

since 1905. doubles in 7 days.

Water Hyacinth. interferes the movement of fish, vessels but it absorbs or metabolise various chemicals such as cadmium, lead and mercury to clean polluted water.

stem fibrous $\rightarrow$ textile, fibre, paper

leaf $\rightarrow$ proteins, vitamins, minerals and animal feed.

leaves - 2-3 cm

starker under water & mud for 3 months.

composition of water hyacinth in comparison with other material.

characteristic	water hyacinth (leaf)	cowdung	Night soil
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moisture cont. (%)	82	74-82	85-90
Total solids (%)	18	18-26	10-18
volatile solids (% of total solids)	82.5	70-80	80-90

comparison of bio gases production

Raw material	gas m ³ /kg (wet mass)	Fuel value kcal/m ³	net fuel value kcal/kg of wet mass
cowdung	0.037	2660	98.4
water (leaf)	0.053	2600	137.8

26 $\pm$ 4°C - 51-64 l/kg (green leaf)
47-58 l/kg (partially dry)

semi continuous } 50-53 l/kg operation

Fuel Values of some Natural Gas & bio gas

Description of the fuel	Fuel value kcal/m ³
Natural gas	
① Producer gas	2080
② Petrol gas	3600
③ SBP spirit	3000
④ Methane (100%)	5320
Bio gas	
cowdung	2660
hyacinth (leaf)	2600

Comparison of rates of reactor loading and gas production hyacinth (leaf) and cowdung (semi continuous feeding)

Reactor	volatile solids fed (kg/m^3) of digester per day.	Biogas production per volatile matter fed ($\text{m}^3/\text{kg/day}$)	Biogas production of digester volume per day m^3/m^3
Hyacinth Reactor 1	0.29	0.61	0.18
Reactor 2	0.58	0.40	0.24
Cowdung	0.44	0.54	0.24
		0.09-0.2	0.25-0.45

Composition of Hyacinth sludge in comparison with the other sludges.

characteristics	percent on dry basis		
	water hyacinth (leaf)	cowdung	Night soil
Total Nitrogen (N)	2.48	1.40-1.8	3.0-5.0
Phosphorus (P_2O_5)	1.20	1.10-2.0	2.5-4.4
Potassium (K_2O)	2.70	0.8-1.20	0.7-1.6

Maximum efficiency of conversions of solar radiation to biomass in terms of total incident solar radiation has been calculated at 5-8%, which gives a maximum biomass yield of 13-21 mg/kcal of incident solar energy. av. solar energy in India $4950 \text{ kcal/m}^2/\text{day}$
 $\therefore$ for hyacinth $4950 \times (13-21) \times 10^4 \times 365 \text{ mg} = 230-380 \text{ t/ha/yr}$
 95% moisture

Uses (a) high ash content $\therefore$ for manure, ash contents 30%, potash, 7%, phosphoric acid, 13%, lime

(b) compost

(c) contents 10-16% crude on dry weight basis also high water content. $\therefore$ reduce & then use in animal feed

(d) Protein, carotene, hormone

(e) Paper, board, cellulose based products.
 stem - 40% add juice 8-10%
 cotton

(f) secondary and tertiary treatment of sewage

and industrial effluent

⑧ source of Energy

i) Saccharification by acid digestion and subsequent fermentation

• 1 t of KCL, 13 gal of C_2H_4OH , • 2 t residue fibre,
and 77B 7700 Btu from 1 t dry hyacinth.

ii) Gasification of air and steam with recovery of NH_3

44,000 cft of gas of 142.8 Btu

89-116 lb $(NH_4)_2SO_4$

• 1 t KCL per 1 t of dry hyacinth

at 800°F
 H_2 - 16.6%
 CH_4 - 4.8%
 CO 21.7%
 CO_2 4.1%
 N_2 - 52.8%

iii) Bacterial fermentation and utilisation of the gas for power production

26500 cft of 600 Btu and • 1 t KCL per 1 t of dry hyacinth

Gas - CO_2 - 22.1, O_2 1.2%, CH_4 51.6%, H_2 25.4%

400 litres / 100 kg of semi dried water hyacinth.

manure 10% of plant used.

Mixture

cowdung only - 214.1 l/kg

water hyacinth only - 225.1 l/kg

mixture with
dung & algae 458.1 l/kg.