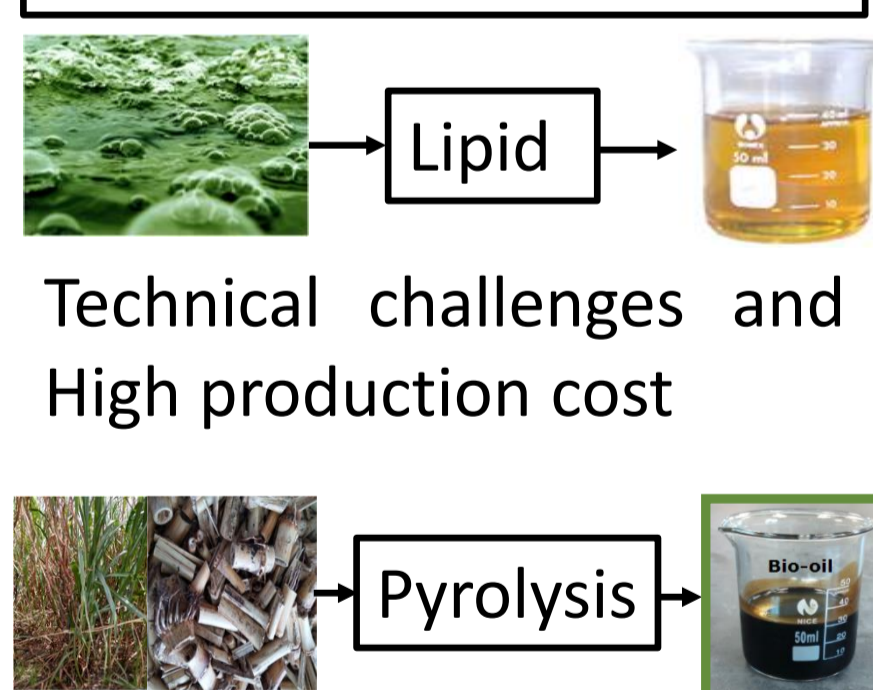
Ethical issues, poor fuel (bioethanol) properties: lower vapor pressure, miscibility with water, corrosive and lower energy density. **Biodiesel:** high alcohol-vegetable oil ratio and low fatty acid content requirement, high cost of the raw material which constitutes about 70% of production cost

#### 2<sup>nd</sup> generation



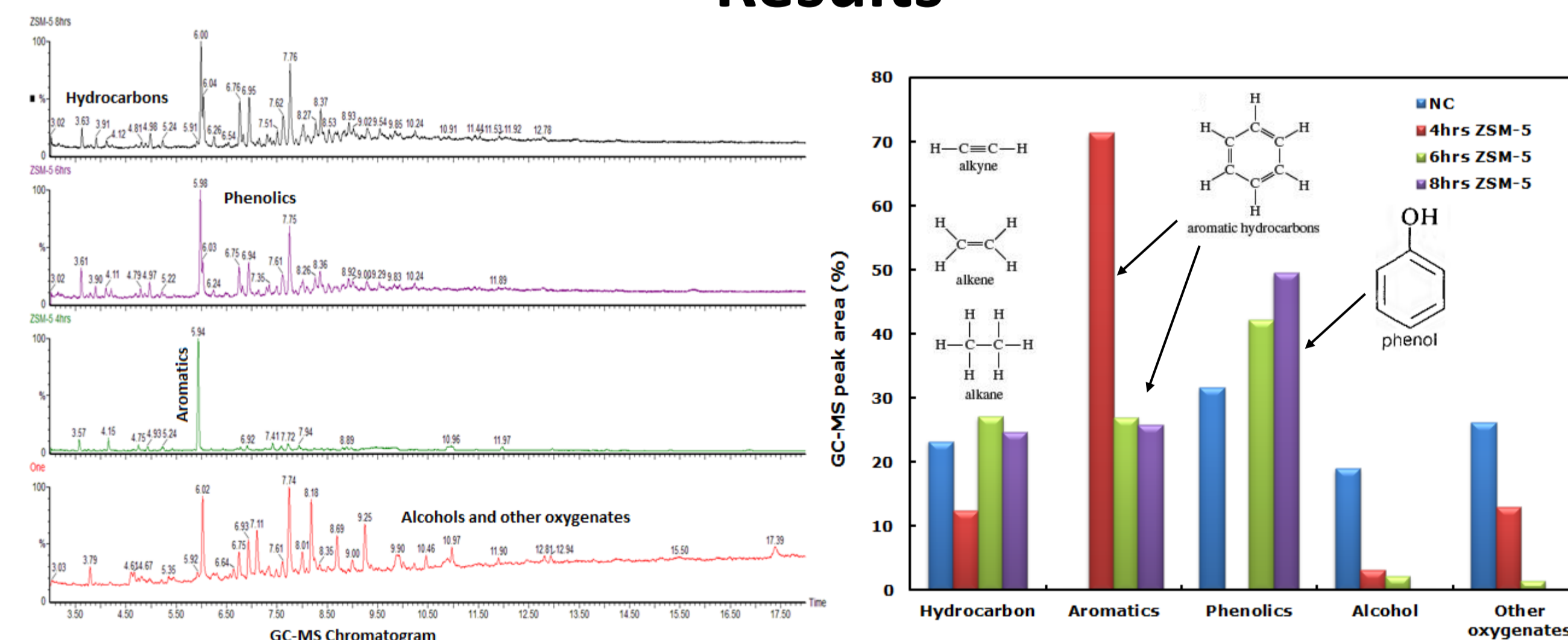
Poor oil yield between 25-40wt%. High processing costs make it unattractive for large scale development. Non-food material, evenly distributed across the globe, simple processing methods and low capital investment. Lignin degradation remains a challenge

#### 3<sup>rd</sup> generation



Technical challenges and High production cost. Low sulfur, nitrogen, and ash which make them relatively environmentally friendly. Pyrolysis process has high efficiency, environmental suitability and flexibility. No disintegration of biomass to its fundamental building blocks (CO and H).

## Results



## Conclusion

- Hydrocarbons and value added chemicals was produced from upgrading of Napier grass bio-oil over zeolite catalyst in a semi-batch reactor.
- Napier grass can be used as a potential feedstock for production of quality biofuel and value added chemicals.