

Wild-Caught Products

Supplementary Sampling and Laboratory Testing Instructions (Issue 1.0 – 5-September-2019)

Seafood Processing Standard (SPS) (Issue 5.0 – 01-February-2019)

Use in conjunction with ANNEX 4 – Sampling and Testing Verification Requirement

1.0 Primary Product Form

As referred to in the SPS Standard – “Primary Product Form” examples are:

- fresh
- raw ready-to-eat (e.g. sashimi)
- raw frozen
- raw breaded
- cooked breaded
- cooked
- dumpling
- smoked - cold
- smoked - hot
- pickled
- dried
- canned
- salted
- marinated

Raw frozen product forms, for the purpose of this definition, include all raw IQF or block frozen products expected to have the same hazards (e.g. microbiological). Examples include: deveined, peeled and deveined, whole, de-headed, butterflied tail on.

Example 1 – Primary Product Form:

A plant produces one species of pink shrimp (*P. borealis*) in the following forms: cooked, breaded, raw ready to eat, marinated, and 3 forms of peeled and/or deveined for a total of 7 products:

- The number of Primary Product Forms to be sampled = 5, (Cooked, breaded, raw ready-to-eat, marinated, and raw).
- When sampling, primary product forms are based on a per species basis. So If the plant above was also producing raw Argentine Red Shrimp *P. muelleri* in frozen block and IQF, that would be 5 primary product forms for *P. borealis* and 1 for *P. muelleri*.

2.0 Sampling Instructions

2.1 Number of Samples

- a. Twelve (12) samples total shall be collected from across a maximum of 3 different species, consisting of 4 samples per species (Table 1).
- b. In the event that less than 3 species are present at the time of sampling, samplers shall collect 12 samples total in equal numbers from the species that are present at the time of sampling (Table 1).
- c. Species and product forms to be selected should be based on risk.
 - i. If Mercury susceptible species (Table 2.) are present, at least 4 samples should be collected from one of the species.
 - ii. If Histamine susceptible species (Appendix A) are present, at least 4 samples should be collected from one of the species.
 - iii. Samples should be selected from one or more RTE primary products forms (e.g. smoked, sushi, etc.) if they are present at the time of sampling.
 - iv. Samples should be selected from the same primary product form within a species when three or more species are present, but samplers should attempt to take different primary product forms from different species in order to cover as many primary product forms as possible.

Table 1. Sample collection sizes for wild-caught species based on the numbers of species present at the time of sampling.

Number of Species Present	Number of Species to Sample	Number of Samples per Species	Number of Primary Product Forms per Species
> 3	3	4	1
2	2	6	2
1	1	12	3

Table 2. Fish species known to contain very high levels of mercury and hence referred to as mercury susceptible species.

BIGEYE TUNA	<i>Thunnus obesus</i>
MACKEREL, SPANISH OR KING	<i>Scomberomorus cavalla</i>
MARLIN	<i>Makaira spp.</i>
	<i>Tetrapturus spp.</i>
ORANGE ROUGHY	<i>Hoplostethus atlanticus</i>
SHARK	All species
SWORDFISH	<i>Xiphias gladius</i>
TILEFISH	Family <i>Malacanthidae</i> (Gulf of Mexico)

Example 2 – Number of samples and primary product form selection per species:

A processing facility provides to the sampler an inventory list containing the following information concerning the wild-caught species they process (Note: lot codes are required on inventory sheets for traceability purposes but have been omitted for this exercise):

King Mackerel, *Scomberomorus cavalla* – Frozen Fillets, Frozen Steaks, Cold Smoked, Hot Smoked

Swordfish, *Xiphias gladius* – Frozen Fillets, Frozen Steaks

Sea Scallops, *Placopecten magellanicus* – Raw IQF

Bay Scallops, *Argopecten irradians* – Raw IQF

Albacore Tuna, *Thunnus alalunga* – Canned

Yellowfin Tuna, *Thunnus albacares* – RTE Frozen Sushi, Frozen Steaks

Blue Mussel, *Mytilus edulis* – Marinated frozen

- Sample selection should consider Microbiological, Mercury and Histamine food safety risks.
- Attempts should be made to sample different “processing steps” by sampling across primary product forms between the species selected.
- Mercury susceptible species include King Mackerel and Swordfish (Table 2).
- Histamine samples include King Mackerel, Albacore Tuna, Yellowfin Tuna (Appendix A).
- The selections indicated in Solutions 2a-2c would be considered acceptable:

Example Solution 2a.

Species	Number of Samples	Product Forms
King Mackerel	4	Cold smoked
Yellowfin Tuna	4	RTE Frozen Sushi
Blue Mussel	4	Marinated frozen

Example Solution 2b.

Species	Number of Samples	Product Forms
King Mackerel	4	Hot smoked
Sea Scallop	4	Raw IQF
Albacore Tuna	4	Canned

Example Solution 2c.

Species	Number of Samples	Product Forms
Swordfish	4	Frozen Fillets
Bay Scallops	4	Raw IQF
Yellowfin Tuna	4	RTE Frozen Sushi



2.2 Sample Collection Requirements

a. Compositing of samples is to be conducted by a qualified third-party laboratory and not by the sampler.
b. When testing for mercury and/or histamines is not required, collect up to twelve samples (500 grams from each separate lot code) as described above from among the Primary Product Forms of finished products that are in the active inventory at the processing plant at the time of the audit. If testing is required for mercury and/or histamines, 750-gram samples should be collected.
c. For Seafood Processing Plants that also process aquaculture species, follow these instructions for wild-caught species only. Additional samples shall be collected for aquaculture species under separate instructions.
d. Aseptic sampling protocols shall be followed at all times.
e. Sampling shall be conducted in accordance with SPS 5.0 ANNEX 4, A4_1.0-3.0 and Table I.
f. Samplers shall organize and obtain equipment necessary to conduct the sampling: thermo-cool boxes, sterile polyethylene bags (clarify firstly with the assigned laboratory concerning their standard procedures, as they may refuse the sample if improper packaging procedures are used), heat-sealing machines (normally available at the plant), and permanent markers (do not attempt to use stickers, as they may not stick properly to sample bags).
g. DO NOT USE black Sharpie markers to identify sample alphanumeric sample codes on sample bags due to the findings that they may contain prohibited dyes utilized in aquaculture.
h. Samplers shall organize the traceability/chain of custody elements related to samples that will be collected, along with the means to document it.
i. Samplers shall inform the lab of the expected date and time for delivery of samples - especially if it is out of normal business hours for the lab, so that they can make arrangement to store the samples accordingly.
j. Samples shall be packaged in an outer package containing only individual samples from a single species.

3.0 Laboratory Testing Instructions

- a. Testing laboratories must be accredited to ISO 17025
- b. Compositing of samples is allowed given the following conditions:
 - i. Compositing is to be conducted by a qualified third-party laboratory and not by the sampler.
 - ii. Before compositing is done, samples shall be split so there will be reserve portions of each sample available in case follow-up breakout testing for one or more parameters is required.
 - iii. No more than 4 samples can be combined into a single composite.
 - iv. No compositing between aquaculture (farmed) products and wild-caught fishery products is allowed.
 - v. Mixing species or primary product forms within a composite is not allowed for microbiological tests.
- c. Testing shall be in accordance with ANNEX 4 Tables I, II, IV.
- d. Laboratories shall conduct 3 sets of microbiological tests for each set of 12 samples submitted.
- e. Laboratories shall conduct 1 Methyl Mercury test on each susceptible species present.
- f. Laboratories shall conduct 1 Histamine test on each susceptible species present.

Example 3 – Laboratory testing determinations for wild-caught species:

The testing laboratory receives 12 individual samples for product testing as indicated in above example Solution 2a.

Species	Number of Samples	Product Forms
King Mackerel	4	Cold smoked
Yellowfin Tuna	4	RTE Frozen Sushi
Blue Mussel	4	Marinated frozen

Microbiological Testing (ANNEX 4 Table II):

King Mackerel – Test 1 composite of 4 samples

Yellowfin Tuna – Test 1 composite of 4 samples

Blue Mussel – Test 1 composite of 4 samples

- **Test 3 composites of 4 samples each (1 set of tests for each species)**

Residue Testing (ANNEX 4 Table IV):

Methyl Mercury – Susceptible species includes King Mackerel only:

- **Test 1 composite 4 samples**

Histamine – Susceptible species includes King Mackerel and Yellowfin Tuna:

- **Test 2 composites of 4 samples each (1 test for each species)**

4.0 Detections

4.1 Microbiological Detections

Assessing whether a composited microbiological detection warrants breakout of individual samples is somewhat subjective for MPN serial dilution tests such as *E. coli* and *Staphylococcus aureus*. Table 3 is provided as a guideline:

Table 3. Microbiological criteria rejection limits and BAP Guidelines for determining whether a composited microbiological test detection should be broken out into individual samples for retesting.

Microbiological Criteria	Species / Form	Composite Breakout Testing Limits
Escherichia coli	Finfish and crustaceans (<i>all forms</i>), and <i>processed/cooked</i> molluscan shellfish	Out of 5 subsamples, breakout if 3 or more units exceed 4.0 per gram; 1 or more units exceed 40 bacteria per gram (MPN)
Escherichia coli	<i>Shell stock, fresh-shucked thawed and frozen</i> shellfish, shellfish <i>frozen on half shell</i>	Out of 5 subsamples, breakout if 1 or more units exceed 165 bacteria per 100g, or if 2 or more units exceed 115 bacteria /100g (MPN)
Staphylococcus aureus	Finfish/crustaceans (<i>all forms</i>)	Reject all samples if positive for Staphylococcal enterotoxin.* Breakout if equal to or greater than 2,500 bacteria per g (MPN)
Salmonella sp.	Finfish/crustaceans/molluscan shellfish (<i>all forms</i>)	Reject all samples if presence is detected in 25 grams*
Listeria monocytogenes	Finfish/crustaceans/molluscan shellfish (<i>cooked and raw, ready to eat products only</i>)	Reject all samples if presence is detected in 25 grams*

* Rejections require immediate notification to the Certification Body and BAP of all potential contaminated lots, to be followed by breakout testing to determine the violative plant production lot(s).

4.2 Residue Detections

A residue detection on a composite that is proportionately capable of exceeding limits specified in ANNEX 4 Table IV shall be broken out into individual samples (using the reserve portions of the associated sample lots) for confirmatory testing to determine which plant production lot(s) may be adulterated. Table 4 provides BAP guidelines for laboratories to use for breakout testing when a composite detection is obtained.



In the event that breakout testing is conducted, ONLY THE SAMPLES IN THE COMPOSITE PRODUCING THE DETECTION SHALL BE RETESTED (USING THE RESERVE PORTIONS), AND ONLY FOR THE PARAMETER(S) THAT PRODUCED A POSITIVE DETECTION.

Table 4. BAP Guidelines for determining whether a residue composite detection should be broken out into individual samples for retesting.

	Limit (ppm)	
	Mercury	Histamine
Samples per composite	0.5	50.0
	Breakout Value (ppm)	
2	0.30	30.0
3	0.20	20.0
4	0.15	15.0

Example 4 – Determination of breakout testing for a composite detection:

The testing laboratory conducts residue tests per ANNEX 4 on a composite consisting of 4 individual samples. Results indicate a positive detection for Methyl Mercury at any value ≥ 0.15 ppm. Per ANNEX 4, the Method LOQ/MRPL for Methyl Mercury is listed as 0.5 ppm. Using the guideline in Table 4, any value ≥ 0.15 ppm (150 $\mu\text{g}/\text{kg}$) would initiate individual breakout of the composite, and the 4 samples that comprise the composite should be retested individually for Methyl Mercury.

5.0 Failures

5.1 Microbiological Test Failures

- a. Individual samples testing above the Limits in ANNEX 4 Table II are considered a Failed Test Result.
- b. Any composite testing above a rejection limit for *Staphylococcus aureus*, *Salmonella* sp., or *Listeria monocytogenes* stated in ANNEX 4 Table II (and Table 3 above), requires immediate notification by the testing laboratory to the overseeing Certification Body and BAP. All potential violative plant production lots shall be identified within the notification. Once the notification has been established, the laboratory shall proceed with confirmatory testing on individual samples comprised in the composite of detection for the Microbiological Criteria detected to determine the violative plant production lot(s).

5.2 Contaminant Failures

- a. A Contaminant Detection on an individual sample testing above the “Method LOQ/MRPL” value listed in Annex 4 Table IV is considered a Failed Test Result.
- b. A Contaminant Detection that is above the Testing Laboratory’s LOQ, but below the “Method LOQ/MRPL” value listed in ANNEX 4 Table IV is considered a “Detection”.

For questions regarding these instructions contact BAP Program Integrity programintegrity@bapcertification.org
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APPENDIX A

Fish Species of Potential Scrombrotoxin (Histamine)

MARKET NAMES	LATIN NAMES	MARKET NAMES	LATIN NAMES	
ALEWIFE OR RIVER HERRING	<i>Alosa pseudoharengus</i>	MACKEREL, CHUB	<i>Scomber spp.</i>	
AMBERJACK	<i>Seriola spp.</i>	MACKEREL, JACK	<i>Trachurus spp.</i>	
AMBERJACK OR YELLOWTAIL	<i>Seriola lalandi</i>	MACKEREL, SPANISH	<i>Scomberomorus spp.</i>	
AMBERJACK OR YELLOWTAIL, AQUACULTURED	<i>Seriola lalandi</i>	MACKEREL, NARROW-BARRED SPANISH	<i>Scomberomorus commerson</i>	
ANCHOVY	<i>Anchoa spp.</i>	MACKEREL, SPANISH OR KING	<i>Scomberomorus cavalla</i>	
	<i>Anchoviella spp.</i>	MAHI-MAHI	<i>Coryphaena spp.</i>	
	<i>Cetengraulis mysticetus</i>	MAHI-MAHI, AQUACULTURED	<i>Coryphaena spp.</i>	
	<i>Engraulis spp.</i>	MARLIN	<i>Makaira spp.</i>	
	<i>Stolephorus spp.</i>		<i>Tetrapturus spp.</i>	
BLUEFISH	<i>Pomatomus saltatrix</i>	MENHADEN	<i>Brevoortia spp.</i>	
BONITO	<i>Cybiosarda elegans</i>		<i>Ethmidium maculatum</i>	
	<i>Gymnosarda unicolor</i>	PILCHARD OR SARDINE	<i>Sardina pilchardus</i>	
	<i>Orcynopsis unicolor</i>		<i>Sardinops spp.</i>	
	<i>Sarda spp.</i>	SAILFISH	<i>Istiophorus platypterus</i>	
ESCOLAR OR OILFISH	<i>Lepidocybium flavobrunneum</i>	SARDINE	<i>Harengula spp.</i>	
	<i>Ruvettus pretiosus</i>		<i>Sardinella spp.</i>	
	<i>Lepidocybium flavobrunneum</i>	SAURY	<i>Cololabis saira</i>	
HERRING	<i>Etrumeus teres</i>		<i>Scomberesox saurus</i>	
	<i>Harengula thrissina</i>		<i>Trachurus spp.</i>	
	<i>Ilisha spp.</i>	SCAD OR HORSE MACKEREL	<i>Trachurus trachurus</i>	
	<i>Opisthopecterus tardoore</i>	SHAD	<i>Alosa spp.</i>	
	<i>Pellona ditchela</i>	SHAD, GIZZARD	<i>Dorosoma spp.</i>	
	<i>Alosa spp.</i>		<i>Nematalosa vlaminghi</i>	
	<i>Clupea spp.</i>	SHAD, HILSA	<i>Tenulosa ilisha</i>	
HERRING OR SEA HERRING OR SILD	<i>Clupea spp.</i>	SPEARFISH	<i>Tetrapturus spp.</i>	
HERRING, THREAD	<i>Opisthonema spp.</i>	SPRAT OR BRISTLING	<i>Sprattus spp.</i>	
HORSE MACKEREL OR SCAD	<i>Trachurus trachurus</i>	TREVALLY	<i>Caranx spp.</i>	
JACK	<i>Caranx spp.</i>	TUNA (SMALL)	<i>Allothenus fallai</i>	
	<i>C. ignobilis</i>		<i>Auxis spp.</i>	
	<i>C. melampygus</i>		<i>Euthynnus spp.</i>	
	<i>C. latus</i>		<i>Katsuwonus pelamis</i>	
	<i>C. lugubris</i>		<i>Thunnus tonggol</i>	
	<i>C. ruber</i>		TUNA (LARGE)	<i>Thunnus alalunga</i>
	<i>Carangoides bartholomaei</i>			<i>Thunnus albacares</i>
	<i>Oligoplites saurus</i>			<i>Thunnus atlanticus</i>
	<i>Selene spp.</i>			<i>Thunnus maccoyii</i>
	<i>Seriola rivoliana</i>			<i>Thunnus obesus</i>
	<i>Urapsis secunda</i>			<i>Thunnus thynnus</i>
<i>Caranx crysos</i>	TUNA, AQUACULTURED	<i>Thunnus spp.</i>		
JACK OR BLUE RUNNER	<i>Alectis indicus</i>	WAHOO	<i>Acanthocybium solandri</i>	
JACK OR CREVALLE	<i>Elagatis bipinnulata</i>	YELLOW TAIL OR AMBERJACK	<i>Seriola lalandi</i>	
JACK OR RAINBOW RUNNER	<i>Nematistius pectoralis</i>	YELLOWTAIL AMBERJACK, AQUACULTURED	<i>Seriola lalandi</i>	
JACK OR ROOSTERFISH	<i>Nematistius pectoralis</i>			
KAHAWAI	<i>Arripis spp.</i>			
MACKEREL	<i>Gasterochisma melampus</i>			
	<i>Grammatorcynus spp.</i>			
	<i>Rastrelliger kanagurta</i>			
	<i>Scomber scombrus</i>			