UMS boosts seaweed seedling output with tissue culture

BP 29.7.13 AG

KOTA KINABALU: Universiti Malaysia Sabah (UMS) plans to increase the production of seaweed raw material to fulfil the requirement of seaweed industry, under the aegis of National Key Economic Areas (NKEA) agriculture, especially in Sabah.

A group of researchers from Universiti Malaysia Sabah's Biotechnology Research Institute headed by Wilson Yong Thaulym, have developed a specialized culture media (EucheRich) and bioreactors (Euche-ReactorTM) for seedling production of seaweed, thus providing specific culture conditions for efficient production.

Wilson Yong said the seedlings are acclimatized in tanks under natural light followed by transfer to the farming community.

"Currently seaweeds collected from the wild serve as the source of germplasm for micro propagation and tissue culture.

"It is essential to conserve our natural sources of seaweeds germplasm as any loss of wild types will jeopardize future production of this economically important plant," he told Bernama here.

Wilson Yong said seaweeds are the principal source of carrageenans, which are a major constituent of food products, cosmetics and pharmaceuticals.

He said the government had promoted the establishment of seaweed production facilities under NKEA to increase the yield from 1.5 metric tonnes to 5 metric tonnes of dried seaweed per hectare per year in a farmed area totalling 28,000 hectares.

"There are six varieties of seaweed that have been identified for commercial cultivation based on their carrageenan yield and growth rate.

"Despite high expectations of the seaweed industry, the production of seaweeds faces many challenges, foremost among these is the efficient production of seedlings," he said.

Unlike terrestrial plants, Wilson Yong said seaweeds do not propagate via seeds, rather they reproduce through a complex mechanism involving zoospores.

"The production of zoospores is not possible under artificial conditions in the laboratory, therefore tissue culture and micro propagation are the best suited alternatives for seedling production.

"Kappaphycus and Eucheuma seaweeds are both classified as Rhodophyceae, or red algae, and they have adapted to exist at low light intensities.

"When exposed to high light intensities in the laboratory, red seaweeds undergo photo-bleaching, which eventually leads to tissue necrosis and death," he said.

Wilson Yong said another factor which has to be considered was the carbon dioxide concentration in seawater.

He said seaweeds produce an enzyme known as carbonic anhydrase which catalyzes the breakdown of inorganic carbon present in seawater, into free carbon dioxide which is a key building block of plant tissue.

"Production of seaweed seedlings in the laboratory is based on fine tuning of the light spectrum as well as regulating the concentration of carbon dioxide in the culture medium, he said.

The project of seaweed seedlings production via tissue culture technology at UMS, initiated by a group of researchers, is currently funded by PEMANDU under the NKEA Agriculture EPP3, headed by Associate Prof Dr Suhaimi Md Yassir.