Crisis management turns Taiwan’s plasticizer nightmare into progressive policy

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The world’s largest emergency food safety effort began in April 2011, when a Taiwan Food and Drug Administration (TFDA) scientist testing a probiotics product noticed irregular results. After weeks of intensive investigation, it was discovered that a widely used emulsifier known as clouding agent had been adulterated with a high concentration (113,402 ppm) of di(2-ethylhexyl) phthalate (DEHP), an industrial plasticizer whose use is prohibited in food due to toxicity and possible endocrine-disrupting effects. Investigators uncovered a profit motive for the contamination: DEHP was used by Yu-Shen Chemical Company, New Taipei City, Taiwan instead of palm oil to reduce the cost of production. One week later, the investigation also revealed another illegal use of plasticizers: the Pin Han Perfumery Company, New Taipei City, Taiwan had used di-isononyl phthalate (DINP) to adulterate its clouding agent.

The disclosure that clouding agents with DEHP and DINP had been used in many foods and beverages caused great concern in Taiwan. The government met the crisis with a whirlwind program of inspections. Officials collected and checked raw materials, additives and product flow records of all relevant companies during these inspections. The government also mobilized different agencies to expand laboratory testing.

By May 31, 2011, officials had determined which products could have contained clouding agent. Products in these categories without food safety certification were prohibited from sale, and offenders faced heavy fines. Sales could resume when items were certified to have used legal clouding agent providers or to have been laboratory tested and found safe. Between May 31, 2011 and July 19, 2011, the government inspected stores and removed prohibited merchandise on a large scale. A total of 4076 retail violations were found in inspections of 49,652 stores, and no intentional contamination was found in 1291 end products (Fig. 1). To ensure that contaminated products were not returned to store shelves, the government began publicly destroying them on June 12, 2011.

Although public health has long focused on tracking epidemic disease, the plasticizer crisis presented greater difficulties in tracking the sources of contamination. This use of plasticizers in food could potentially affect human health by disregulating estrogen receptor and thyroid hormone functions. To address this threat, source and vendor management were critical in identifying the problem’s source. The investigation of source companies that...
provided the contaminated clouding agents allowed the government to target some 425 manufacturers suspected of using these compounds.

Many useful lessons were learned from this episode of willful product contamination. Taiwan has strengthened regulations governing source and container management and food additives registration. As these extra safeguards have led to examination of other potential foodborne threats, Taiwan’s food supply and exports have also changed for the better.

Because the plasticizer adulteration presented a global public information challenge of the most urgent sort, this case can serve as a model of crisis management involving food additives. To communicate with the public, the TFDA Web site (www.fda.gov.tw) provided information about the effects of plasticizers on health as well as constantly updating a list of specific products recalled.

Although more than 130 hospitals established special services for public consultations, after more than 4000 patient visits the contamination’s short-term impact on human health appears minimal. Only 1.4% of patients who came for consultation were referred to specialists for further examination, and only six cases showed suspected abnormalities. The Department of Health (DOH) and National Health Research Institutes (NHRI) are working together to review risk assessment and thoroughly investigate plasticizers’ effects on human health. Preliminary data show that urine and blood phthalate levels and questionnaire data can be used effectively to identify levels of exposure to DEHP-contaminated foods and beverages for risk assessment. We also have found that DEHP exposure can affect neonatal sex hormones and male reproductive capacity (unpublished data).

Taiwan notified the World Health Organization and the European Union’s Rapid Alert System for Food and Feed about the potentially contaminated products and their exporting companies. Twenty-two importing countries were notified and further exports of contaminated foods were prohibited. To ensure food safety and rebuild a positive image of Taiwan products, officials launched three longer-term strategies:

1. Systemic industry and management improvements: This initiative includes establishment of a Taiwan food additive industry association and food additive tracing system. These are used to enforce a certification system for industry self-management via food additive registration.

2. Risk assessment and prevention in policy support: This strategy includes comprehensive food inspections, stipulates the category criteria for management of food additives and initiates regulation of onsite inspections and signatory certification. Plasticizer levels in foods will be tracked to assess risks and formulate industrial guidelines to minimize plasticizer contamination.

3. Continuing care and follow-up: The DOH has drafted standard procedures for medical care and follow-up of plasticizer-exposed patients. To better understand plasticizer effects over time, NHRI and Department of Health hospitals are tracking 500 patients affected by plasticizer exposure. In April 2012, 411 patients of this group agreed to give their data to the Institutional Review Board, after whose approval NHRI will track residual plasticizer levels using follow-up testing. Until May 31, 2012, no cases deteriorated or developed new symptoms or signs during the follow-up period.

Although this was the first case of plasticizers being added to foods intentionally, in little more than a month Taiwan’s health officials took the following measures:

1. Mobilized laboratories to analyze residual levels of contaminated products and announced tolerable daily intake (TDI) levels for five phthalate plasticizers
2. Tracked residual plasticizer levels in patients
3. Destroyed and prohibited export of contaminated products
4. Modified Web site to provide pop-up messages and other information to fully inform the public and importing countries
5. Communicated risks via short educational films, news stories, posters and leaflets
6. Imposed increased punishments on food safety violators

Figure 1 Retail businesses monitored and inspected between May 31, 2011 and July 19, 2011. The peak period was from June 2 to June 12, 2011, during which inspectors ordered up to 18.3% of products inspected to be removed from sale due to suspected contamination. After June 13, 2011, fewer contaminated products were found, and no contaminated products were found after July 8, 2011.
In conclusion, we believe Taiwan’s food safety has emerged stronger in the wake of this widespread product adulteration using these strategies. We hope to work with other nations on these issues, and welcome any health researchers or policy-making officials to contact us for further information.

References