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Legislative Council Panel on Food Safety and Environmental Hygiene

Surveillance and sampling of seawater in fish tanks used in the keeping of live seafood

INTRODUCTION

The Food and Environmental Hygiene Department ("FEHD") conducts regular surveillance and sampling of seawater in fish tanks used in the keeping of live seafood. This paper sets out FEHD's current monitoring regime and efforts to explore ways for further improvement.

BACKGROUND

2. In response to a cluster of cholera cases associated with the consumption of seafood in 1998, a special inter-departmental working group was set up to examine ways to improve control over the hygiene quality of seawater in fish tanks used in the keeping of live seafood (fish and shellfish). Members of the working group included the then Agriculture and Fisheries Department, Urban Services Department and Regional Services Department, Department of Health, Environmental Protection Department and Water Supplies Department. The working group examined the problem and recommended that a surveillance and sampling system be introduced. This is the system currently used by FEHD.

EXISTING CONTROL AND MONITORING SYSTEM

3. Under section 10A of the Food Business Regulations (Cap 132 sub. leg.), "*no person shall in the course of any food business keep any live fish or shell fish intended for human consumption in water of a quality below the standard specified by the Director (of Food and Environmental Hygiene) by notice published in the Gazette*". The specified standard is "E. Coli*: less than 610 per 100ml and absence of pathogenic organisms*". Anyone in breach of

the provision is liable to a maximum fine of $10,000 and three months' sentence upon conviction.

4. FEHD currently monitors the hygiene standard of seawater for its fitness in keeping live seafood through compulsory licensing/tenancy conditions, regular sampling surveillance, and the issue of guidelines to operators.

Licensing and tenancy conditions

5. Since February 1999, all food premises and market stalls selling live marine fish and shellfish for human consumption are required to install filtration and disinfection equipment to purify the water. The use of flushing water for keeping live sea fish is also prohibited. These requirements are included in FEHD's licensing/tenancy conditions. Currently, anyone in breach of the conditions will be warned. If such warning goes unheeded, FEHD will suspend or even cancel/terminate the licences/tenancies. (Under the current legislative framework, the Water Supplies Department takes regular prosecution actions against the use of flushing water for other unauthorised use.)

Sampling and surveillance

6. The main purpose of sampling and surveillance is to ensure that a high hygiene standard is maintained and to safeguard public health. A risk-based surveillance scheme is adopted in fish tank water sampling. On top of water sampling, FEHD also operates a separate surveillance programme targeted at cooked and raw food items.

7. FEHD adopts a two-pronged approach in the monitoring of fish tank water. Samples are taken regularly for *E. Coli* testing. *E. Coli* is a scientific and widely accepted indicator of hygiene quality. Currently, FEHD collects water samples for *E. Coli* testing once every eight weeks to assess the hygienic condition of the food premises and the seafood market stalls. When samples are found to exceed the prescribed standard, investigations at the premises or market stalls will be conducted immediately to detect the source of the contamination and follow-up samples will be collected.

8. Surveillance for presence of *Vibrio Cholerae* constitutes the second safety net in the monitoring of fish tank water. Cholera is endemic in Hong Kong and *Vibrio Cholerae* grows best in waters that are warm and with moderate salinity. Isolation of *Vibrio Cholerae* requires sophisticated

laboratory set-up and highly trained professional personnel to track down the specific pathogenic species. Normally at least two water samples for *Vibrio Cholerae* testing are collected from each operator every year with one being taken between June and August. The sampling frequency is flexibly adjusted as circumstances require.

9. Under the food surveillance programme, a regular programme in respect of the monitoring of *Vibrio Cholerae* is in place to ascertain the safety of food intended for human consumption. Food samples are taken at different levels including port of entry, wholesale and retail. An average of 60 samples of fish, shellfish, and high-risk ready-to-eat food (such as cold-served food, frozen confection and milk) are taken each month. Over the past two years, none of the samples taken were found to have been contaminated by *Vibrio Cholerae*.

10. In addition, investigation will also be triggered upon notification (by either hospitals or general practitioners) of cholera cases on the victims, their contacts, food and travel history. This includes field inspection of food premises, including sampling of fish tank water.

Guidelines

11. FEHD issues guidelines to the relevant food premises/retail outlets to remind operators to –

- keep live seafood at an optimal stock level to avoid overcrowding; and

- avoid abstracting seawater from coastal waters and to encourage the use of synthetic seawater, etc.

EFFECTIVENESS OF THE EXISTING SYSTEM

Recent Cases

12. In 2000, over 8,500 samples of seawater were taken from seafood restaurants and seafood market stalls for examination of *E. Coli* and *Vibrio Cholerae*. Of these, seven were found to have exceeded the *E. Coli*-specified limit in the follow-up samples. In the *Vibrio Cholerae* monitoring, one water sample was found to contain *Vibrio Cholerae.* In the first eight months of 2001,

5,400 samples were taken. 11 were found to have exceeded the *E. Coli*-specified limit in their follow-up samples. Three were found to contain *Vibrio Cholerae* which necessitated the closure of the premises for thorough cleansing and disinfection.

13. The existing monitoring and surveillance system adopted by FEHD has proven effective in detecting *Vibrio Cholerae* in seawater in fish tanks. Of the three recent cases of discovery of *Vibrio Cholerae* in seawater in fish tanks, the first case involving a restaurant in Mongkok was a case of investigation triggered upon notification of a cholera case. The other two discoveries involving a licensed cooked food stall at Lok Wah Estate and a seafood market stall at Sai Ying Pun Market respectively were uncovered in FEHD's regular surveillance sampling.

MEASURES TO FURTHER ENSURE THE FITNESS OF SEAWATER USED IN THE KEEPING OF LIVE SEAFOOD

14. FEHD has looked into measures to further ensure the fitness of seawater used in the keeping of live seafood –

Control of the supply of seawater

15. There have been suggestions that a licensing system should be established to regulate seawater suppliers and that the Government should identify suitable locations for them to draw seawater. This proposal had been considered previously by the two Municipal Councils. The licensing of seawater supplier was not considered a viable option for the following reasons-

(a) Water quality is subject to climatic changes, especially ambient and water temperature. Generally speaking, waters in the remoter parts of the New Territories to the east and north of Hong Kong are of an acceptable quality. However, there is no guarantee over the quality of water drawn due to natural variation/fluctuation of water quality because of heavy rainfall, direction of water flow, and the effects of human-induced pollution. Given the long shoreline of Hong Kong, the quality of seawater cannot be constant and designating supply spots is not meaningful.

(b) There is no foolproof way to guarantee the quality of seawater at the different stages of extraction, transport, storage and delivery. It is also possible for contamination to occur after delivery.

(c) Having water supplied from a "licensed" supplier may give both the operators and consumers a false sense of security. They may assume that the water is safe and overlook the inherent risks involved, such as the constant need to keep seawater in water tanks filtered, disinfected and changed.

(d) Operationally, enforcement and monitoring the operation of seawater suppliers will be very difficult. In the event that water quality is found to be sub-standard in fish tanks, the question will arise as to whether the stall/food premises operators or the water supplier should be held responsible. This will give rise to arguments between the water suppliers and the seafood retailers. The enforceability of the licensing regime will be cast in doubt.

Use of synthetic seawater

16. The use of synthetic seawater has been examined and considered a preferred option. However, there would be a number of problems in making the use of synthetic seawater a mandatory requirement. Firstly, the correct use of synthetic seawater calls for expertise on the part of the operator/user to monitor and control the water salinity. The operator/user must equip themselves with the knowledge and the technical know-how to ensure its proper function. Secondly, as fish/shellfish can carry bacteria externally on their skin/shell, even with the use of synthetic seawater, it is still necessary for retailers to provide adequate disinfection and filtration facilities to safeguard water quality. The above reasons, coupled with the cost implications for using synthetic seawater (estimated at $260/20kg, about $2,380 per month (including $1,600 handling charges) for a restaurant with 5 fish tanks) FEHD does not advocate making the use of synthetic seawater a mandatory requirement.

Effective Disinfection Systems

17. A properly installed and well-maintained disinfection and filtration system for fish tanks is scientifically proven to be effective in the control of the level of bacteria in the seawater. While it is a requirement in the licensing/tenancy conditions that seafood vendors and seafood market stall

operators must use an effective disinfection and filtration equipment, specific standards have not been set to measure their effectiveness. FEHD has commenced a review to assess the effectiveness of the commonly used ultra-violet filtration and disinfection systems and other new applications and technologies that have come onto the market. We expect to complete the review towards the end of the year and will put forward recommendations for consultation with the trade.

WAY FORWARD

18. FEHD will undertake to investigate further on the subject of effective disinfection systems as set out in paragraph 17 above. The Department will continue to publicize and enhance public awareness of the importance of good personal hygiene and remind both food handlers and consumers of the risks which can be eliminated by proper and thorough cooking.

Food and Environmental Hygiene Department
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