

Case study

Developing Asparagopsis seaweed cultivation at scale in northern Australia

A.3.2021051

Unlocking a new seaweed industry for low-methane agriculture

Methane from cattle and sheep is a major contributor to greenhouse gas emissions.

Feed made with the red seaweed *Asparagopsis taxiformis* can cut methane production dramatically, but growing enough seaweed has been a major barrier. Current methods rely on harvesting wild plants and collecting spores, which is slow and unsustainable.

Innovative science for large-scale cultivation

With support from the CRCNA's Industry-production and supply chain innovation program, researchers from The University of Western Australia developed a new, scalable way to produce Asparagopsis seedlings using protoplast (cell-based) technology instead of wild spore collection.

The team:

- Analysed Asparagopsis cell walls to enable cell release.
- Identified an effective enzyme mix for protoplast isolation.
- Achieved the first successful release of viable protoplasts.
- Engineered E. coli to produce the key enzyme λ-carrageenase.

Real-world impact

The project has created a pathway for sustainable, large-scale seaweed farming in northern Australia. These breakthroughs enable a consistent supply of Asparagopsis seedlings for commercial production, helping:

- Reduce methane emissions from livestock.
- Diversify and strengthen regional coastal economies.
- Support Australia's transition to climate-smart agriculture.

Next steps

Future work will refine enzyme production and improve seedling growth to achieve commercial-scale seaweed cultivation. This research is positioning Australia as a global leader in low-emission livestock feed production.

"This project is a breakthrough in cultivating Asparagopsis at scale. Protoplast-based seedling production paves the way for sustainable seaweed farming and major cuts to livestock methane emissions."

Dr John Statton
The University of Western Australia