

## THE NATURAL POTENTIALLY TOXICITY OF SEAFOODS IN CATERING

Iuliana Vintilă<sup>1</sup>, Ș. Chicoș<sup>2</sup>, Aurelia Turcescu<sup>3</sup>

<sup>1</sup>Facultatea de Știința și Ingineria Alimentelor Galați, str. Domnească, 111

<sup>2</sup>Șef secție Chirurgie I Spitalul de urgență „Sfântul Andrei” Galați, str. Brăilei, 177

<sup>3</sup>Colegiul Economic ”Virgil Madgearu” Galați, str. Strungarilor, 8

### Abstract

*Raw or with an incorrect culinary processing seafoods may vehicles from contaminated waters some pathogenic microorganisms and natural toxins. Bacterias (Salmonella, Listeria monocytogenus, Staphylococcus, Bacillus cereus, Clostridium bifermentans) and vibrio (Vibrio vulnificus, bacterium, Norwalk, phaemolyticus, cholerea) are pathogenic microorganisms with highly potential of risk in human health. Shellfish poisoning is caused by a group of toxins elaborated by planktonic algae (dinoflagellates, in most cases) upon which the shellfish feed. The toxins give paralytic, diarrheic, neurotoxic or amnesic poisoning. This study gives specifically microbiological criteria required for harvesters and dealers to be licensed and certified.*

**Key Words:** *seafood, toxins, catering*

### Introduction

Shellfish is produced under the FDA mandatory HACCP inspection program that required processors to identify and control significant food safety hazard in their HACCP program (Lowe, 1988; Cardello, 1982). Natural shellfish poisoning is caused by a group of toxins elaborated by planktonic algae, which are accumulated and metabolized by the shellfish. The types of shellfish poisoning are (Tabel 1):

- Paralytic Shellfish Poisoning (PSP);
- Diarrheic Shellfish Poisoning (DSP);
- Neurotoxic Shellfish Poisoning (NSP);
- Amnesic Shellfish Poisoning (ASP).

*The Natural Potentially Toxicity of Seafoods in Catering*

**Table 1.** The clinical history of diseases caused by shellfish poisoning

Type of shellfish poisoning	Associated toxin	Symptoms	Course of disease and complications	Associated Foods
PSP	Saxitoxin	Tingling Burning Numbness Drowsiness Incoherent speech Respiratory paralyzes	Symptoms develop within 0,5-2 hours after ingestion. In severe cases respiratory paralyzes is common with death without respiratory support	Shellfish(fitter-feeding molluses) are potentially toxic: mussels, clams, cockles, scallops
DSP	Dinophysis	Nausea Vomiting Diarrhea Abdominal pain Chills, Headache Fever	Symptoms develop within 0,5-3 hours after ingestion, with symptoms of illness lasting 2-3 days. Recovery is complete; no after effects	Mussels, oysters, scallops
NSP	Brevetoxins	Gastrointestinal and neurological disorder (tingling numbers of lips, tongue, throat, muscular aches, dizziness)	Onset of this disease within a few minutes to a few hours, duration from a few hours to several days. Recovery is complete, without fatalities.	Shellfish from Florida and Mexic
ASP	Domoic acid	Vomiting, Diarrhea Abdominal pain Confusion Memory loss disorientation Seizure, Coma	Gastrointestinal symptoms within 24 hours and neurological symptoms within 48 hours. Fatalities on elderly	Mussels

The mouse bioassay has been the most universally applied technique for examining shellfish but as a result a good HPLC procedure has been developed to identify individuals PSP toxins, DSP and ASP (Josephson, 1986; Sawyer, 1987 and 1988).

The objective of this study was to give the guidelines for catering units in buying, preparation and cooking shellfish without toxicological risks. The critical points may be integrated in a HACCP program for each catering units.

### **Results and Discussions**

This study concerns three major groups of shellfish: oysters, scallops and shrimps, in terms of quality control of buying, preparation and cooking. Microbiological considerations are of prime importance in processing plant, especially time-temperature abuses. The critical control points in buying, processing and cooking for oyster below:

1. Check for evidence of contamination in the plant;
2. Check on incoming oyster (filth, decomposition, pesticides or bacteria);
3. Check incorporation of excessive fresh water through prolonged contact with water or by insufficient drainage;
4. Check misbranding oysters by size;
5. Employee sanitation practices implementation;
6. Equipment washed and sanitized about every 2 hours; check time-temperature abuses that may cause rapid bacterial growth.

The critical control points for scallops below:

1. *Raw materials, determine:*
  - a) Geographical area where the scallops are harvested.
  - b) Type of scallops harvested and processed by common or species name.
  - c) How scallops are handled between harvesting and processing.
2. *Processing*
  - a) Observe in detail the scallop processing operation. Make a flow plan.

- b) Check shucking and evisceration process and see if this process is physically separated from the packaging and other operations.
- c) Determine source of water used in the scallop washing and rinsing operations. If treated by the processor, determine nature and extent of treatment.
- d) See if equipment used in processing operation is of proper construction and design.
- e) Check firm's equipment cleaning and sanitizing operation.
- f) Determine time and temperature of processing operation.  
Check
  - How long between harvest and chuckling and the temperature of the scallops.
  - How long scallops are held at ambient air temperature and determine the ambient temperature.
  - How long between shucking and rinsing and the temperature of the scallops.
  - After being iced, how long before scallops reach an internal temperature below 40°F.
- g) Check finished product packaging.
- h) Determine source of ice used in icing operation and if bagged ice is used, source and type of bag, condition of bags, and conditions storage.
- i) Check finished product storage facilities and condition.
- j) Obtain any coding system used and key.
- k) Check on the use of any food additives to determine if used at allowable levels.

### 3. *Sanitation*

- a) See if building or vessel is free from rodent or insect activity.
- b) Check that toilets and hand washing facilities provide are properly located and maintained.
- c) Determine strength and type of hand sanitizing solutions used and the sanitizer's location.
- d) Note any employee practices that could lead to the contamination of the scallops with filth or bacteria.
- e) See if water and iced used in the process is from an approved source and list source.

- f) Determine method of shell and waste material disposal.
- g) Evaluate the firm's operation for compliance with FDA's Human Foods (Sanitation) Good Manufacturing Practice Regulations.
- h) Document any non-sanitary conditions noted that could lead to the contamination of this firm's products with filth and/or bacteria.
- i) Obtain distribution for the collection of official samples.

The critical control points for shrimp below:

*Raw Materials: Receipt and Storage*

- 1) Shrimp and other raw materials are inspected on receipt for decomposition, microbial load, pesticides, and filth.
- 2) Raw materials susceptible to microbial contamination are received under a suppliers guarantee.
- 3) Raw materials specifications exist and only wholesome raw materials are accepted into active inventory: determine disposition of rejected raw materials.
- 4) Shrimp receiving and storage facilities are physically adequate.
- 5) Frozen shrimp are stored at -18°C or below.
- 6) Fresh or partially processed shrimp are iced or otherwise refrigerated to maintain a temperature of 4°C or below until they are ready to be processed.
- 7) Decomposed shrimp are being processed.
  - a) Examine shrimp as received and again after sorting, for decomposition; classify as passable (class 1), decomposed (class 2), or advanced decomposition (class 3); less-experienced inspectional personnel should submit some of class 2 and class 3 shrimp for confirmation by the laboratory.
  - b) Prompt handling and adequate sorting is necessary to prevent decomposition; check times and temperatures.
  - c) Where decomposed shrimp are going into canned or cooked-peeled shrimp, collect investigational samples of the finished pack; give attention to disposition of loads showing a high percentage of decomposition that cannot be adequately sorted, and to disposition of regent shrimp; make certain that bait shrimp is denatured.

- 8) Fresh raw shrimp are washed and chilled to 4°C or below within 2h of receipt; frozen shrimp should be held at -18°C or below; determine if they are examined organoleptically when received.
- 9) Peeled and divided shrimp are promptly chilled to 4°C or below.

*Processing*

- 1) Raw frozen shrimp are defrosted at recommended temperatures: air defrosting at 7°C or below or in running water at 21°C or below in less than 2h.
- 2) Fresh raw shrimp are washed in clean potable water and chilled to 4°C or below.
- 3) Fresh shrimp are adequately washed, culled, and inspected.
- 4) Every lot of shrimp that has been partially processed in another plant, including frozen shrimp, is inspected for wholesomeness and cleanliness.
- 5) Shrimp entering thaw tank are from exterior packaging material and substantially free of liner material.
- 6) On removal from thaw tank, shrimp are washed with a vigorous potable water spray.
- 7) Shrimp are removed from thaw tank within 30 min. after they are thawed.
- 8) Firm prohibits the practice of salvaging shrimp (ie, repacking the accumulated hulls and shells for missed shrimp or shrimp pieces).
- 9) Peeled and divided shrimp are promptly chilled to 4°C or below.
- 10) Peeled shrimp are transported from peeling machines or tables immediately, or, if containerized, within 20min.
- 11) Peeled shrimp containers, if applicable, are cleaned and sanitized as often as necessary, but in no case less frequently than every 3h.
- 12) When a peeler is absent from his duty post, his container is cleaned and sanitized prior to resuming peeling.
- 13) Peeled shrimp that are transported from one building to another are properly iced or refrigerated, covered, and protected.

- 14) Shrimp are handled minimally and protected from contamination.
- 15) Shrimp that drop off processing line are discarded or reclaimed.
- 16) Shrimp are washed with a low-velocity spray or in unrecirculated flowing water at 10°C or below just prior to the initial batter or breading application, whichever comes first, except in cases where a predust application is included in the process.
- 17) Removal of batter or breading mixed or other dry ingredients from multi-walled bags is accomplished in an acceptable manner.
- 18) Batter in enclosed equipment is insured a temperature of not more than 4°C and disposed of at the end of each workday, but in no circumstances less often than every 12h.
- 19) Batter in an unenclosed system is maintained at or below 10°C and disposed of at least every 4h and at the end of the day's operation.
- 20) Breading reused during a day's operation is sifted thru a 0.5-in. or smaller mesh screen.
- 21) Breading remaining in the breading application equipment at the end of a day's operation is reused within 20h and is sifted as above and stored in a freezer in a covered sanitary manner.
- 22) Hand batter pans are cleaned, sanitized, and rinsed between each filling with batter or breading.

### **Conclusion**

Shellfish may have a potential toxicity, which is controlled with a HACCP program created for each catering units.

The essential guidelines general for shellfish below:

- 1) BUYING:
  - Purchased alive; discard any dead ones;
  - Fresh sea breeze odor;
  - A clear, slightly, milky or light gray liquid should surround freshly shucked oysters.
- 2) PREPARATION:
  - Store fresh shellfish in refrigerator (meat keeper)

- Live shellfish store covered with a clean damp cloth;
  - Cook only shellfish alive; discard any dead ones
  - Marinades or rubs add great flavor. Marinate under refrigeration.
  - Keep raw and cooked shellfish separate to prevent bacterial cross-contamination.
  - Wash knives, cutting surfaces, sponges and hand with hot soapy water after handling raw shellfish.
- 3) COOKING:
- Oysters in the shell will open when cooking by steaming 4-9' or boiling 3-5' after they open;
  - Scallops turn milky, white or opaque and firm (3-4', depending on size)
  - Shrimp turn pink and firm (3-5' of boil)
  - Microwave cooking: 3' for 450 g + 3' standby.

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