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<NEDO International Demonstration Project, follow-up report>

Kao Delegated by NEDO to Begin Feasibility Study on a Manufacturing Model for Utilizing Cassava Residue

A new project*¹ launched by Kao Corporation and Kao Industrial (Thailand) Co. Ltd. to utilize cassava residue as biomass was selected in the New Energy and Industrial Technology Development Organization (NEDO)'s stage gate review for an International Demonstration Project on Japan's Energy Efficiency Technologies (Feasibility Study) in FY2023, and Kao and Kao Industrial (Thailand) have started a feasibility study.

*1 This technology demonstration project's title is "Manufacturing model project for bio-based nonionic surfactant from non-edible biomass using on-site production system of enzymes optimized for cassava residue (Thailand)."

■Background and new selection

Kao Corporations have a major responsibility and role to play in addressing climate change caused by global warming. To minimize new CO₂ emissions, Kao has been engaged in researching the use of biomass, a renewable plant-based resource, to replace petroleum-based raw materials. Kao has focused on non-edible biomass, such as agricultural residue and similar materials, from the perspective of stable supply and environmental compatibility and to avoid competing with food sources.

Kao Corporation and Kao Industrial (Thailand) Co. Ltd have investigated government policy and business environment in Thailand under International Demonstration Project*² on Japan's Energy Efficiency Technologies (Study of Suitability of Demonstration Requirements) since August 2022*³. The project is selected to the next step, Feasibility Study, and has started its F/S study in September 2023.

*2 International Demonstration Project on Japan's Technologies for Decarbonization and Energy Transition

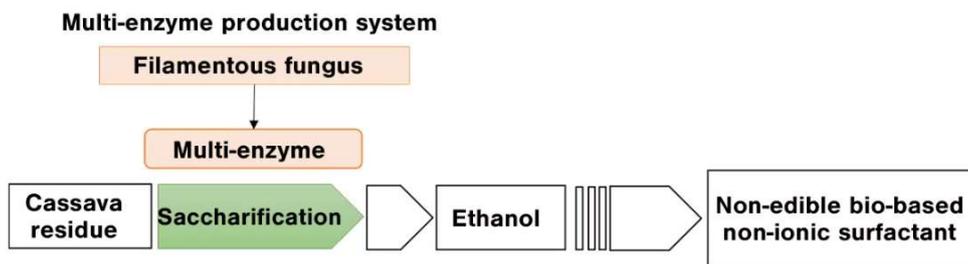
https://www.nedo.go.jp/english/activities/activities_AT1_00175.html

*3 Kao News Release Kao Delegated by NEDO to Begin a Study on a Manufacturing Model for Utilizing Cassava Residue

<https://www.kao.com/global/en/newsroom/news/release/2022/20220907-001/>

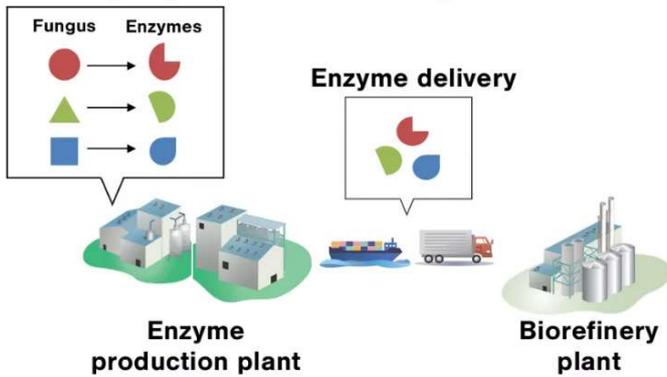
■Outline of the project on a Manufacturing Model for Utilizing Cassava Residue

Cassava is a tuberous root grown extensively in tropical and sub-tropical regions that generates non-edible residue as waste once starch has been extracted from the rhizome. Kao developed a saccharification enzyme to break down the cassava residue into sugars to utilize this biomass resource, which Thailand generates in large quantities. By applying technologies for using fungus for simultaneously producing several enzymes to develop a one-pot multi-enzyme production system for making the enzymes needed to break down cassava residue, and on-site production system, Kao and Kao Industrial (Thailand) have started a feasibility study on a manufacturing model for utilizing cassava residue.



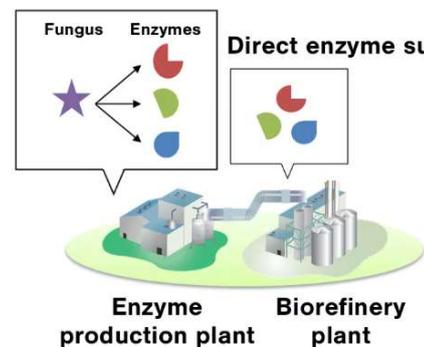
Kao concept for utilizing biomass

One-enzyme-per-line manufacturing



Conventional production system

**<One-pot Multi-enzyme Production System>
Multiple enzymes manufactured in one pot**



Kao's proposed on-site production system

■Summary

Kao's chemicals business, "Through the power of chemistry, we create a future of Kirei for people, society and the planet", addresses challenges faced by our customers, environment, and industry by offering innovative products and solutions. Kao is now exploring the potential for the future creation and commercialization of an integrated system for manufacturing biochemicals from cassava residue.