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Scientists develop technique for sustainable fish farming

By [Sara Michael](#)

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In the basement of Yonathan Zohar's office in Baltimore, giant blue plastic tanks teem with fish swimming feverishly in circles.

These fully contained tanks are Zohar's response to floating net pens suspended off the coast in open water, a habitat for farming fish that Zohar and others say isn't the best option for the fish or the environment.

"There is no interaction with the environment. There is no pollution," Zohar said of his technology.

Zohar is director of the Center for Marine Biology at the University of Maryland Biotechnology Institute in Baltimore.

The tanks rely on recirculating water, which is cleaned using microbes. A column of pastalike pieces of plastic inoculated with microbes churn in water next to the tanks.

This keeps the water free of waste, which is one of the concerns around using floating net pens in open water.

These pens, which act as a cage for farmed fish, generate loads of nutrient waste from the fish, and fish are exposed to toxic contaminants and poor conditions, Zohar said.

Uneaten food and treatments added to the fish food can accumulate, causing dissolved oxygen, which can be harmful for the water, said Bill Goldborough, director of the fisheries program at the Chesapeake Bay Foundation.

"It concentrates and accumulates the waste material, and that can cause water quality problems," he said.

No net pens are present in the Chesapeake Bay, Goldborough said, because it's shallow and crowded with human activities.

Open water systems farther off shore are less of a concern, because the water around the cages dilutes

the waste, said David Secor, a scientist at the University of Maryland Center for Environmental Science who has studied bluefin tuna.

However, that creates another set of complications, such as problems with rough conditions, enforcing rights on the area and getting someone to maintain the cages far offshore, he said.

“Things get more expensive out there,” he said.

Meanwhile, Zohar’s system allows for optimal conditions, so the fish can grow faster — eight to nine months compared with 14 to 16 months — and at much higher densities. The toxin-free fish can be marketed as clean, and conditions can be tweaked to fit the fish, Zohar said.

“You can tailor the conditions.”

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