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Evaluation of waste–energy process through the combustion and co-combustion of palm residual biomass.

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PROIBIDO REPRODUÇÃO

EVALUATION OF WASTE-TO-ENERGY PROCESS THROUGH THE COMBUSTION AND CO-COMBUSTION OF PALM RESIDUAL BIOMASS

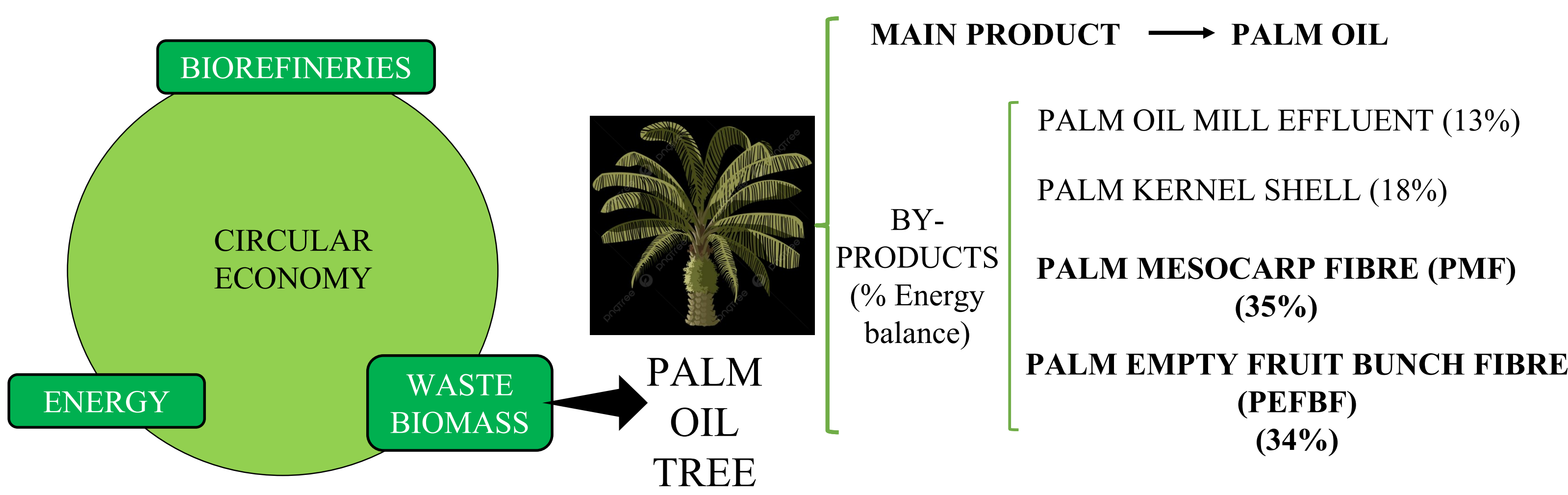
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INTRODUCTION

Brazil has the **largest suitable area** for oil palm cultivation, estimated at approximately **75 million hectares**, mostly concentrated in the **North and Northeast** regions.



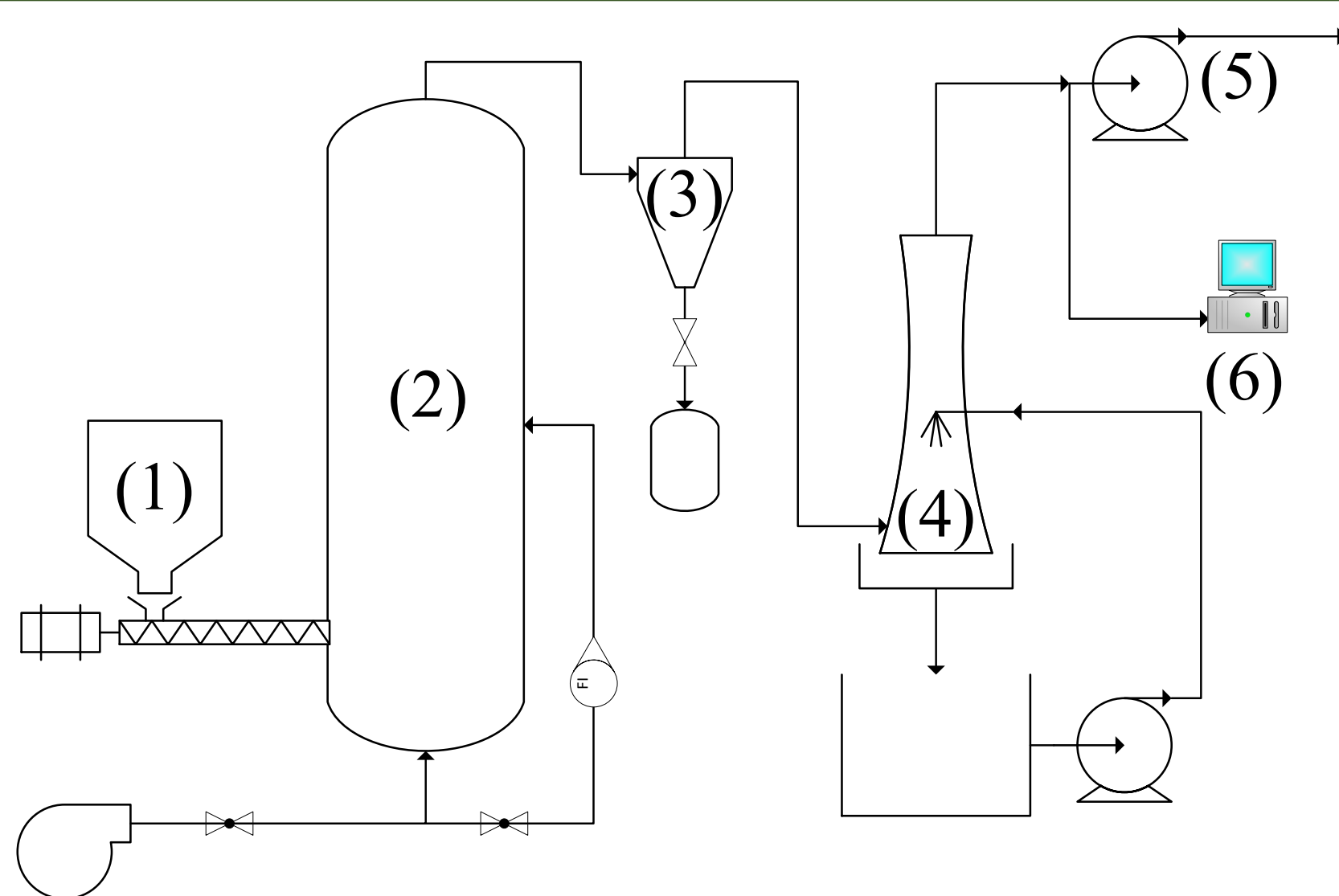
Despite their energy potential, the use of PMF and PEFBF in combustion is limited by **ash composition** and **flue gas composition**

Objective: To investigate the combustion behavior of palm residues and their impact on gaseous emissions

MATERIAL AND METHODS

Combustion system:

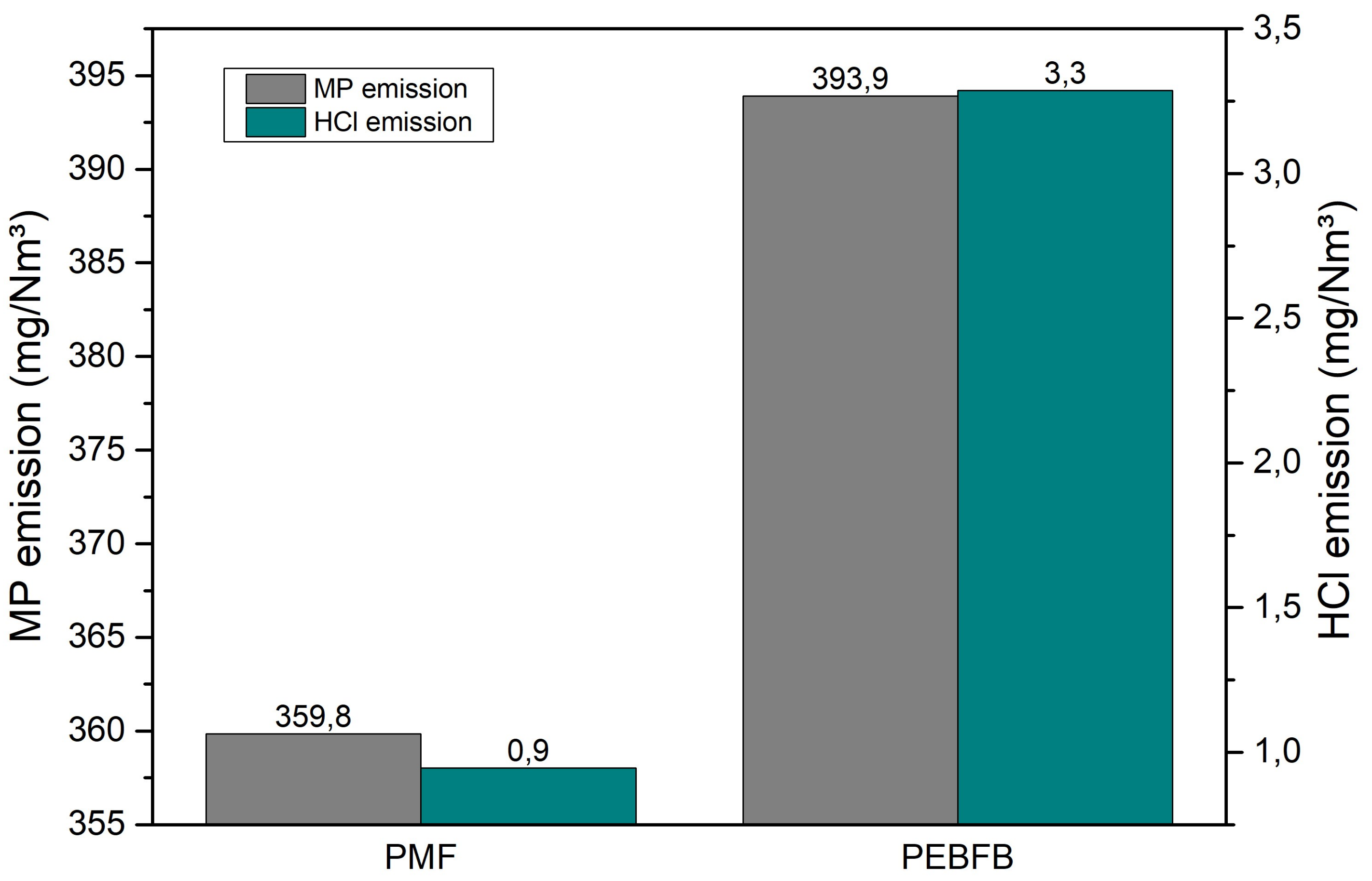
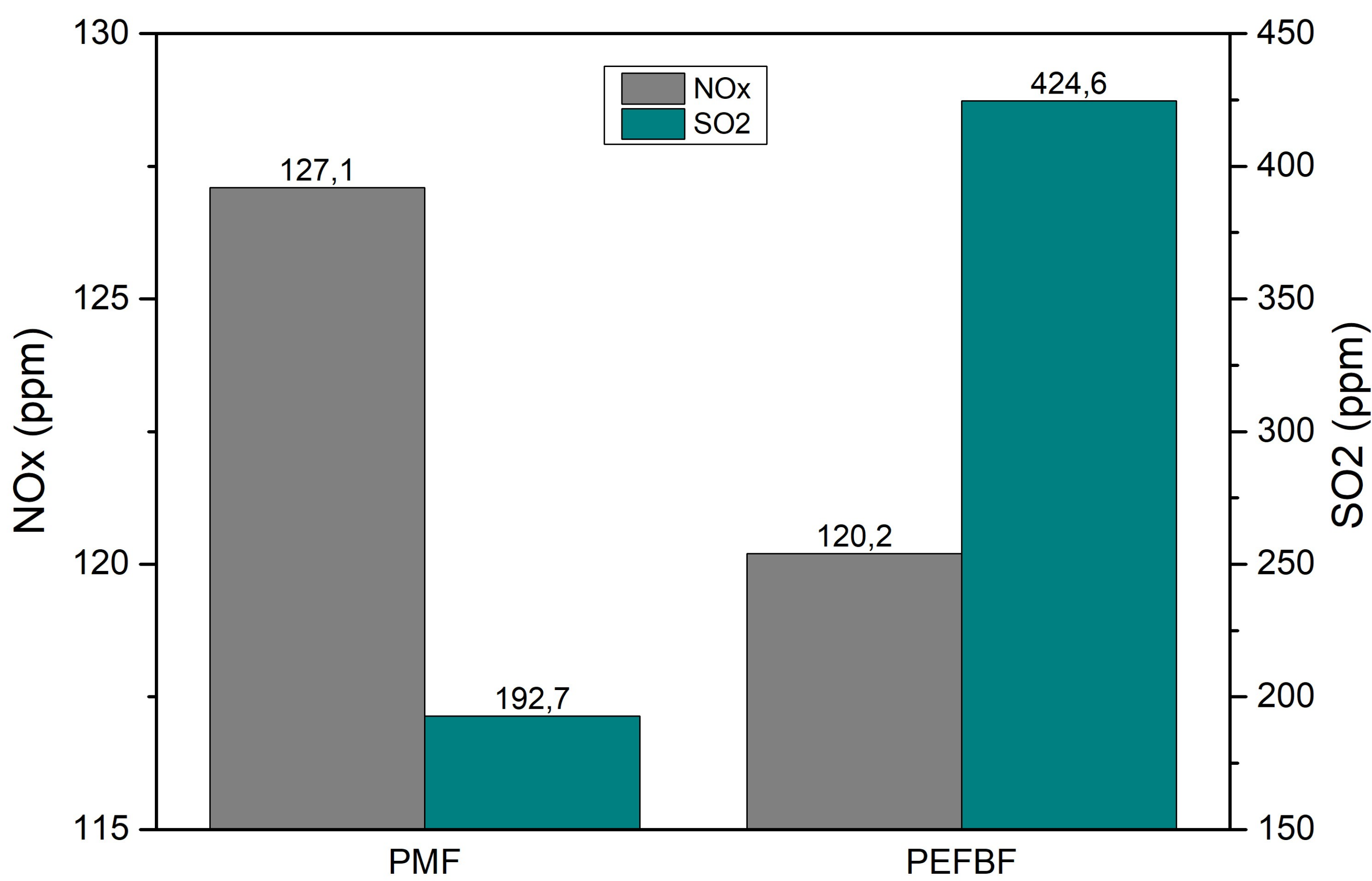
- (1)Feeding system
- (2)Bubbling fluidised bed reactor
- (3)Cyclone
- (4)Gas cooling and scrubbing
- (5)Exhaust fan with chimney
- (6)Gas analysers



	PMF	PEFBF
C (wt.%)	47,4	50,7
H (wt.%)	6,01	6,69
N (wt.%)	1,5	0,8
S (wt.%)	0,26	0,15
Cl (wt.%)	0,4	0,3
Ash (wt.%)	12,9	6,7
HHV (MJ/kg dry)	20,20	21,25

Biomass	Feed flow rate (kg/h)	Total air (Nm ³ /h)	Excess air (%)	Bed temperature (°C)	Freeboard temperature (°C)
PMF	6,31	51,96	189,1	884,42	819,7
PEFBF	7,83	51,94	142,1	878,42	862,38

RESULTS AND DISCUSSION



CONCLUSION

- **Higher N content** of PMF, aligned with higher HHV and reactor temperatures, led to **increased NOx emissions**.
- **SO₂ emissions** increased under higher combustion temperatures.
- **Particulate matter** emissions **decreased** with higher excess air.
- The **ash composition** may have contributed to **lower HCl emissions**.

ACKNOWLEDGMENTS

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