EFFECTS OF SALINITY ON BIOLOGICAL METABOLISM IN BRACKISH WATER ECOSYSTEM

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SUMMARY

Concern on the global warming caused by the increment of greenhouse gases such as CO_2, CH_4 and others has indeed become more and more pressing. The share of the anthropogenic greenhouse effect is 49% by CO_2 and 17% by CH_4. As regards CH_4, the greenhouse effect rising potential relative to CO_2 is 32 times, the increase per year 1.1%, and the most may originate from biological resources. According to the report issued by IPCC in June of 1990, the 45% of methane emission may derive from paddy field, lake, marsh and coastal zone. In 1960, Takai elucidated that the reductive development under waterlogging occurred successively from aerobic oxygen respiration, via nitrate respiration, manganese, iron and sulfate reductions, to methane fermentation. Deduced from this theory, sulfate reducing reaction may predominate over methane forming reaction in the coastal zone where the supply of sulfate ion from sea or brackish water is abundant.

From the above idea, this study aims to make clear of the interaction between sulfate reducing bacteria and methane forming bacteria, and to contribute the progress of knowledges on the sources of methane emission to the atmosphere.

The first year, pH, Eh and sulfide have been periodically determined for the soil samples waterlogged with sea water, sea water diluted solutions or deionized water, which were incubated for 72 days at 30°4C. The amount of methane was analyzed only for the samples at 72 days after incubated.

In brief, the amount of sulfide produced at each plot was in the following decreasing order: Sea water Plot>sea Water 1/2 Plot>Sea water 1/4>Deionized Water. The decreasing order coincided both with the decreasing order for the amount of sulfate ion contained in the solution and with the increasing order for the amount of methane produced for 72 days' incubation. The result suggests that the predominance of sulfate reducing reaction may suppress methane forming reaction in brackish water zone.