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OCEAN GENETICS HOPES TO HARVEST RICH REWARDS FROM SEAWEED CROP

MARY A.C. FALLON | Feb 17, 1988 7:00PM EST

A short stroll inland from the Santa Cruz coast, on fields that in past years yielded cauliflower and Brussels sprouts, a new crop bubbles in cold, filtered sea water.

The crop is red seaweed. And its possibilities are intriguing. The spidery, aquatic plants are the only source of agarose, a gel that genetic engineers use to separate and purify the molecular proteins of human genes.

The farmer is Ocean Genetics Inc. of Santa Cruz and its founder, Wayne Harvey.

Ocean Genetics hasn't recorded a dollar of sales yet, but it hopes to ride the coattails of the growing biotechnology industry. Standing in the way, however, is chemical giant FMC Corp. of Chicago, whose subsidiary, Marine Colloids of Rockland, Maine, controls 80 percent of the world's agarose market.

Before that battle with FMC's Marine Colloids even begins, Mr. Harvey is looking way beyond to a bigger dream: to farm the sea for drugs.

Inside one of the company's four labs, Mr. Harvey, a 44-year-old marine biologist with a master's degree in business, offers a simple explanation.

How we get from organism to outdoors, well, there's a lot of complicated steps, Mr. Harvey said. But we're basically farming the sea. Instead of plowing a field and planting a seed, we go out into the ocean, collect samples and come back and plant acreage.

Ocean Genetics' acreage starts as tiny tips snipped off mature seaweed plants. They are nurtured in small glass jars until they're big enough for the move to 20-liter water jugs called carboys, whose bubbling, temperature and exposure to light are computer-controlled.

Eventually, the seaweed is taken to one of the long, open tanks inside seven plastic greenhouses next door to the University of California's marine mammal lab.

During the first six to nine months, the tiny tips grow slowly. But by the time the plants are vigorously churning in the tanks, they're doubling in

size every 10 to 20 days. It's very easy for the seaweed to get ahead of you, Mr. Harvey said. We literally can't build fast enough.

The seaweed is scooped from the tanks and boiled under pressure so the agar will seep out. The hot liquid is purified for sale to labs.

We're right between the 'Gee, will it work?' stage and the 'Gosh, these guys have done it!' stage, Mr. Harvey said.

Most companies harvesting seaweed sell it to the food industry, which uses it to make jellies and cake icing. But Ocean Genetics wants the quicker return and the higher profit margins found in the scientific market. That way, the seven-year-old company can more quickly recover the costs of building its \$5 million aquatic farm.

The company has a four-part strategy:

- * To make its first sale of agarose this fall.
- * To have ready three years from now a second product, agar, another seaweed derivative used in biological research.
- * To grow new strains of seaweed by creating hybrids and tinkering with seaweed genes.
- * To find seaweeds that produce chemicals that could be made into useful drugs.

Mr. Harvey's confidence in the market potential of his first agarose product is based on industry estimates that agarose sales will grow 25 percent annually for the next few years. By 1992, worldwide agarose sales could reach \$40 million to \$50 million, according to a study by Beckman Instruments.

Farming seaweed in controlled conditions could give Ocean Genetics an advantage over Marine Colloids, Mr. Harvey said. Marine Colloids relies on seaweed harvested by hand along tropical coasts. Variations in sunlight, pollution and temperature can affect seaweed and the quality of the agarose.

Mr. Harvey expects agarose sales will keep the company running while it tackles the problem of making agar, the clear gel found at the bottom of petri dishes. It's the most widely used culture medium for studying bacteria, cells and tissues in hospitals, universities and biotech companies. It's also a bigger market than agarose: Worldwide agar sales could reach \$130 million by 1992, Mr. Harvey estimates.

But the company's biggest market could come from a very different byproduct of seaweed. To fend off hungry fish, many seaweeds produce toxins that repel predators. Some of those toxins are natural sources of drugs for people.

We've barely scratched the surface on what new drugs the marine environment holds, Mr. Harvey said. I honestly feel we're on the edge. I don't think we're talking 20 years before this unfolds.