Israel Experts on prof. T.L.GVELESIANI'S book "Mathematical models of transient waves generation in problems of environment". Tel-Aviv "Studio Fresco Publishers". 2010, p216.

Mitigation of the greenhouse gases emissions, and first of all of the carbon dioxide released from the stacks of power station firing fossil fuels became the mostly stringent problem of the mankind. Few ways of the mitigation are now considered in the industrial countries (increase of the power units efficiency, CO2 pre- and post combustion capture with further storage and so on). Meantime incorporation of the CO2 emissions in the photosynthetic process is one of the mostly feasible ways for mitigation of CO2 emissions.

Photosynthesis in green plants and microorganisms achieves CO2 fixation on a global scale achieving about 1011 tons CO2 per year, which is converted together with solar energy into biomass. Under field conditions, the efficiency of solar energy conversion in plant production is not high – the global average efficiency has been estimated at 0.15%. However, under optimal growth conditions it is much higher, reaching sometimes even 5 to 6%; the highest rate of photosynthesis (up to 10 %) is reached in marine microalgae. There are many efforts to develop technology of intensive microalgae cultivation in ponds fertilized by flue gases of the power plants with the aim to mitigate emitted CO2The grown microalgae can be used for production of high-value chemicals, nutritional products, in wastewatertreatment and so on. In the last yearsmicroalgae are being studied as a promising source for vegetable oils suitable as feed stocks for bio-fuels. The advantage of microalgae is their potential to achieve much higher productivities than conventional oil crops, in part due to their continuous production process and overall high oil content. Let us emphasize, that one can produce from algae up to 30 toe (ton oil equivalent ~42 GJ) per hectare as compared to 0.5 - 1.5 (up to theoretical 5) toe from terrestrial plants. Moreover, no sweet water and no fertile lands are needed. Microalgae can use waste, sea, and brackish waters and land resources that are unsuitable for crop agriculture; algae fuels contain no sulfur, are non-toxic.

Development of technology of microalgae cultivation under intensive CO2 enrichment by coal fired power station flue gases started in the Institute for Oceanography and Limnology Research (Haifa, Israel) in 2003 with participation of the Israel Electric Corporation (IEC). After one year of laboratory research, feasibility of the above enrichment gas been demonstrated. The project continued by Seambiotic Ltd, which erected a pilot algae farm in the Ruthenberg coal fired power station, with the aim to develop more efficient cultivation technologies which can me applied for large scale algae cultivation in various countries. To make such cultivation feasible, both from technical and economic points, few problems have to be solved. One of the problems is hydrodynamic of the ponds. Traditionally, in the algae ponds, mixing is provided by pedals designed based mainly on empiric data; obviously we look for a more solid footing. Mathematical models developed by professor Gvelesiani describe process of generation of various types of waves in the wide range of conditions. Although the models have been developed for the water storage basins, they proved to be very useful for algae ponds. First results of the computations of wave parameters have been presented in International Conference on Marine Biology (Eilat, 2007) and were found interesting and promising. We believe that publication of Prof.Gvelesiani′s book with our assistance is a right step in deepening the Seambiotic Ltd collaboration with Prof. Teimuraz Gvelessiani; the published research results and computational formulae in both English and Russian will provide an efficient tool to be used by staff (a part of them new immigrants from the former USSR) as well for our partners in the technology development (IEC and NASA).

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