

ADVISORY COMMITTEE ON THE MICROBIOLOGICAL SAFETY OF FOOD

A MICROBIOLOGICAL SURVEY OF RETAIL SMOKED FISH WITH PARTICULAR REFERENCE TO THE PRESENCE OF *LISTERIA MONOCYTOGENES*

Attached is a summary sheet and the weblink to the final report for the Food Standards Agency microbiological survey of retail smoked fish with particular reference to the presence of *L. monocytogenes*. Dr Chun-Han Chan will be presenting the findings from this survey report which was published on 16 September 2008.

The full report can be found on the Food Standards Agency website at the following address:

http://www.foodbase.org.uk/results.php?f_report_id=261

**Secretariat
September 2008**

A microbiological survey of retail smoked fish with particular reference to the presence of *Listeria monocytogenes*

Summary

1. Between July and November 2006, 3,226 samples of ready-to-eat (RTE) hot and cold smoked fish were sampled from over 1,000 retail premises within the UK, of which 3,222 samples were acceptable for testing. The prevalence of *L. monocytogenes* in RTE smoked fish sold in retail premises in the United Kingdom was measured. The presence of *Listeria* spp., *Salmonella*, *Escherichia coli*, coagulase positive staphylococci and Enterobacteriaceae was also investigated and salt, pH and water activity were measured.
2. Samples were tested for the presence of *Listeria* spp. and *L. monocytogenes*. Overall 378 samples were found to contain *Listeria* spp. giving a weighted prevalence of 10.5%. Of these, *L. monocytogenes* was detected in 302 samples with a weighted prevalence of 8.3% (of which 99.3% were satisfactory according to the Microbiological Criteria Regulations).
3. Of the 1,344 samples of cold smoked fish tested, 282 (20.5%) contained *Listeria* spp.; 236 (17.4%) were *L. monocytogenes* which was present below the 100 cfu/g legal limit.
4. Of the 1,878 samples of hot smoked fish tested, 96 (5.2%) contained *Listeria* spp.; 66 (3.4%) were *L. monocytogenes*. Three of these samples (0.06%) were in breach of the limits (>100 cfu/g) for *L. monocytogenes* as laid down in the Microbiological Criteria Regulations. The Agency took appropriate action as soon as the results for these samples were reported and the products were withdrawn from retail sale.

5. *Salmonella* was not detected in any of the samples tested. Only 7 samples contained *E. coli* (threshold for detection was 10 cfu/g); 13 samples contained coagulase positive staphylococci (threshold for detection was 10 cfu/g).
6. Of the 3,222 samples taken, 587 samples contained levels of Enterobacteriaceae ranging from 10cfu/g to 10⁶cfu/g. There was a significant correlation between the detection of Enterobacteriaceae and detection of *Listeria* (p<0.001).
7. The ranges for salt indicated a lower concentration of salt in some hot smoked fish sampled (0.1-6.8 g/100g) compared to the cold smoked (0.6 – 6.4g/100g). The pH range for cold smoked fish (pH3.1 -7.2) indicated a slightly lower pH compared to hot smoked (pH4.1 – 8.4). The water activity for both types of smoked fish covered the same ranges (0.89 – 0.99).

8. **Key facts**

- Prepacked and loose RTE smoked fish were sampled at retail
- 378 samples contained *Listeria* spp. Most of the *Listeria* species detected were *L. monocytogenes*.
- 302 samples contained *L. monocytogenes* of which 99.3% were within legislative limits.
- Three hot smoked fish samples (0.06%) breached the limits for *L. monocytogenes* laid down in the Microbiological Criteria Regulations. Immediate action was taken by FSA to withdraw the products from retail.
- No *Salmonella* was detected in any of the samples tested.
- Variations were found in storage temperatures at retail ranging from -14°C to 13.3°C.

9. **Aims of survey**

The aims of the survey were to:

- To establish the prevalence of *Listeria* spp. and *L. monocytogenes* in RTE hot and cold-smoked fish sold at UK retail outlets.
- To measure and report the levels of *Listeria* spp. and *L. monocytogenes* found in RTE hot and cold-smoked fish sold at UK retail outlets.
- To measure the incidence of other microbiological organisms including Enterobacteriaceae, *E. coli*, *Salmonella* and coagulase positive staphylococci.
- pH, water activity and salt content, were also measured.

Background and approach

10. *Listeria monocytogenes* is one of the 5 key organisms against which the Agency monitors progress towards reducing foodborne disease.
11. Since 2000, the number of cases of *Listeria* has doubled. It is estimated that there were 400 cases in 2005, of which 380 were hospitalised with 130 deaths giving it the top ranking for deaths of the foodborne disease pathogens monitored by the Agency. Although the numbers of cases are relatively low, the severity of the illness is a cause for concern.
12. ALcontrol laboratories coordinated the survey and samples were collected by dedicated samplers from over 1,000 retail premises. Samples were taken according to market share and were representative of the UK market for smoked fish with retail premises selected at random in England, Scotland, Wales and Northern Ireland. Seasonal effects were not investigated in this survey.
13. A range of information concerning the fish samples was collected including the type of retail premises, sampler details, brand/product name, hot or cold smoked, species and cut of fish, country of origin (where possible), identification mark, type of packaging, price, use by and display until dates and temperature at storage and on arrival at the

laboratory. The methods used were Health Protection Agency national standards or validated equivalent methods.

14. The survey was designed to allow comparisons between prevalence and levels of *Listeria* species in different fish types, cuts of fish and methods of smoking. In terms of sampling, the number to be tested to achieve this objective depended on the estimated level of prevalence contamination, allowing for possible changes over time. Sample numbers were boosted in Scotland to allow a measurement of prevalence of *Listeria* in smoked fish in this region. It was estimated that approximately 3,400 samples of RTE smoked fish were required to measure an estimated prevalence of around 9% for *Listeria* spp. and 2.5% for *L. monocytogenes*.

15. This is one of two *Listeria* themed food surveys commissioned by the Agency investigating the levels of *Listeria* species in RTE foods at retail premises. The results from this survey and investigations of RTE foods for *Listeria* contamination will be used to build up a picture of the prevalence of *L. monocytogenes* contamination in foods across the UK.

Action

16. ACMSF are asked to:

Comment on the findings of this survey and whether these results identify any food safety issues for consideration with particular reference to vulnerable groups.