

Paralytic Shellfish Poisoning Toxicity of Shellfishes, Sold at Fish Markets in Seoul

Hee-jin Ham, Yoon-tae Chung

Seoul Health & Environmental Research Institute, Seoul 137-130, Korea

=Abstract= In order to investigate the distribution of paralytic shellfish poison, we examined the toxicity during from February to October in 2000. Of 591 shellfish samples, 17(2.88%) samples were detected. *Scapharca broughtonii* was highest collected 14.29 %(2/14). In the monthly detection rate of PSP, April was highest 13.3%(8/60), in the regional collecting rate, Cheon-nam coastal area was highest 3.82 %(10/262), and in cases of imported area, China was 8.3 %(1/12). Imported area as well as domestic area samples should be strengthen to examine enduringly.

Introduction : Paralytic Shellfish Poison(PSP) is a notorious marine food poisoning occurring worldwide, is occurring continuously every year in Jin-hae bay et al., Kyiung-nam, Korea. Paralytic Shellfish Poison is a nervous paralytic poison of dinoflagellate, *Alexandrium* spp., *Gymnodinium* spp., et al, also the poison of that is equal to tetrodotoxin, $1,000 \times$ Cyanide¹⁻⁴⁾. Poisonous accidents on this poison was the first death affair in 1689, in France, were many victims in other countries¹⁾⁵⁾. In Korea, in case of 1986' Gamcheon bay, Busan, eleven persons were poisoned because of *Mytilus edulis*, two persons of those died, and in 1996, Geojae city, Gyiung-nam, two persons died because of *Mytilus edulis*, one person was coma¹⁾⁴⁻⁷⁾. In America and Europe, the limited value is $80\mu\text{g}/\text{edible part } 100\text{g}$, in Japan, 4.0 above Mouse Unit²⁻⁶⁾. In our country, the limited value had been launching by $80\mu\text{g}/\text{edible part } 100\text{g}$ from 1993, in similar to America and Europe⁴⁾. In this study, it was examined Paralytic Shellfish Poisoning Toxicity of Shellfishes Sold by monthly and harvested areas at Fish Markets in Seoul.

Materials & method

- 1. Materials :** February-June, September-October in 2000, seven months, on total, we examined 302 *Crassostrea gigas*, 275 *Mytilus edulis* and 14 *Scapharca broughtonii*, total 591 shellfish samples in Garak agricultural & fishery product market and Noryangjin market.
- 2. Analysis :** It was examined by Food Code⁸⁾ and A.O.A.C⁹⁾¹⁰⁾.

Results & discussion

- 1. Detection ratio by sample species :** 17 samples of 591 shellfish samples was detected on PSP,

detection rate was 2.88%, on the species, *Crassostrea gigas* was 0.33%(1/302), *Mytilus edulis* 5.45%(15/275) and *Scapharca broughtonii* 14.29%(2/14), and by the detection order, *Crassostrea gigas*<*Mytilus edulis*<*Scapharca broughtonii*(Table 1).

Table 1. Detection ratio of paralytic shellfish poison intoxicated shellfishes in various species of shellfish during from February to October in 2000

Sample name	Number of sample		Detection ratio(%)
	Tested	Positive	
<i>Mytilus edulis</i>	275	15	5.45
<i>Crassostrea gigas</i>	302	1	0.33
<i>Scapharca broughtonii</i>	14	2	14.29
Total	591	17	2.88

Hong et al¹⁾ found *Mytilus edulis* 16.6%(11/64), *Crassostrea gigas* 14.0%(9/64) and *Scapharca broughtonii* 26.2%(11/42) in 1998, Jung et al³⁾ found *Mytilus edulis* 6.7%, *Crassostrea gigas* 0% and *Scapharca broughtonii* 0% in 1989, Jang et al²⁾ found *Mytilus edulis* 21.8%, *Crassostrea gigas* 0.0% and *Scapharca broughtonii* 6.1% in 1988.

It was tend to exalt the detection rate of *Crassostrea gigas* and *Scapharca broughtonii* by the years, and *Mytilus edulis* showed tendency to declining of detection rate, but *Mytilus edulis* was the highest detection values. It was presumed that the differences of detection for paralytic shellfish poison by the years were due to the marine water environments from the shellfish harvested area.

2. Detection ratio by months and harvested areas : March 13.3%(8/60), April 12.5%(8/64) and May 1.3%(2/151), but February, June and October were non-detected, consequently March-May period was concentrated in PSP detection(Table 2).

Table 2. Monthly changes of detection ratio of paralytic shellfish poison intoxicated shellfishes by harvested area in 2000

Harvested area	Month									Total
	Feb.	Mar.	Apr.	May	Jun.	Jul.	Sep.	Oct.		
Domestic	Cheon-nam	0/2*	4/18	4/24	2/66	0/74	0/3	0/39	0/38	10/262(3.82)
	Kyeung-nam	0/1	3/41	4/39	0/78	0/69	0/3	0/31	0/40	7/302(2.32%)
	Chung-nam&Cheon-buk	0/0	0/0	0/1	0/5	0/2	0/0	0/0	0/2	0/10
Imported	China	0/2	1/1	0/0	0/1	0/4	0/0	0/4	0/0	1/12(8.33%)
	New Zealand	0/1	0/0	0/0	0/1	0/1	0/0	0/2	0/0	0/5
	Total	0/6	8/60	8/64	2/151	0/150	0/6	0/76	0/80	17/591 (13.3%) (12.5%) (1.32%) (2.88%)

* numbers of intoxicated samples / numbers of tested samples.

These results were similar to the reports of February-July period' concentrated detection in south

coasted area in Korea^{1-3,11)}, such reason was related with sea water temperature 5.6-17.8°C the same period's which was suitable for PSP source plankton to live²⁾³⁾¹²⁾

Detection rates by harvested areas, in domestic cases, Cheon-nam coasted area included Yeosu, Goheung etc. were 3.82%(10/262), Kyiung-nam coasted area 2.32%(7/302), but Chung-nam and Cheon-buk coasted areas were non-detected. In imported samples, China 8.3%(1/12), Newzealand non-detected(0/5).

High detection rate of Cheon-nam coasted area was differentiated with Hong et al¹⁾ demonstrated high rate of Kyiung-nam. Also, Jang et al²⁾ found not detected in west coastal area but detected in south coastal area.

3. Paralytic shellfish poison toxicity : There was no samples detected over 80µg PSP/edible part 100g, the limited value. By harvested area, Kiung-nam 29.28~51.6µg/100g, Cheon-nam 28.92~49.46µg/100g and China 32.21µg /100g. By species, *Mytilus edulis* 28.92~51.60µg/100g, *Crassostrea gigas* 43.5µg/100g and *Scapharca broughtonii* 32.21~59.63µg/100g. Also, Jang et al²⁾ found 2.6% detected on over 80µg/edible part 100g in 1988, Korea.

Table 3. Paralytic shellfish poison toxicity of intoxicated samples by harvested area during from February to October in 2000

Harvested area	Shellfish	Toxicity(µg/100g)		
		Range	Mean	
Domestic	Kyeung-nam	<i>Mytilus edulis</i>	29.28-51.60	39.78
		<i>Crassostrea gigas</i>	43.50	43.50
	Cheon-nam	<i>Mytilus edulis</i>	28.92-49.46	39.37
		<i>Scapharca broughtonii</i>	59.63	59.63
Imported	China	<i>Scapharca broughtonii</i>	32.21	32.21

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