

# Overview of Cold Smoking Process for Fish

|                  | Process  | Food Safety Parameters   | Hazard Considerations  | CCP ? |
|------------------|--|--|--|-------|
| Receiving        | Quality check  | Sensory Evaluation   | Removal of rotten & diseased fish  | Yes   |
|                  | Temperature check  | Product is at or below 4°C (39°F)  | Prevention of spoilage   |       |
| Eviscerate       | Guts and gills are removed and discarded. Parasites are removed if found in flesh.   | Visual inspection of fish to remove parasites, use of candling if possible per 93/140/EEC  | Gut and gills contain parasites, botulinum spores & other spoilage bacteria. Delay in evisceration allows parasites to migrate from gut into flesh.  | Yes   |
| Wash             | Cold potable water is used to remove blood & bacteria before brining   | Water meets Drinking Water Regulation BC Reg 200/2003 (Schedule A) for potable water, and meets Canadian guidelines.   | Non-potable water may have contaminants.   | Yes   |
| Brine            | Brine consists of potable water, salt, sugar, color, flavoring, preservatives etc. <sup>a</sup>  | Fresh brine each batch<br>Nitrites not allowed<br>Max. 1000 ppm sorbates<br>★2.5-3.5% WPS achieved   | Reduction in moisture content from brining will inhibit bacterial growth, specifically, <i>C. botulinum</i> Type E.  | Yes   |
| Rinse            | Cold potable water is used to remove blood & excess salt.  | Water meets Drinking Water Regulation BC Reg 200/2003 (Schedule A) for potable water, and meets Canadian guidelines.   | Non-potable water may have contaminants.   | Yes   |
| Dry              | Fish are air dried (often done in smoker)  | Air temp less than 28°C (82°F),<br>Relative Humidity ≥ 70%.  | Drying must be slow enough to prevent case hardening (to prevent bacterial decomp)   | Yes   |
| Smoke            | Food grade wood chips used to impart flavor. Smoke has some bactericidal & anti-oxidative properties. Fish should not touch or be overcrowded. | Cold Smoke: usually at 32°C (90°F); keep below 37°C (97°F) with 3.5% WPS.  | Cold smoking is not a kill step as temperatures are below 37°C.  |       |
| Cool             | Smoked product is cooled in refrigerator or (blast) freezer  | Chill product below ≤3°C (37.5°F).<br>(1) Cool to <10°C (50°F) within 3 hrs and to ≤3°C within 12 hrs, OR<br>(2) Cool to <20°C (68°F) within hrs and to 3°C within 4 hrs | Cooling time does not allow for germination of spore forming bacteria. Cross contamination with raw product after smoking.   | Yes   |
| Freeze           | Product is frozen for parasite control. Records must be maintained to verify freezing has occurred.  | Freezing requirements before sale<br>A. -35°C (-31°F) 15 hr or,<br>B. -20°C (-4°F) for 7 days or,<br>C. -35°C (-31°F) until solid & stored at -20°C (-4°F) for 24 hr     | Freezing for parasite control can be done before or after smoking step.  | Yes   |
| Package          | Product is packaged and labeled.   | Food grade packaging for fish sold frozen; food grade MAP for fish sold fresh per FDA Reg. B21.025 & B27.001 Labeling per FIR Part II.29 & FDA B.01.401                  | <i>Clostridium botulinum</i> spores as a hazard mean all smoked fish must be either frozen or sold fresh in MAP (oxygen permeable packaging), held at or below 3°C (37.5°F) & sold w/in 14 days. | Yes   |
| Storage/Shipping | During storage and shipping the product temperature is acceptable<br>Lot and batch identify is maintained so product is traceable.             | Refrigerated product must not exceed 3°C (37.5°F).<br>Frozen product must not exceed -18°C (-0.4°F) during transit and -26°C (-15°F) during storage.<br><br>Records      | Refrigerated product storage above 3°C (37.5°F) increases risk for <i>C. botulinum</i> Type E.   | Yes   |

Temperature control for all processing steps is cumulative (excluding smoking step): product must be held either (1) <10°C with no limit for time, or (2) between 10°C to 21°C for a max. of 9 hrs, or (3) above 21°C for a max. of 6 hrs

Hygienic handling of product

<sup>a</sup> – Ingredients approved by [CFIA](#).