



Fipronil Scandal in Eggs

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Abbreviations: GABA: Gamma Amino Butyric Acid; FAO: Food and Agriculture Organization of the United Nations; GluCl: Glutamate-Gated Chloride

What is Fipronil?

Fipronil is a broad-spectrum insecticide that belongs to the phenylpyrazole chemical family. Fipronil is used for the control of many soil and foliar insects on a variety of crops, and for public health insect control. Fipronil is a white powder with a moldy odor and was first registered for use in the United States in 1996 [1].

How does Fipronil Work?

Fipronil kills insects when they eat it or come in contact with it. Fipronil works by disrupting the normal function of the central nervous system in insects. Fipronil is more toxic to insects than people and pets because it is more likely to bind to insect nerve endings [1].

Fipronil disrupts the insect central nervous system by blocking the passage chloride ions through the GABA receptor and glutamate-gated chloride (GluCl) channels, components of the central nervous system. This causes hyper excitation of contaminated insects' nerves and muscles. Specificity of fipronil on insects may come from a better efficacy on gamma amino butyric acid (GABA) receptor, but also because GluCl channels do not exist in mammals.

What is the Relation between Eggs and Fipronil?

Poultry farmers caught up in the scandal, which has now affected 17 European nations and Hong Kong have begun counting the costs. Initial damages to poultry farmers were estimated to be €150m, according to Dutch sources but the figure may in the end be far higher.

Millions of eggs have been pulled from super market shelves and destroyed across Europe and dozens of poultry farms have been closed since the contamination was made public on 1st August. Food Standards Agency regarding the investigation into the distribution of eggs contaminated with fipronil in the UK, established that more eggs from affected farms than originally reported have been imported into the UK as fipronil is unauthorized for use in food-producing animals. Although some of the products such as

sandwich fillings or other chilled products made from these eggs had a short shelf life and will have already been eaten.

Is Fipronil a Risk for Health?

According to FAO (Food and Agriculture Organization of the United Nations) Specifications and Evaluation for Fipronil, adverse effects in the short term studies are observed in the central nervous system for all species and in the liver and thyroid for the rat. No genotoxic or carcinogenic potential is demonstrated. The mechanism for induction of thyroid tumour observed only in rats was discussed by several experts and considered specific to the rat and not relevant to humans. Neither reproductive nor developmental toxicity is observed. In specific neurotoxicity studies, no his to pathological findings are observed in the nervous system [2].

Scientists have not found any evidence of fipronil causing cancer in humans. Researchers fed fipronil to rats in their diet for nearly two years to find out if fipronil can cause cancer. Researchers found thyroid tumor sin both male and female rats fed the highest dose. While these findings are considered to apply only to rats, fipronil is classified as a "possible human carcinogen" by the United States Environmental Protection Agency (US EPA).

Studies have been done to find out the possible effects from long-term exposure to fipronil. In one study, scientists fed fipronil to rats for a year and found an increase in seizures and death among test animals. Fipronil was also found to decrease thyroid hormone levels among rats. However, most short-term and long-term studies find that fipronil does not affect the endocrine system, the system responsible for regulating hormones in the body.

In another study, scientists found that long-term exposure to fipronil in the diet can affect the ability of rats to produce offspring. Effects in those rats included: Less mating, reduced fertility, smaller litter size, and increased loss of pregnancy. Scientists also found decreased survival and delayed development among offspring [3].



As a result, the measurements have to be done for the residues of fipronil especially in eggs after the contamination of millions of eggs and the farmers have to be more watchful and avoid the contamination of food products.

References

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