

Water Hyacinth! have benefits?

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Water Hyacinth, an invasive species is a subject of discussion among the scientist for its destructive environmental and economic impact. Originating from the Amazon, this notorious macrophyte invaded through the waterways into different tropical and sub-tropical regions. It directly affects mankind by disrupting human activities, acts as a breeding ground of vector borne diseases and a pest to the aquatic environment. Even managing it through physical, mechanical, chemical, and biological processes, it can cause additional complications like water pollution, bio concentration, bio accumulation and bio magnification in the aquatic food web and eventually eliminates no target organisms. Yet sustainable management of water hyacinth can control its negative impact human and environment. Like, it can be used as animal fodders, bio fertilisers, for phytoremediation, metal reclamation, and conversion to bio energy.

Water hyacinth contain ample of nutrients like cellulose (20%), hemicelluloses (33%), crude protein etc. and its nutrient contents were proven to be independent of its place of origin and remain constant at the same levels, even if collected from different geographical areas or water sources that make it relevant as **feed for livestock**, poultries and fish. Except nutrients it consists more than 70% organic matter (dry) and high levels of NPK. It seemed mulched water hyacinths contain 10–40% more nitrogen and 20–50% more carbon that increase the quality of water hyacinth as bio fertilizer compared to other aquatic weeds. **Bio fertilisers** made from water hyacinth can improves soil nutrient content, increase crop growth, improve crop quality, even curb weed and pest infestation in certain cases viz. it improves soil nutrient content for strawberry growth, improve



morphological and physiological characteristics of the tuber plant in turmeric farming; and also improve soil temperature, soil moisture and crop yield in maize cultivation. With high nutrients it contains a low lignin (10%) these make the plant especially appropriate to use as a **bio energy** resource because this compound hinders the fermentation processes of several commercial yeasts and enzymes. It also exhibits a useful C/N ratio within the range of 20:1–30:1, which is appropriate for microbial decomposition processes. These make it useful for use as feedstock for many types of bio fuels like biogas (biochemical conversion); syn-gas (thermal conversion); solid fuel briquettes (mechanical conversion) and others.

Apart from fodder, bio fertilizer and bio energy resource water hyacinth are used for **phytoremediation and metal Reclamation**. This plant can remove up to 99.5% of chromium [Cr (VI)] pollution from industrial mine wastewater, removes phosphorous from rice mill wastewater up to 77.2% and is also able to remove zinc, lead, iron, copper and nickel from landfill. Besides heavy metals, water hyacinth



has a capacity to remove ammonia and phosphorus from sago mill (agro based industry) effluent. It removes heavy metals by root uptake and accumulates them in the plant. These accumulated heavy metals can be removed easily by electro coagulation, electro-floatation or a combination of the two. The recovered metals can be formed into solid bars and sold to metallurgical industries i.e., the process flow adopted by e-waste recycling facilities in Malaysia.

Water hyacinth, the worst aquatic weed is highly impossible to eliminate from the water ways, but the studies and research have shown us many positive as well as sustainable resource to use it for the economic growth.