Monocrotophos poisoning in wild mallards (*Anas platyrhynchos*)

Hang-Sub Shim*, Hae-Sung Kim, Jong-Tae Woo, In-Seop Kim, Hae-Sun Jung, Eun-Ah Song, Jun-Jo Bark

Gyeonggi Veterinary Service, Geumgokdong, Gwanseongu, Suwon, 441-460, Korea
(Received 23 November 2007, accepted in revised from 12 December 2007)

Abstracts

The toxicity of organophosphate arises from disruption of the nervous system due to the inhibition of cholinesterase enzymes, leading to death. Six dead mallards were found at Ansung where is one of the most popular wintering sites for migratory birds in Korea, and requested for diagnosis to Gyeonggi Veterinary Service on January of 2007. Some examinations including polymerase chain reaction (PCR) could not find any evidence of specific disease condition. However, the contents of gastrointestinal tracts of the birds contained residues of monocrotophos ranged from 31.3ppm to 294.3ppm by gas chromatography and mass spectrometry. It can be supposed that monocrotophos was responsible for the death of mallards by this results.

Key words: Monocrotophos, Poison, Wild mallard.

*Corresponding author

Phone: +82-31-299-5482 Fax: +82-31-294-6773
E-mail address: shinhsub@gg.go.kr

Introduction

The agricultural chemicals used for the control of malady, vermin and weed are necessary in most fields of agriculture. The production and the use of those are increasing every year for expanding of agricultural products, resulting in environmental pollution.

The absorbed organophosphoric chemicals are dispersed in the every portions of the body within 30 minutes, causing acute toxicity. These combined with the cholinesterase and restrained its operation irreversibly, which led to accumulation of neurotransmitter acetylcholine in the synapsis among preganglionic fiber of sympathetic nerve and postganglionic fiber of parasympathetic and motor nerve. Finally intoxicated animals may die by muscarinic parasympathetic action and nicotinic sympathetic action of muscular nerve.)

- 545 -
The intoxicated wild birds can show trembles, convulsions, paralysis, coma and severe nervous signs.

There were few reports on the toxicosis with organophosphoric chemicals to the animal in Korea. For example, there was a report related to dead white-napped cranes (Grus vipio) with parathion toxicosis, not monocrotophos in Chulwon region.[4]

This study was conduct to investigate the death cause of the mallards wintering at Ansung, and describe the toxicity with monocrotophos.

**Materials and Methods**

**Animals**

This study examined six dead mallards wintering at the Ansung stream, Gyeonggi province in on January, 2007.

**Gross and histopathological examination**

We examined the outside of carcasses, and necropsy was done from respiratory tract to solid internal organs. Especially the remains of inflammatory exudate in respiratory organs such as trachea, lung, air sack and morphological change of the organs were investigated closely. Paraffin method was used after fixing with 10% formalin, and stained with H&E for microscope.

**Organophosphoric agricultural chemicals examinations**

The used reagents were hexane, acetonitrile, acetone (Burdick & Jackson, USA) and solid phase extraction (SPE) with florisil (1,000mg/6㎖) (Applied Separations, USA), standard monocrotophos (Dr. Ehrenstofer, Germany) for control.

The instrument used for residual chemicals analysis was gas chromatography nitrogen-phosphorous detector (Hewlett Packard 5890, USA), Chemstation (Hewlett Packard, USA) was used for data system and the size of capillary column was HP–5 (30m × 0.25㎛, 0.25㎛).

The condition of analysis was as follows: 1) injection temperature was 250℃, 2) detection temperature was 270℃, 3) oven was maintained initially for 3 minutes at 120℃, and for 5 minutes at 260℃ after increasing from at 120℃ to at 260℃, 4) carrier gas (N₂) flow rate was 1㎖/min (split 50:1).

Also, to examine the quality of the chemicals, gas chromatography mass selective detector (Hewlett Packard 5973, USA) was used as like follows: 1) inlet temperature was 260℃ (split 50:1), 2) oven was maintained initially for 2 min at 100℃, and for 10 min at 230℃ after increasing from at 100℃ to at 230℃, 3) temperature of MS source and MS quadrupole were 230℃ and 150℃, respectively, 4) the size of capillary column was HP–35 (30m × 0.25㎛, 0.25㎛). 5) range of MS scan was 50–500 Amu, 6) flow rate of carrier gas (He) was 1㎖/min.

To make specimen for analysis of the chemicals, 5㎖ acetonitrile was added into 1g of chemical, which was sonicated for 10 min. Acetonitrile-layer was selected after adding of 3g NaCl into the specimen to make incrassate specimen, and it was solved with 1㎖ acetone. One milliliter of incrassate solution was added into SPE–FLO conditioned with 3㎖ hexane, which