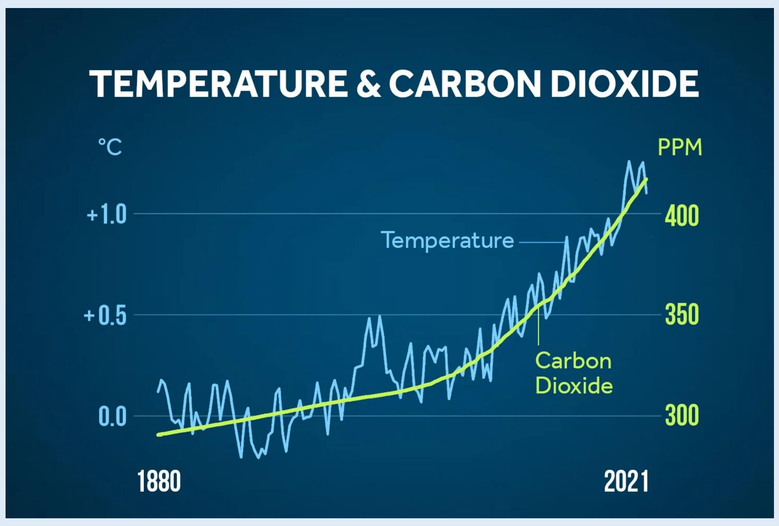
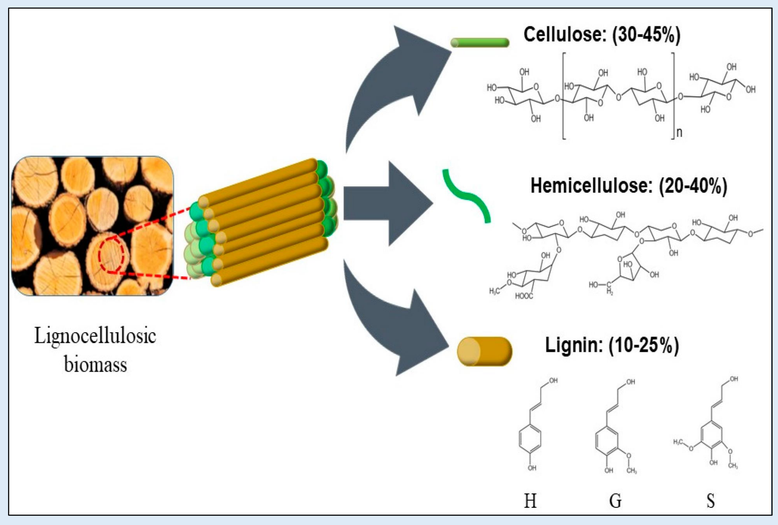
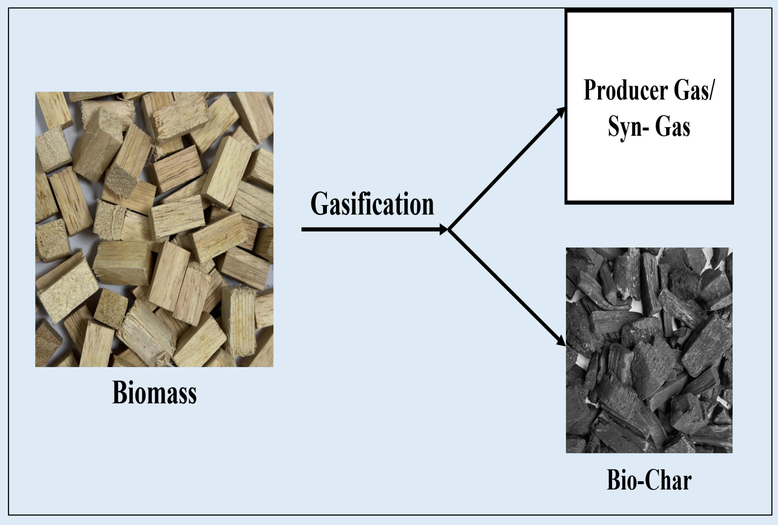
CO_2 Sequestration
Packed Char Bed

Bio-char is a product of gasification in addition to producer / synthetic gas. Bio-char having high constituent of fixed carbon, used in reduction reaction.







Sample	Ultimate Analysis					Chemical Formula
	C (%)	H (%)	O (%)	N (%)	S (%)	
Woody Biomass	46.20	6.24	46.59	0.85	0.12	$C_{1.0}H_{1.5}O_{0.6}$
Biomass Char	81.42	1.35	16.37	0.68	0.18	$C_{1.0}H_{0.2}O_{0.2}$

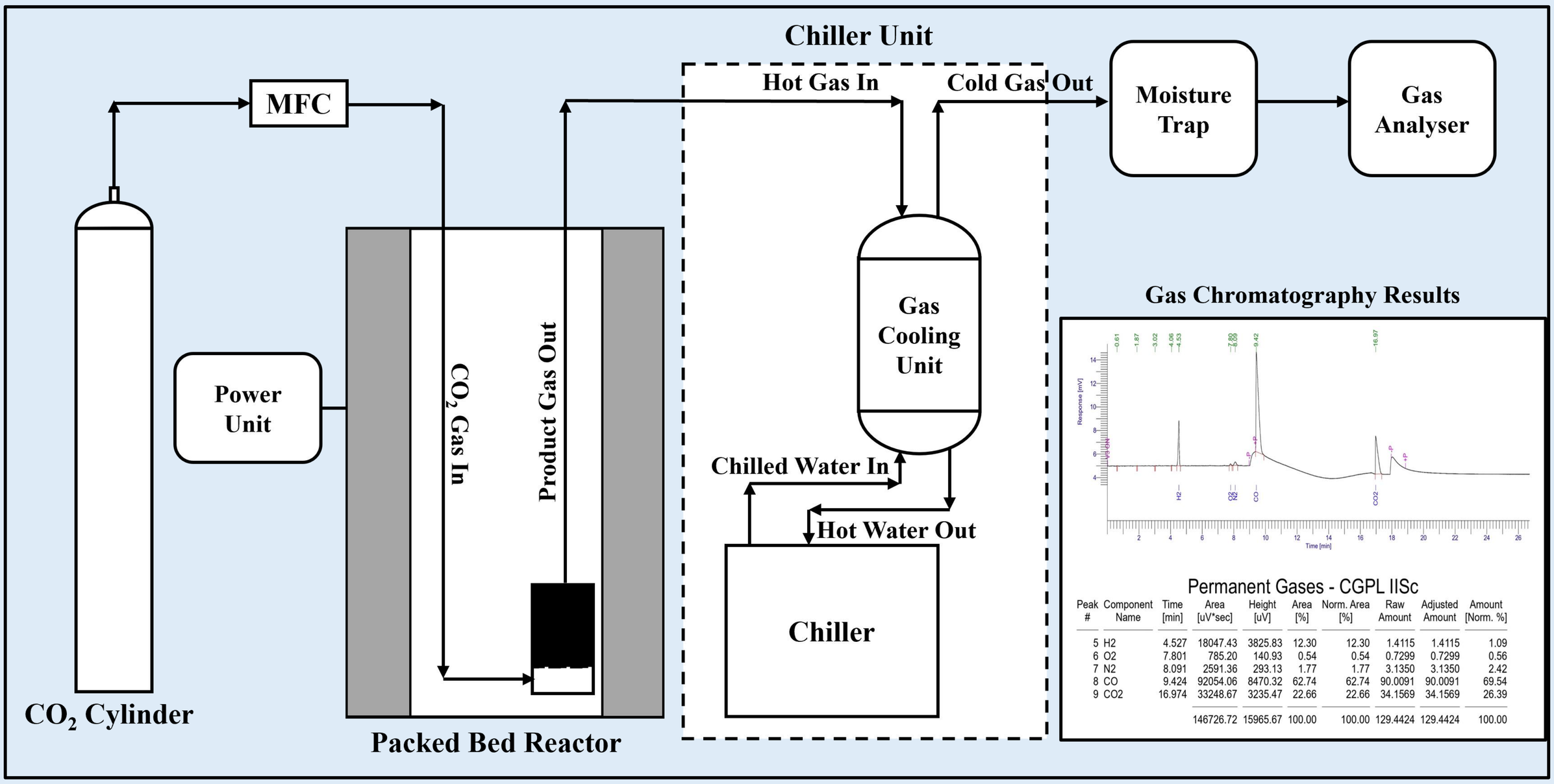
CO_2 Sequestration:

- Capture, collection and storage of CO_2 to bring the atmospheric CO_2 below 350 ppm enables restricting global temperature rise to < 1.5 ºC.
- Carbon capture and storage is a cost intensive and tedious process.
- 1 kg of bio-carbon sequestrates 3.67 kg of CO_2 by using packed bed reactor.

Packed Bed Reactor:

- Use of bio-char in packed-bed reactor helps to sequester CO_2 and convert to useful gaseous product.
- Conversion rate depends on the bio-char particle size, inlet CO_2 flow rate, temperature and fixed carbon percentage in the bio-char.
- The composition of the gaseous product is analysed by means of gas analyser.

Chemical Reaction	
$C + CO_2 \rightarrow 2\,CO$	LCV = 5 MJ/kg



Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	Norm. Area [%]	Raw Amount	Adjusted Amount	Amount [Norm. %]
5	H2	4.527	18047.43	3825.83	12.30	12.30	1.4115	1.4115	1.09
6	O2	7.801	785.20	140.93	0.54	0.54	0.7299	0.7299	0.56
7	N2	8.091	2591.36	293.13	1.77	1.77	3.1350	3.1350	2.42
8	CO	9.424	92054.06	8470.32	62.74	62.74	90.0091	90.0091	69.54
9	CO2	16.974	33248.67	3235.47	22.66	22.66	34.1569	34.1569	26.39
			146726.72	15965.67	100.00	100.00	129.4424	129.4424	100.00

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