CENTER FOR TROPICAL AND SUBTROPICAL AQUACULTURE

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Letter from the Director

Aloha,

We here at CTSA have just finished another busy summer month. First and foremost, our FY25 development process is continuing forward; last week we sent out requests for full proposals based on the voting results from our IAC/TC meeting. Competition for CTSA's limited dollars is very strong this year and unfortunately our budget cannot cover all of the good project ideas we received. As I have shared in recent e-Notes, this cycle's focus is on supporting projects that will swiftly complete development for priority species and increase revenue from aquaculture in our region, including through hands-on workforce training in the U.S. affiliated Pacific Islands (USAPI). We look forward to receiving the full proposals in October.

On the topic of the USAPI, I am very happy to learn that the Taiwan technical mission in Palau has achieved the first hatchery run of milkfish fry. Although there were only 1,600 fry in this first run, it marks an important start to what will hopefully be a long and successful partnership. Milkfish are a desirable species in Palau, and the technical assistance that Taiwan is providing will make it more affordable for farmers to create a local milkfish industry. As I frequently express in e-Notes, this type of partnership is essential for the development of aquaculture in the Pacific.

Similarly, I had the chance to visit SEAFDEC this month and conduct information exchange with aquaculture researchers and farmers in the Philippines. SEAFDEC (pictured) has been working on many species that are of great interest across the Pacific Islands including rabbitfish, mangrove crab, sea cucumber, tilapia, and many more. Instead of reinventing the wheel, it is advantageous for us to cooperate with established partners to get a head start on regional production efforts. With many aquaculture researchers on site, SEAFDEC is able to conduct critical studies to solve technical problems and increase farming revenue in the Philippines. Their findings are applicable across our region as well, and their experience in floating cage culture can benefit our efforts in the USAPI. Reciprocally, work done in Hawaii contributes to their local farm productivity. For example, shrimp farms in the Philippines have demonstrated that white shrimp now grow faster than tiger shrimp as a result of breeding work in Hawaii.

In other good news for our region, there are several new aquaculturists in the USAPI, and Hawaii is again increasing its aquaculture workforce. Following the creation of a new aquaculture position at UH, the State of Hawaii government is opening four more new aquaculture positions to boost local development; we will share more information when available. In addition, Hawaii Senator Brian Schatz joined Sen. Roger Wicker from Mississippi to co-sponsor the Marine Aquaculture Research for America (MARA) Act of 2025. Aside from supporting the expansion of the blue economy, the MARA Act looks to use seaweed for a variety of purposes and products including furniture. More information on this legislation is included in the AquaClip below. We would also like to extend our appreciation to Hawaii's Senator Hirono and Representative Tokuda for their support of the RAC program. Indeed, we are in exciting times for aquaculture development in the U.S. and around the world!

Mahalo,
Dr. Cheng-Sheng Lee
Executive Director, CTSA

CTSA Project Results: Pineapple Peel Waste May Be Effective Substrate for Probiotics

The recently-completed project "Assessment of Hawaiian Aquaculture for Disease Mitigation and Control" achieved objectives across a range of health focused areas. Additional results from the work will be shared in e-Notes later this year, including an update on the status of a local PCR laboratory and the release of a 'Best Management Practices for Tilapia Hatcheries' manual. In the meantime, the following is a report on the Probiotics portion of the project, led by Dr. Yong Li (UH).

One of the primary objectives of this project was to culture probiotic bacteria in extracts from local food byproducts and investigate their antimicrobial properties. To achieve this objective, dried pineapple peel, pineapple core, and taro peel were ground into powder. Chemical analysis showed significant differences in protein content, with taro peel having the highest value (10.7%). The three materials had similar crude fat and moisture contents. Regarding ash content, taro peel (7.5%) was significantly higher than the other two materials. For carbohydrates, pineapple core had the highest content (90.24%), and significant differences were observed among the three materials. Lastly, pineapple peel and taro peel had significantly higher crude fiber content than pineapple core.

Broth media with different concentrations of pineapple peel, pineapple core, or taro peel powder were evaluated for their potential to support the growth of the probiotic bacteria *Lactococcus lactis*. Lactobacillus MRS broth was used as a reference. Growth performance in 10% pineapple core and 10% pineapple peel was significantly better than in 5% and 20%. For taro peel, the 20% extract was too viscous to filter through a membrane. The bacterial number was higher in 10% taro peel broth than in the 5% medium. MRS showed similar performance to the three materials in supporting probiotic growth. Therefore, 10% of pineapple peel, 10% taro peel, and MRS (or TSB) were further evaluated with four additional probiotic strains: *Lactobacillus plantarum, Pediococcus acidilactici, Bacillus* sp., and *Enterococcus* sp. Statistical analysis showed no significant differences in bacterial counts at 48 h between the three tested media for any of the probiotic strains, indicating that all three media supported probiotic growth.

The antimicrobial activity of probiotic cultures in MRS, 10% of pineapple peel, and 10% taro peel was assessed against the fish pathogens *Streptococcus agalactiae* and *Francisella orientalis* (Fo). Interestingly, both pineapple peel and taro peel exerted significant inhibitory and even bactericidal effects on *Streptococcus agalactiae*, as evidenced by the complete elimination of viable cells after 24 h of incubation, whereas MRS retained bacterial viability. This highlights the potential of these food byproducts as natural antimicrobial agents against *Streptococcus agalactiae*.

Against Fo, *Lactobacillus plantarum*-inoculated pineapple peel and MRS broth supernatants demonstrated the strongest antimicrobial activity at 48 h, with Fo counts dropping to undetectable. For *Lactococcus lactis*, pineapple peel medium supernatant exhibited a bactericidal effect. Taro peel and MRS broth supernatants held back the growth of Fo. For *Pediococcus acidilactici*, pineapple peel and MRS supernatants showed no significant differences at 48 h. However, both exhibited stronger bactericidal effects on Fo than the taro peel supernatant. These results suggest pineapple peel is an effective substrate for producing inhibitory compounds by probiotics against Fo, performing comparably to MRS.

AquaClip: "With Wild Fish Stocks Dwindling, Congress Considers Backing Aquaculture"

Advocates for increasing Hawai‘i’s aquaculture production are buoyed by the introduction of federal legislation that could supercharge the almost $2 billion national fish farming industry, a sector many believe has been neglected by state authorities for too long.

The bipartisan bill, co-sponsored by Sen. Brian Schatz of Hawai‘i, intends to streamline permitting, build the aquaculture workforce, facilitate research and development, and eventually pave the way for offshore, commercial-level demonstration facilities across federal waters.

The draft Marine Aquaculture Research for America Act or MARA Act, aims to boost production throughout the country to lessen the nation’s reliance on imported products, which account for 75% to 90% of its seafood — and 63% in Hawai‘i. The legislation is a streamlined revival of a previously failed bill, although aquaculture industry leaders say it may now be primed for success.

Both Republicans and Democrats have already shown support for the bill, introduced by Schatz and Sen. Roger Wicker, a Republican from Mississippi. The bill also includes provisions for various environmental and cultural concerns, which is being seen as an olive branch between environmental and fish farming groups that previously were at odds.

But there has been growing recognition of the role aquaculture can play in relieving pressure on wild fish stocks, which have suffered from overfishing and been in decline for decades. Global demand has been rising in the meantime, which means more fish is needed.

“You can’t do that on the back of wild stocks,” Neil Sims of Kona-based Ocean Era says. “At best, your wild stock fisheries are going to be stable … So then where is that seafood going to come from?”

That, Sims says, is where commercial-scale, offshore aquaculture comes in...

Source: Honolulu Civil Best // Read Full Article

This newsletter is written and prepared by the CTSA Information Specialist Meredith Brooks.
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CTSA was established in 1986 and is administered by the University of Hawaii.

Center for Tropical and Subtropical Aquaculture
www.ctsa.org

Center for Tropical and Subtropical Aquaculture | University of Hawaii at Manoa 1955 East West Road, Ag. Sci. 216 | Honolulu, HI 96822 US

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