

UMS pioneers green mining tech using hyperaccumulator plants

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KOTA KINABALU: Universiti Malaysia Sabah (UMS), fondly known as the "Brain of Borneo", continues to cement its reputation as a regional leader in innovation, this time through the introduction of a cutting-edge green technology, phytomining, an eco-friendly method of extracting valuable metals using specific plant species.

The research is spearheaded by Associate Professor Dr Mohd Khalizan Sabullah and Ts Dr Nur Zaida Zahari from the Faculty of Science and Technology, UMS, in collaboration with Dr Zakuan Azizi Shamsul Harumain of the International Islamic University Malaysia (IIUM), and with support from Sabah Parks.

The project focuses on two unique indigenous plant species, *Phyllanthus rufuschaneyi*, which accumulates high levels of nickel, and *Rinorea bengalensis*, known for its ability to absorb cobalt.

According to Dr Mohd Khalizan, phytomining offers a viable alternative to conventional mining methods that are often harmful to natural habitats. Unlike traditional approaches, phytomining does not rely on hazardous chemicals, thereby significantly reducing environmental pollution while extracting high-demand metals like nickel and cobalt, key components in electric battery manufacturing.

"Based on our research data, global demand for nickel is projected to rise by nearly 40% by 2030, with Malaysia's market expected to exceed USD 50 billion by 2033.

"Meanwhile, cobalt remains a critical element in lithium-ion batteries, with market prices reaching hundreds of thousands



From left: Dr Mohd Khalizan, Dr Nur Zaida and Dr Zakuan Azizi



Phyllanthus rufuschaneyi (left) and *Rinorea bengalensis* (right).

of ringgit per tonne," he said.

He noted that the development of this technology could open up new opportunities for green employment, enhance the value of underutilised land, and

generate sustainable income for rural communities, particularly in Kampung Monggis, Ranau, where pilot studies are being conducted.

However, he emphasised that

large-scale commercialisation of phytomining requires the establishment of designated commercial testing zones, as well as technical training for local farmers.

"This initiative will also necessitate the development of infrastructure to process metal from plants, alongside regulatory alignment and policy support to ensure sustainable and transparent operations," he added.

UMS Vice Chancellor, Professor Datuk Dr Kasim Mansor, underscored that phytomining reflects the university's unwavering commitment to scientific innovation that benefits society, the economy and the environment.

"With the backing of government, industry and the community, Sabah has the potential to emerge as a regional hub for the green economy.

"This achievement also opens avenues for international collaboration in biotechnology, materials science, and green economic development," he said.