

BIOLOGICAL MACHINE EXERCISE

Deposition of Calcium by A.foliacea
& using it by converting into Calcium
Carbonate then driving a piston
system
connected with a generator....

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INTRODUCTON...



(1)

Fig1.1 Calcified Amphiroa Foliacea.

Amphiroa foliacea belongs to kingdom Plantae - plants » divisio Rhodophyta - red algae » class Rhodophyceae » order Corallinales » family Corallinaceae.

Energy Crisis in the world has become a global issue. Science says that energy never ends, it only change its forms. But the source of energy can be well diminished. Now the time has arrived when energy crisis has become a cause of concern for the entire man kind. It is like an activated bomb threatening to explode any time.

OBJECTIVES...

In my idea the main objective is to extract calcium from sewage water by using culture of A.foliacea, then using the calcium, deposited during calcification to produce calcium carbonate and then producing carbon-

dioxide that will derive the piston mechanism which can be used to some useful work. Also use it as a preliminary step to the recycling of sewage water.

METHODOLOGY...

Deposition of calcium carbonate by
Amphiroa

foliacea culture in sedimentation tank

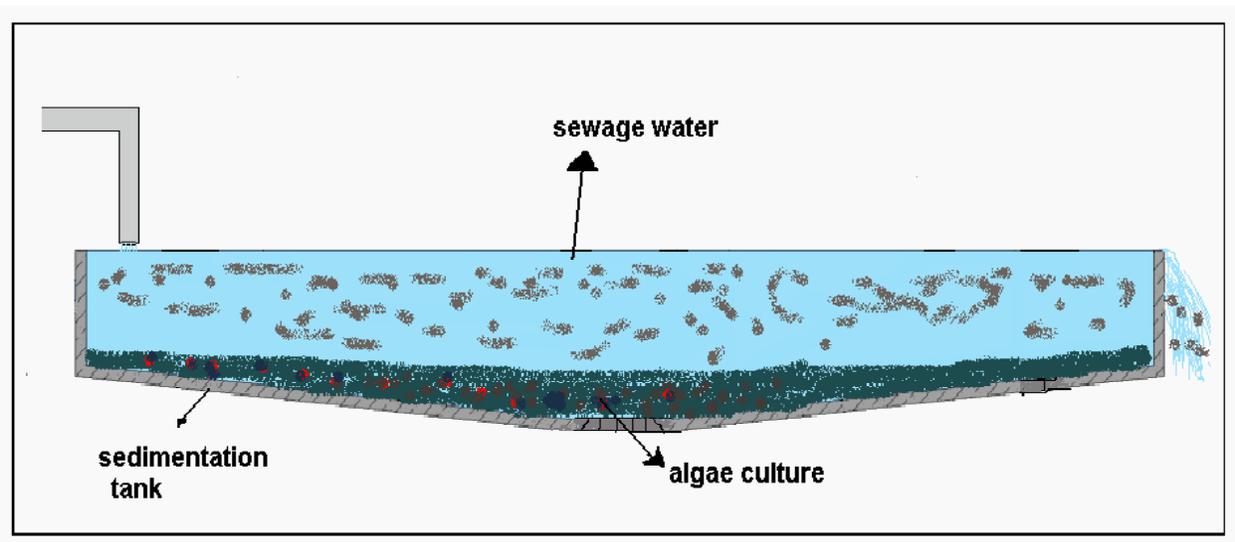


Fig 1.2

BASIC OUTLINE OF THE SYSTEM

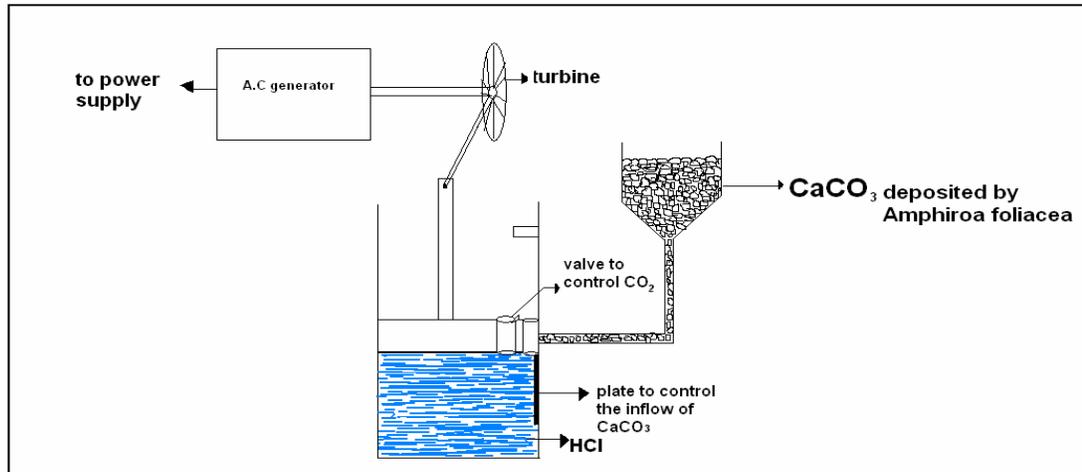


Fig 1.3

The process starts with the setting up of algae culture in the sedimentation tank, which should be shallow and physical conditions suitable for the culture. The calcification rate in the light in *A. foliacea* Lamouroux is proportional to the photosynthetic rate, whereas at higher pH where the photosynthetic rate is very low, the calcification rate is stimulated by the higher concentration of CO₃²⁻ ion. Calcification in live *A. foliacea* in the light is influenced both by the photosynthetic rate and the CO₃²⁻ ion concentration in the medium. (2)

Environmental Conditions:-

Habitat

This red algae will grow on almost any hard surface, rock, substrates or aquarium walls; some under intense illumination, others with very dim lighting.

Chemical/Physical

Higher pH's (8.3), stable temperature, ready calcium concentrations (400ppm plus), generally low metabolite loads are conducive to growing calcareous marine algae.

Lighting

Besides water quality, the quality, quantity and duration of useful wavelengths of light determine the well-being of captive algae. It is sufficient to say that proper spectral mix (i.e. broad visible spectrum and upper UV), of adequate brightness and regular light cycle are necessary. (2)

Once the culture is set up then sewage water is allowed to enter the tank by which calcification in the culture starts and the water from which Ca^+ ions has been removed overflows from the tank which can be further recycled and reused.

After the sufficient deposition of calcium carbonate in the culture the topmost layer is removed and fed into the system for further usage as shown in the figure 1.3, in the tank containing HCl , the piston is combined with a plate that controls the opening and closing of the CaCO_3 container as the piston moves up it allows the CaCO_3 to enter the acid tank and react to produce CO_2 and CaCl_2 , the CO_2 produce will drive the piston up which is connected to a turbine, as the piston reaches the point A in the figure the valve connected with the piston opens and CO_2 is released, which can be collected and used in many purposes. The turbine is connected to a generator that can be used to produce electricity and other useful purposes. The water that is left over in the sedimentation tank can be recycled and reused for other purposes...

CONCLUSION...

The above machine is one such example of harnessing energy by CaCO_3 , The calcium carbonate produced can be used for other purposes stated below; (3)

1. The main use of calcium carbonate is in the construction industry, either as a building material in its own right (e.g. marble) or limestone aggregate for road building.
2. Calcium carbonate is used as an extender in paints, in particular matte emulsion paint where typically 30% by weight of the paint is either chalk or marble.
3. Calcium carbonate is also used in a wide range of trade and DIY adhesives, sealants, and decorating fillers.
4. Ceramic tile adhesives typically contain 70 to 80% limestone. Decorating crack fillers contain similar levels of marble or dolomite.
5. Calcium carbonate is widely used medicinally as an inexpensive dietary calcium supplement, antacid, and/or phosphate binder.

According to survey of Energy resources 2007 by WORLD ENERGY COUNCIL, the energy demand has grown astronomically in recent years - with primary energy demand increasing by more than 50% since 1980. The world holds enough proved reserves for 40 years of supply and at least 60 years of gas supply at current consumption rates. So there is a need of finding more renewable and cheap sources of energy to meet the energy crisis that is going to come after few 30 to 40 years.(4)

The system can also be used as a preliminary step in the usage of living organism in the purification of sewage water and also to collect useful metal ion from the water, which can be used to make other useful substances.

The piston mechanism can be attached with other system to do useful work which can save man work.

References:-

1. Wetwebmedia.com
2. Fenner, Robert 1997. Red Algae; Branching its way into the aquarium. TFH 9/97.
3. Wikipedia .com
4. www.worldenergy.org