BC Centre for Disease Control
An agency of the Provincial Health Services Authority

Environmental Health Services

Food Issue

*Notes from the Field*

# Food safety assessment for use of scallop visceral parts as (1) human food – mantle smoking, or (2) pet food

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| Request received from: | Regional Health Authority |
| Date of request: | July 26, 2013 |
| Issue (brief description): | Processor would like to<br>(1) smoke mantles of scallop for human consumption; and<br>(2) make pet food with scallop offal to add value to business. |

*Disclaimer: The information provided in this document is based on the judgement of BCCDC's Environmental Health Services Food Safety Specialists and represents our knowledge at the time of the request.*
*It has not been peer-reviewed and is not comprehensive.*

## Summary of search information

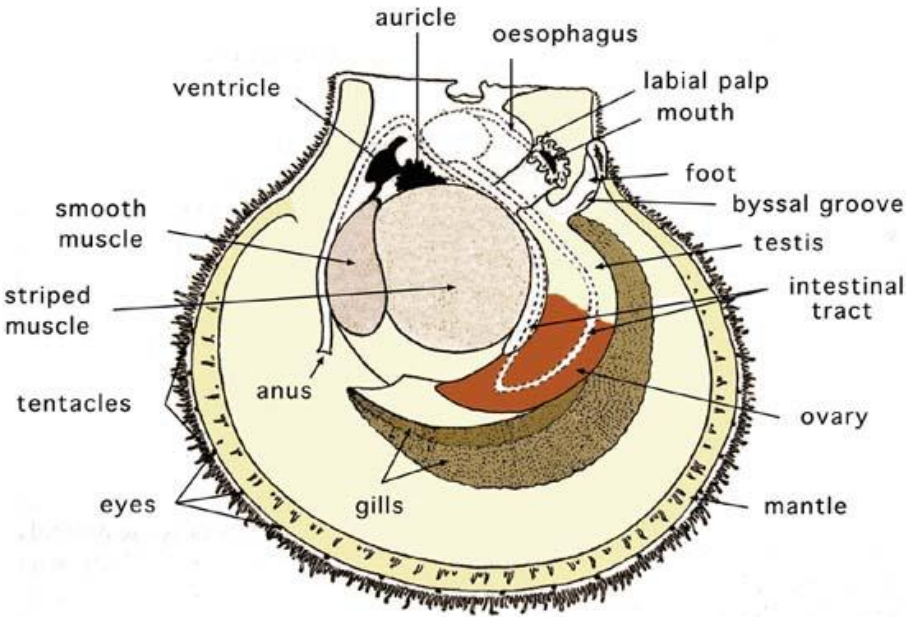
1. Internet sources – government sites (Canada, UK/EU) for regulations, guidelines and pet associations, consumer groups
2. Direct e-mail inquiries to federal and pet associations

## Issue 1 – Smoking of scallop mantles for human consumption – Background information

Fish products are defined under provincial and federal regulations as marine or fresh water animal products that include fish, shellfish and other invertebrate animals. Scallops would fall under the definition of fish.

The issues of importance to smoking of scallop mantles include (1) a review of the hazards, (2) the smoking conditions during product processing, and (3) packaging, labelling and storage conditions. In addition, the processor would need to apply for a smoking licence from the Ministry of Agriculture.

## 1. Review of hazards




The anatomy of a typical scallop is shown - the mantle is the outer most portion of the animal, responsible for secreting the shell, and controlling water flow into and out of the animal (movement).[1] The adductor muscle or in this diagram "striped muscle/smooth muscle" is the normal part of the scallop eaten. Other materials are known as the visceral components of the animal. Unwanted less commercially desirable portions of the scallop, once the muscles are removed, are also referred to as "offal".

Currently, scallop adductor muscles are not subject to the Canadian Shellfish Sanitation Program (CSSP), as marine biotoxin accumulation in the mantle is considered low risk. However, for the mantle and other viscera, this food product would be subject to CSSP. All scallops would need to be harvested from tested and approved marine waters, similar to other bivalves, such as oysters, clams, mussels and cockles. Marine biotoxins hazards include saxitoxins which cause paralytic shellfish poisoning (PSP), domoic acids causing amnesic shellfish poisoning (ASP) and okadaic acids/dinophysis toxins causing diarrhetic shellfish poisoning (DSP).[2] BC's first outbreak of DSP occurred in 2011, and this is now a concern for all shellfish growers.[3] A large-scale outbreak of Diarrhetic Shellfish Poisoning affected 164 people in Japan were attributed to scallops and mussels in Japan.[2] Scallops are have also been associated with azaspiracids and pectenotoxins marine biotoxins.[2]

Cadmium is a heavy metal naturally present in marine waters in British Columbia. This metal bioaccumulates in the digestive gut of marine bivalves. This metal is also a known carcinogen, and can have toxic affects in humans and animals. BCCDC does not recommend ingestion of whole scallops for human consumption.[4] Should the mantle or parts of the scallop other than the adductors muscles be ingested, BCCDC would recommend both testing of harvest areas and consumer advisory messaging to limit intake.

Smoked products are subject to any number of microbial hazards, from microbes either naturally present in the product and environment, such as *Clostridium botulinum, Listeria monocytogenes* and *Vibrio parahaemolyticus*, or from unsanitary handling, such as *Staphylococcus aureus* and *E. coli.* Product cross-contamination with *Listeria* is problematic as it is capable of growing at refrigeration temperatures. [5]

### 2. Smoking conditions during product processing

We strongly advise that the processor follow the recently revised guidance for preparing any smoked product available on the BCCDC web-site at http://www.bccdc.ca/foodhealth/fish/Provincial+Fish+Inspection.htm.[6] In particular, we advise the operator to review this cold-smoking chart and to review the best practices for smoked products table. Other information can be found in guidelines on plant approval and HACCP.[6]

### 3. Packaging, labelling and storage conditions

Correct packaging temperatures and packaging types are also a concern for growth of *Clostridium botulinum.* The scallops, should any part be smoked for human consumption would be subject to the *Food and Drugs Act* Regulation B21.025, designed to address storage conditions for smoked fish.[7] See below for the conditions given in this regulation:

- Smoked fish in packages that are sealed to exclude air without any other means of preservation **must be kept frozen**, unless
    - The container is heat processed to destroy all spore of C. botulinum (ie. canning)
    - The container contains not less than nine per cent salt,
    - The contents are cooked before eating,
    - The container says “keep frozen prior to use”
- Smoked fish in reduced oxygen packaging must have oxygen permeability of 2,000 cc/m2/24 hours at 24°C and 1 atmosphere. This product must be held refrigerated under 4°C if hot-smoked and 3.3°C if cold-smoked. This product must have a labelled shelf-life that does not exceed 14 days from the date of packaging.

Also on the same BCCDC page are the smoked products packaging and labelling requirements chart and guidelines that may also be helpful to interpret the regulations. [6] We also advise the inspector may find the smoking checklist helpful to assess activities.

According to sources at CFIA, no other scallop processors are harvesting mantles or other portions from scallops for human consumption. As this practice is not well-established the operator must be very careful to control the hazards as described.

## Recommendations from BCCDC

1. The grower/producer must verify scallops are harvested from sites and marine water in compliance with the CSSP. Scallops should be sent to a federally registered plant and special request made to ensure they comply with marine biotoxin reports so that product with unacceptable levels of PSP, DSP or ASP does not enter the food chain for human consumption.
2. The grower/producer is strongly advised to monitor the marine water harvest area for cadmium levels. Consumer warning advisory for consumption intake are recommended if levels exceed 2ppm cadmium wet weight of the scallop mantles.
3. The grower/producer must apply for and receive permission for a smoking license from the Ministry of Agriculture.
4. Once product is cold-smoked, the grower/producer should either freeze product or keep product refrigerated at or below 3.3°C. The packaging and product storage must comply with appropriate federal and provincial regulations, for e.g., B21.025 as described.
5. Recommendations and guidelines mentioned above can be found on the BCCDC web-site at the following locations:
   - http://www.bccdc.ca/foodhealth/fish/Provincial+Fish+Inspection.htm
   - http://www.bccdc.ca/foodhealth/fish/FishShellfishProcessingBC.htm

## References

1. Food and Agriculture Organization of the United Nations. The hatchery culture of bivalves: a practical manual. Fisheries and Aquaculture Department, editor. Rome: FAO; 2004. Available from: http://www.fao.org/docrep/007/y5720e/y5720e07.htm.

2. Food and Agriculture Organization of the United Nations. Assessment and management of biotoxins risks in bivalve molluscs. Rome: FAO; 2011.

3. Taylor M, McIntyre L, Ritson M, et al. Outbreak of diarrhetic shellfish poisoning associated with mussels, British Columbia, Canada. Mar Drugs. 2013;11(5):1669-76.

4. BC Centre for Disease Control. Cadmium in BC Shellfish. 2010; Available from: http://www.bccdc.ca/NR/rdonlyres/03A34F14-7A96-4746-B439-94942FDA31AA/0/CadmiuminBCShellfish_Dec2010.pdf.

5. Lado BH, Yousef AE. Characteristics of *Listeria monocytogenes* important to food processors. In: Ryser ET, Marth EH, editors. *Listeria*, listeriosis and food safety. Boca Raton, FL: CRC Press; 2007. p. 157-213.

6. BC Centre for Disease Control. Provincial Fish Inspection. 2013; Available from: http://www.bccdc.ca/foodhealth/fish/Provincial+Fish+Inspection.htm.

7. Department of Justice Canada. Food and Drugs Act (R.S., 1985, c. F-27). Available from: http://laws.justice.gc.ca/en/F-27.