

RESEARCH AND DEVELOPMENT

Upholding our image as a technology-driven company, we are responding at the industry-leading Kajima Technical Research Institute to customers' increasingly complex and diverse needs. Through research and development, we continue to lead to new market creation, contribute to stronger competitiveness, and boost profitability and quality.

TOPICS 01

DEVELOPMENT OF CULTIVATION SYSTEM FOR MEDICINAL PLANTS

Kajima, the National Institute of Biomedical Innovation (NIBIO) and Chiba University have developed Japan's first hydroponic system to stably produce licorice in a short period of time.

Licorice root is one of the most commonly used plant sources of Chinese herbal remedies. Among its many other applications, the plant is widely used as a food additive to impart sweetness to *miso* paste and soy sauce, and as a raw material for cosmetics. However, there is growing concern that securing the plant will become more challenging going forward due to restrictions on its harvesting in China and increased global demand for medical herbs. Consequently, there have been stronger calls from Japanese industries, notably pharmaceuticals, food products and cosmetics, to cultivate licorice root

domestically. Despite this mounting pressure, little progress has been made by medicinal plant owners in establishing cultivation technology due to its high research and development cost.

Kajima, NIBIO and Chiba University worked jointly to select promising seedlings. In contrast to conventional hydroponics, in which licorice roots fail to enlarge, the partners developed a cultivation unit that stimulates root enlargement by controlling multiple environmental conditions and artificially applying appropriate levels of stress. The team is now designing a hybrid plant production facility that incorporates both sunlight and artificial lighting to form the right environment needed to encourage licorice root growth.

Going forward, in addition to building production facilities for companies seeking to commercially produce licorice root, Kajima is eyeing proposals around

everything from seedling propagation and cultivation know-how, to cultivation facility operation services.



Licorice root grown using the Kajima cultivation unit

TOPICS 02

COMPLETION OF 3-D SHAKING TABLE SYSTEM BOASTING BEST PERFORMANCE LEVEL IN JAPAN

Kajima Technical Research Institute, Kajima's in-house technical research laboratory, has adopted "W-DECKER," a high-performance, 3-D shaking table system to reproduce a variety of earthquake motions.

In terms of recreating the speed and displacement of an earthquake, W-DECKER boasts the highest level of performance in Japan, and is capable of producing the world's largest amplitude of displacement recorded on upper floors of high-rise buildings during long-period earthquakes.

For Kajima, ensuring and improving seismic resistance and safety in its buildings and structures is a management issue

of continual importance. Since introducing our first shaking table in 1975, and upgrading to 3-D shaking tables in 1990, we have continued to actively invest in R&D for delivering the latest in seismic response technology. Now, effective utilization of W-DECKER will be vital to maintaining and enhancing the baseline seismic resistance, isolation and control technologies that support this commitment. Kajima is also vigorously tackling technology fields related to BCP (business continuity planning), involving efforts to maintain building functionality, as well as real-time earthquake disaster prevention, to contribute to faster post-quake recovery.



W-DECKER 3-D shaking table