

# Jellett – Rapid Testing For Shellfish Toxins

By Sandra Phinney

Dr. Joanne Jellett's passion and life's work is the development of rapid methods of detection of marine toxins. Founder of a new company called Jellett Rapid Testing Ltd. she has worked on test kits since she finished her Ph.D. and long before she incorporated her very first company. "In my post-doctoral fellowship with DFO at the Bedford Institute, I was studying the microscopic algae that cause poisoning, and needed a large number of toxin tests to complete my planned research. The only methods available at the time was the regulatory animal test (unacceptable ethically) or analytical chemistry-a very powerful tool but also very expensive and way beyond my budgetary limitations in the postdoc." So she scanned the existing literature and found some older papers in the field of pharmacology that were using cancer cells of a mouse to study the actions of the sodium channel. She used this older research as a starting point to develop a simple kit using the mouse cancer cell line.

Jellett validated this method with DFO Inspections in Halifax, then went on to successfully complete her research using this new tool. That's when she came up with the idea that her methods could have commercial value. She then spent three years trying to obtain grant money to take this technique to the streets.

At the point where she thought she'd have to give up her dream, InNOVAcorp stepped up to bat. "It had just been born out of the old Nova Scotia Research Foundation, and I took the proposal out one more time. After some 18 more months of discussions and negotiations, they agreed to back the



company and bought half of it.

Unfortunately, instead of a fairy tale ending, things started to sour and spiral downward. Fast forward through years of allegations, lawsuits, staff layoffs and attempts to source new business partners. A determined but not quite disheartened Jellett hung in for the duration. Eventually, the original company, Jellett Biotek Ltd., was placed into bankruptcy. "Despite the beating, I remain determined to move ahead and succeed in building a world class company with stable long term jobs and a product that is known around the world as the best." Jellett bought a building in Marriott's Cove close to her home, and this past December - almost to the day from the cessation at her former business - she started Jellett Rapid

Testing Ltd., with funding from her family. "My old partners at the NRC and internationally have rejoined me, and I am now making my kits as before. This time, I have the assistance of a great local group, Bonny Lea Farm (a sheltered workshop for adults with Down's Syndrome), who are assembling the kits here at my new location. I am building a new team, and have acquired some great people in the last couple of months. There are now 8 employees, plus the 10 or so people from Bonny Lea Farm who work here part time."

Now that she's back on track, her focus is once again the detection of shellfish poisoning. Jellett explains that shellfish poisoning is not one of the most widespread causes of food borne illnesses, and that in fact there is a low incidence of cases, mainly due to good monitoring methods in place by the Canadian Food Inspection Agency. However, paralytic shellfish poisoning is a very serious illness and causes death every year. It is also a serious economic issue where attempts to develop economic activity around a shellfish resource can be difficult to impossible in areas where the toxins are present. "Remote communities both in Canada and the US-especially native communities-rely on shellfish for subsistence, and therefore do not have the luxury of just refusing to eat shellfish in areas prone to toxic events. Shellfish, so toxic they can kill people, can clear themselves and be safe to eat in a week to 10 days, making timing of harvest a critical issue."

Jellett points out that the same holds for aquaculture activity. Toxic incidents have significantly increased between 1972 and 2000, possibly because of human and industrial effluent,

which stimulates the growth of all sorts of microscopic algae including the toxic ones. She surmises that this may be due to the fact that there is more aquaculture activity in areas where no shellfish was previously harvested, or possibly because we now have better methods to detect these toxins. "Most scientist believe that all three are factors," she said. Some areas like the Gulf of St Lawrence, the Bay of Fundy, and parts of coastal BC suffer recurrent toxic events and sometimes high levels of toxicity. Other areas where toxic shellfish is an ongoing problem include Kodiak Island in Alaska, and many parts of Europe and Southeast Asia. "The blooms are patchy and ephemeral, and do not occur at the same time or even every year, so predictability is difficult to impossible."

So how does Jellett's kits work? She explains: "The test is a small device that looks somewhat like a home pregnancy test, and operates similarly. It uses antibodies (the same kind of molecules that attach diseases in our body like the flu and colds) to trap any toxins that are present in a shellfish sample. The shellfish are prepared by homogenizing several in a blender, adding rubbing alcohol and vinegar, then applying the liquid part to the test using a plastic eyedropper. The results are two lines (no toxin) or one line (toxin present).

This test has been shown to reduce animal use by 50% or more in European labs. It is also much less expensive than the animal testselling at \$20 US per test compared to the USFDA price of \$250 US for the mouse test. It is similar in speed to the animal test, with completed results in 15-20 minutes.

During the year that Jellett spent in court, she also published the results of international trials with the kits. "These publications have been great marketing tools, and have boosted the credibility of the tests. The UK regulatory lab is

commencing the use of the kits in their regulatory system this year. Regulatory labs could both reduce animal use and save costs by adopting the kits for screening the approximately 80% of the sample streams that are negative." Shellfish growers can also use the test for harvest management, for in house quality control, and for site selection for new operations.

Processors can control what is coming into their plants from many sources. Remote native communities can monitor their subsistence harvest beaches, and recreational boaters can protect their families from accidental poisoning when they are boating in areas where the shellfish safety is uncertain. "The kits are not intended to replace the animal test, but could add an additional layer of food safety to the food chain. We are just entering the toxin season (April to October) and we are working to overcome the lag that the business experienced because of the demise of JBL."

However, loyal clients returned as soon as they found out that Jellett was back in business with a new company. And an outbreak of poisoning in the US in 2002 was solved by the use of the kits by the USFDA, which also greatly improved the credibility of the technology.

Through the thick and thin of it all, Jellett retains her sense of humour. She recalls travelling in a large outrigger canoe in the Philippines with several scientific colleagues, en route to visit an oyster operation. "Once loaded there was very little freeboard, and not being a swimmer I asked about life jackets. Our Philippino boat operator was polite but firm-'ma'am you do not need life jackets here because we have sharks'. I did not find this too

funny at the time but look back on it with amusement now."

Anytime she feels a little overwhelmed by her struggles, she calls up memories of a trip to Kodiak Island in Alaska with her Chief Scientist. They were returning from Kodiak City to Anchorage in a small plane, and the flight attendant was from the Island and knew everyone else on the plane but Jellett and her party. When the attendant learned who they were, she said, "Thank you for saving us," along with many others. "In the absence of government testing in this chronically toxic area, there is not a single family in the small native communities there who have not experienced a serious illness or death due to shellfish poisoning. Moments like that make years of frustrating lab work all worthwhile."

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