Improved CO₂ recovery and application equipment to reduce greenhouse gas emissions and increase productivity in greenhouse horticulture by utilizing exhaust gases from heating and cooling equipment

Production		Demonstration	Item: Greenhouse	GHG emission reduction
Outline			horticulture	Labor productivity enhancement
Carbon dioxide (CO_2) is applied in greenhouses to increase productivity. We developed equipment				

that can capture and store CO_2 from exhaust gases generated by nighttime heating and apply it to greenhouses. This method promotes photosynthesis, thereby increasing the yield of horticultural crops such as roses by 30–45%, while reducing greenhouse gas emissions.

Background/effect/note

Typically, fossil fuels are burned to generate CO_2 for application in greenhouses. The use of CO_2 recovery and application equipment to collect and store CO_2 from the exhaust gases generated during heating and apply it in greenhouses reduces both fuel costs and CO_2 emissions (Fig. 1).

Existing CO_2 recovery methods generally involve adjusting the gas pressure or temperature. However, the energy-saving CO_2 recovery and application equipment we developed uses the concentration difference method to recover CO_2 from exhaust gases at a low cost. To apply the captured CO_2 in greenhouses, outside air is input into the device to release the CO_2 , which contains few impurities such as nitrogen oxides (Fig. 2). This device can also capture and use exhaust gases from cooling.

The application of CO_2 using this system in the cultivation of roses shortened the time to flowering by 2–6 days, increased the yield by 30–45%, and increased the length and weight of cut flowers (Fig. 3). Effects such as increased yield, have also been observed in other flowering plants.







Technical details:



equipment

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5

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