

Guam Seaweed Poisoning: Environmental Investigation and Actions

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Abstract—Seaweed associated with an apparent common-source food poisoning outbreak on Guam was sold at a licensed food establishment. Inspection of the sites used for preparation and sale of the seaweed failed to identify a probable source of contamination or improper food handling procedures. Seaweed samples collected after the outbreak from several areas around Guam all contained low levels of toxins suggesting that these toxins may be endogenous rather than the result of environmental contamination at a particular site.

I was notified at about 5:15 a.m. on Sunday, April 28, 1991, that several patients had been admitted to our local hospital with possible seaweed poisoning and that the suspect seaweed had been purchased at a regulated food establishment. I immediately mobilized our inspection staff to start an investigation.

Three victims of the poisoning were interviewed on the same day. They indicated that they had all purchased seaweed from a single booth at a local flea market. The implicated vendor informed us that she had been harvesting algae from the same site (Naval Communications Station [NCS] Beach—also known as Tanguisson Beach) for about one year. Another vendor was also selling the same type of seaweed harvested from the same site but to the best of our knowledge no one who ate the seaweed purchased from this second vendor became ill. All seaweed in possession of both vendors was confiscated, labeled and stored under refrigeration so that it would be available for laboratory testing at a later date.

To investigate the possibility that the seaweed might have been contaminated with a poisonous chemical, the premises of the implicated vendor's home where the seaweed had been prepared were inspected on May 2, 1991. Intact containers of the pesticides malathion and diazinon were found outside the house but there was no evidence that they had been improperly or carelessly used. Other possible mechanisms by which seaweed might have become contaminated were investigated including how it was harvested, transported and stored, processed, and packaged. The environs of the booths at which the seaweed was sold were investigated the next day but nothing of apparent significance relative to the poisoning incident was discovered.

To safeguard the health and safety of the people of Guam, the NCS Beach area was closed to public use. We called a news conference to inform the public

about the incident. Photographs of the implicated seaweed were published in local newspapers and the public was advised not to harvest it from any site. We also requested the public to inform us if they had any ill effects after eating seaweed but were not treated by a physician. One person called about six days after the incident and told us that her family had also collected approximately one-half pound of seaweed from the same area. After cleaning the seaweed by rinsing in tap water, they boiled it, then added soy sauce, vinegar and hot pepper. This provided about half a medium soup bowl of seaweed salad which was then shared by nine family members, ages 5 to 73 years. No one experienced any discomfort.

Samples of seaweed were also collected from several additional reef areas surrounding Guam. Laboratory analysis showed that all of these algae also contained toxins. This has led to the conclusion that the poisoning incident was most likely due to toxins produced by the algae rather than the result of environmental contamination at the harvest site. Studies are still under way to determine what factors may influence the production of these toxins.

From the beginning we felt that the coordination and cooperation between professionals involved in this investigation and the agencies they represented were quite effective. However, some problems were encountered. Although we were initially concerned that this incident might have been due to pesticide poisoning, at present no one on Guam possesses the analytical equipment necessary to provide on-island analysis for these chemicals. This is a weak point in our preparedness that we should plan to correct in the future.

A second and more mundane but related problem was that of shipping seaweed specimens to off-island laboratories for analysis. We have been unable to obtain petty cash funds for this purpose (each air freight shipment to Japan costs from \$25.00 to \$50.00 US) so government employees must pay for each shipment from their personal funds and then request reimbursement from the government. This process may take several months.

We were fortunate that a leading authority on marine toxins is based relatively close to Guam. Dr. Takeshi Yasumoto, Professor of Food Hygiene for the Faculty of Agriculture at Tohoku University in Sendai, Japan, had previously visited Guam in connection with his studies of ciguatera fish poisoning. We are particularly grateful that Prof. Yasumoto has been able to return to Guam for this conference and we look forward to his preliminary report on the progress he and his co-workers have made in identifying toxins present in the seaweed samples from Guam.