



NOAA Center for Coastal Fisheries And Habitat Research Project Synopsis

NPD NUMBER
03F00032

User Groups

- Quinalt Nation
- Quileute Tribe
- Canada Fisheries and Oceans
- California Department of Health
- Florida Fish and Wildlife Research Institute
- Florida Gulf Coast University
- Florida International University
- French Research Institute for Exploitation of the Sea
- Monterey Bay Aquarium Research Institute
- Moss Landing Marine Laboratory
- The Southern California Coastal Water Research Project
- University of Alaska Fairbanks
- University of California Irvine
- University of California Los Angeles
- University of California Santa Cruz
- University of Oregon
- University of Southern California
- Woods Hole Oceanographic



Research Theme

Harmful Algal Blooms

DEVELOPMENT OF RAPID DOMOIC ACID TEST KITS

THE PROBLEM

Domoic acid (DA) is a potent neurotoxin produced by certain microalgae in the genus *Pseudo-nitzschia* that bloom along the Pacific coast of the US from California to Alaska. DA accumulates in the marine food chain in shellfish, crabs and small fish and kills fish, birds and marine mammals. Consumption of contaminated shellfish by humans results in amnesic shellfish poisoning. Symptoms can include gastrointestinal distress, dizziness, headache, disorientation, and permanent short-term memory loss, characterized seizures, focal weakness or paralysis, permanent memory impairment and death.

WHY CARE

Coastal tribes and communities from California through Alaska depend on local harvest of clams and crabs as a food source and cash crop and are particularly hard hit by domoic acid events. Losses for many coastal communities exceed \$20 million annually. For the more remote communities that depend on subsistence harvests there is no practical way to monitor for DA leaving them vulnerable. Consequently, there is critical and long standing need for rapid, cost-effective monitoring tools that can be used directly by the tribes, local environmental groups, and state agencies to monitor DA concentrations.

WHAT WE DID

In response to this need and requests by Northwest Tribes, scientists at the CCFHR worked in collaboration with the Northwest Fisheries Science Center and Mercury Science, Inc. to develop an accurate 96-well enzyme-linked immunosorbent assay (ELISA) for DA. The technology has been transferred to the private sector and is now sold commercially. It is used by the Quileute Tribe and Quinalt Nation in Washington to safeguard their food supply and by various environmental managers and public health officials in the US, Canada and France.

NEXT STEPS

Conduct validation study so that the ELISA can be sanctioned for official use by the Interstate Shellfish Sanitation Conference and produce simplified direct detection kits that can be used in the field by tribes, public health officials, citizens monitoring groups and NGOs.



The Big Picture

The domoic acid kits developed by CCFHR scientists are designed to reduce risks of amnesic shellfish poisoning for coastal residents who harvest shellfish for subsistence, recreational or commercial use. The kits are robust, inexpensive and quick to perform. They can be used by state, local and tribal environmental managers, public health officials, commercial and recreational fishers, citizens monitoring networks and aquaculture facilities.

Expected Outcome

The expected outcome is increased public health protection improved protection shellfish resources worth millions of dollars to Native American tribes and coastal communities.

User Group Publication

Litaker, R.W., T.N. Stewart, B.-T. L. Eberhart, J.C. Wekell, V.L. Trainer, R.M. Kudela, P.E. Miller, A. Roberts, C. Hertz, T.A. Johnson, G. Frankfurter, G.J. Smith, A. Schnetzer, J. Schumacker, J.L. Bastian, A. Odell, P. Gentien, D. Le Gal, D.R. Hardison and P.A. Tester. 2008. Rapid enzyme-linked immunosorbent assay for detection of the algal toxin domoic acid. *Journal of Shellfish Research* Vol. 27(5): 1-10.