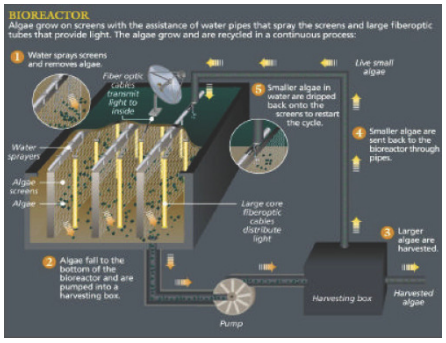
BIOLOGICAL REMEDIATION OF GREEN HOUSE GAS EMISSIONS

TECHNOLOGY OVERVIEW



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The technology is a novel cost effective mechanism that removes substantial amounts of CO_2 from the gaseous effluents of scrubbed fossil-fired power plants. The process is facilitated by the use of algae that have been grown on fabric sheets in a high temperature (thermophilic) environment. The algae are located in a separate chamber downstream of the scrubber, and are exposed to the effluent gas stream in the presence of carefully designed lighting conditions and nutrients. After their maturation, the algae can be harvested to maximize CO_2 consumption. The usage of the scrub units in the biological control of CO_2 is suitable as they provide an ambient environment for the growth of the algae. The process is carried out as follows: CO_2 moving towards the smokestacks is passed through running water and converted into bicarbonates. This water is then passed through bioreactors that contain a series of screens coated with CO_2 absorbing algae. An efficient harvesting technique is employed to remove the algae from the fabric sheets through a mechanism of spray washing. The resultant liquid slurry is filtered using a sieve to remove the mature algae, and the remaining slurry is sprayed on the fabric plates to assist in re-population.

POTENTIAL FIELDS OF USE

The invention has immense importance on both commercial and environmentally beneficial grounds. More than 1.7 billion tones of CO_2 are annually produced in the US alone. The industry consumption for this by-product is lesser than 40 billion tones, and is far more economical to produce commercially than by recycling the CO_2 from the flue gas. Hence, the necessity to control the amount of CO_2 from industrial emissions cannot be stressed enough. US's commitment towards the Kyoto protocol calls for taking measures to reduce CO_2 emission in the atmosphere in order to control the greenhouse effect.

BENEFIT ANALYSIS

The proposed technology has several advantages:

- Provides a low cost method to reduce CO_2 emissions from coal-fired power plants by more than 20%, facilitating the use of coal as a cleaner energy source.
- Eliminates the requirement to separate and transport CO_2 over long distances.
- Facilitates a process that increases the growth rate of the algal community as well its stability.
- Provides a mechanism to optimally utilize the area of the fabric plates for the growth of the algae.
- Facilitates the maximization of CO_2 consumption due to the ample population of algae.

STAGE OF DEVELOPMENT

The technology is at an advanced phase of development. It needs further testing before the commercial implementation as viable mechanism to control CO_2 emission. It has been developed as a low scale model, and requires further research and optimization before it can be converted into a cost effective industrial process.

FUTURE DEVELOPMENT

Future efforts will be concentrated on testing an optimal harvesting method for the algae, including determining the duration and intensity of the lighting cycles used for their growth. Also, researchers aim to re-use the mature algae for commercially productive ventures such as the manufacture of value-added products and energy. The algae can be used as a fuel source, fertilizer and fermentation agent among other useful products.

LICENSING OPPORTUNITIES

The patent application for this technology has been filed. Licensing opportunities are available.

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