

March 13, 2024

Kyushu University
Carbon Xtract Corporation
National Federation of Agricultural Cooperative Associations
Sojitz Corporation
MUFG Bank, Ltd.

Partnership Agreement Concluded for Early Practical Implementation of
Separation Membrane-based DAC Devices for Greenhouse Horticulture

Kyushu University, Carbon Xtract Corporation (“Carbon Xtract”), National Federation of Agricultural Cooperative Associations (“ZEN-NOH”), Sojitz Corporation (“Sojitz”), and MUFG Bank, Ltd. (“MUFG Bank”) have concluded a partnership agreement as of March 13, 2024, for early practical implementation of separation membrane-based DAC devices (m-DAC[®])*¹ that enable direct capture of carbon dioxide (CO₂) from the atmosphere and can be installed within horticultural greenhouses*² in Japan.



Image of m-DAC[®] device
(Created by Professor Yoshito Ogata's Research Lab,
Faculty of Design, Kyushu University)

[Background]

Japan's agricultural industry faces a labor shortage and an aging population, and the country's crop yields are trending in decline. Urgent measures are needed to maintain agricultural infrastructure for domestic production. At the same time, global warming is also greatly impacting agriculture. Under these circumstances, it is critical that farmers take proactive steps to reduce environmental burdens through sustainable agricultural initiatives.

Carbon Xtract and Kyushu University conducted R&D for the small-scale m-DAC[®] devices which will be introduced in horticultural greenhouses, and these m-DAC[®] devices are highly anticipated to provide solutions to the issues facing the agriculture industry.

Increasing the CO₂ concentration in greenhouses (CO₂ application) promotes photosynthesis of plants. Therefore, supplying higher CO₂ concentrations is effective in increasing crop yield. The m-DAC[®] devices capture CO₂ directly from the atmosphere and supplies a concentrated CO₂ stream in horticultural greenhouses, contributing to improve crop yields and decarbonize agriculture.

Carbon Xtract and Kyushu University have therefore partnered with ZEN-NOH, which possesses extensive farming expertise and a network of agricultural cooperatives, to realize a new sustainable agricultural model in horticultural greenhouses. Sojitz and MUFJ Bank have joined these three institutions as partners in this partnership agreement in order to accelerate decarbonization within the farming industry.

[Sustainable Initiatives]

ZEN-NOH's research facilities will be used to conduct planned future development and demonstration trials of CO₂ dosing machines that utilize the optimized m-DAC[®] for installation within greenhouses. Additionally, Sojitz and MUFJ Bank's company networks, financing function, and business-building function will be leveraged for early practical implementation of the m-DAC[®] devices. All five institutions aim to create carbon credits through installation of these m-DAC[®] devices.

Kyushu University, Carbon Xtract, ZEN-NOH, Sojitz Corporation, and MUFG Bank strive to expand use of m-DAC[®] devices to greenhouses across Japan in order to contribute to both decarbonization of agriculture and to maintain and raise domestic agricultural production infrastructure.

*1 m-DAC[®]: A direct air capture (DAC) technology based on nanomembrane separation that captures CO₂ directly from the atmosphere. Kyushu University is advancing the development of m-DAC[®] technology, which captures CO₂ by simply passing air through membranes having the world's highest CO₂ permeability.

*2 Horticulture greenhouses: Greenhouses used for growing crops that are made using glass or plastic film coverings to increase light permeability.

[Related Information]

[Overview of Kyushu University]

President	Tatsuro Ishibashi
Established	January 1 st , 1911
Website	https://www.kyushu-u.ac.jp/en/

[Overview of Carbon Xtract Corporation]

President	Tetsuo Moriyama
Established	May 26 th , 2023
Website	https://c-xtract.com/

Carbon Xtract Corporation is a startup established through cooperation between Kyushu University and Sojitz. Carbon Xtract aims to realize early product commercialization and utilization of m-DAC[®] devices to become a leading company in the small-scale and distributed DAC market.

[Overview of National Federation of Agricultural Cooperative Associations]

President & CEO	Sakae Noguchi
Established	March 30 th , 1972
Website	https://www.zennoh.or.jp/english/index.html

[Overview of Sojitz Corporation]

President & CEO	Masayoshi Fujimoto
Established	April 1 st , 2003
Website	https://www.sojitz.com/en/

[Overview of MUFJ Bank, Ltd.]

President & CEO	Junichi Hanzawa
Established	August 15 th , 1919
Website	https://www.bk.mufg.jp/global/

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