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題目：

南美白對蝦海水養殖可能會增加水域溫室氣體濃度

Litopenaeus vannamei mariculture might increase the aquatic greenhouse gases concentrations

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Abstract

After the Industrial Revolution, the atmospheric greenhouse gases concentrations have increased as well as the human population. Demands for aquatic animal protein increases and this has greatly promoted the rapid expansion of global aquaculture industry. Previous studies have pointed out that the aquatic ecosystem is an important source of greenhouse gases. However, scarce researches have focused on the greenhouse gases emissions from the aquaculture. In addition, greenhouse gases emissions may differ between different types of aquaculture ponds, species and pond management practices. Achieving net-zero by 2050 is the global target and consensus, and it facilitates the industrial transformation. In this research, we investigated the concentrations of CO₂, CH₄ and N₂O of *Litopenaeus vannamei* mono-mariculture in semi-indoor and indoor concrete ponds. During the culture period to harvest, aquatic environments have been monitored and the concentrations of CO₂, CH₄ and N₂O have been analyzed.

Seawater was pumped individually from the aquaculture farm's adjacent sea area to the semi-indoor and indoor ponds as inflow water. The inflow water concentrations of pCO₂, CH₄ and N₂O in semi-indoor and indoor ponds did not vary much during the entire culture period. In semi-indoor ponds, the average pond water concentrations of pCO₂, CH₄ and N₂O during the entire culture period were 2417.1±1854.4 μatm, 3.7±0.1 nM, 22.3±16.8 nM, respectively while they were 2890.9±793.8 μatm, 184.6±252.7 nM, 73.0±54.7 nM in the outflow water. In indoor ponds, the average pond water concentrations of pCO₂, CH₄ and N₂O during the entire culture period were 1539.9±1122.1 μatm, 5.7±5.1 nM, 24.2±29.0 nM, respectively while they were 2407.7±2581.8 μatm, 224.7±524.7 nM, 82.4±145.5 nM in the outflow water.

In conclusion, the concentrations of CO₂, CH₄ and N₂O in the inflow water, pond water and outflow water all exceeded equilibrium, which acted as sources of CO₂, CH₄ and N₂O to the atmosphere. Furthermore, ascending trends in CO₂, CH₄ and N₂O concentrations in both the pond and outflow waters were observed with increasing culture days in semi-indoor ponds as well as the indoor ones.