

Ki Hyun Kim, Kyoung-Min So, Sang Yun Ji, Yoo Kyung Lee, Sung-Dae Lee

National Institute of Animal Science, RDA

ABSTRACT

In August 2017, the detection of pesticides in eggs has led to the issue of livestock safety. To ensure the safety of livestock products, it is important to ensure the safety of the feed. The establishment of maximum residue limits (MRL) for pesticide in feed should take into account both livestock products safety and animal health. *In vivo* residue experiment using livestock, such as ruminant and poultry, is essential for establishing MRL of pesticides in feed. However, livestock residue testing comes with a lot of cost and time investments. This study was conducted to provide basic data for evaluating the possibility of using experimental animal for setting up pesticide MRL in feed. A total of 24 SD rats (4 weeks-old) were randomly assigned into 4 treatment groups of 0, 3, 9, and 30 mg/kg diet with sulfoxaflor. Body weight was measured every week, and feed intake was measured daily. All rats were slaughtered after feeding of each experimental diets for 28 days. There was no effect on the body weight gain, feed intake, and feed conversion ratio by feeding of sulfoxaflor. There were no clinically abnormal tissues in the histological lesions, and the weight of the tissues was not affected by feeding of sulfoxaflor. The contents of sulfoxaflor residue in each tissue (serum, liver, kidney, muscle, fat, and small intestine) were linearly increased in dose-dependent on feeding levels. We proposed the possibility of using experimental animals to establish MRL of pesticide in feed.

INTRODUCTION

Pesticides have been widely used in Korea as insecticides used in households, and in the cultivation of vegetables and primary feed ingredients. In Aug. 2017, the detection of pesticides in eggs has led to the issue for livestock safety. To ensure the safety of livestock products, it is important to ensure the safety of the feed. The establishment of maximum residue limits (MRL) for pesticide in feed should take into account both livestock safety and animal health. This study was conducted to provide basic data for evaluating the possibility of using experimental animal for setting up pesticide MRL in feed.

RESULTS

Table 1. Effect of feeding of sulfoxaflor on growth performance in pigs

	Con	1X	3X	10X	SEM	P value
Initial BW, kg	162.5	163.3	161.2	160.1	0.93	0.673
Final BW, kg	341.8	343.4	339.2	330.7	3.33	0.564
ADFI, kg	21.94	21.80	21.95	22.08	0.04	0.072
ADG, kg	6.40	6.43	6.35	6.09	0.11	0.695
FCR, FI/ADG	3.44	3.45	3.46	3.64	0.06	0.624

Cont, sulfoxaflor 0 mg /kg; 1X, sulfoxaflor 3 mg /kg; 3X, sulfoxaflor 9 mg/kg; 10X, sulfoxaflor 30 mg/kg
BW, body weight; ADFI, average daily feed intake; ADG, average daily gain; FCR, feed conversion ratio; SEM, standard error mean

MATERIALS AND METHODS

- Experimental Animal : A total of 24 SD rat with BW 161.8 ± 0.93 g
- Experimental Design
 - Control group : non-feeding of sulfoxaflor (6 heads)
 - 1X group : feeding of 3 mg sulfoxaflor per 1 kg feed (6 heads)
 - 3X group : feeding of 9 mg sulfoxaflor per 1 kg feed (6 heads)
 - 10X group : feeding of 30 mg sulfoxaflor per 1 kg feed (6 heads)
- Sampling : serum, muscle, fat, liver, kidney, small intestine
- Analysis items : growth performance, sulfoxaflor residue value
- Statistics Analysis : one-way ANONA

Table 2. Effect of feeding of sulfoxaflor on residue value in each tissues of rats

	Con	1X	3X	10X	SEM	P value
	mg/kg					
Small intestine	n.d.	0.07 ^c	0.22 ^b	0.52 ^a	0.05	< 0.001
Fat	n.d.	0.02 ^c	0.08 ^b	0.24 ^a	0.02	< 0.001
Kidney	n.d.	0.09 ^c	0.38 ^b	0.95 ^a	0.09	< 0.001
Liver	n.d.	0.22 ^c	0.75 ^b	1.72 ^a	0.15	< 0.001
Muscle	n.d.	0.05 ^c	0.20 ^b	0.48 ^a	0.04	< 0.001
Serum	n.d.	0.06 ^c	0.19 ^b	0.45 ^a	0.04	< 0.001
Total residue	n.d.	0.51 ^c	1.81 ^b	4.35 ^a	0.39	< 0.001

Cont, sulfoxaflor 0 mg /kg; 1X, sulfoxaflor 3 mg /kg; 3X, sulfoxaflor 9 mg/kg; 10X, sulfoxaflor 30 mg/kg
a-c, Means with same superscript in a row significantly differ (P<0.05)
SEM, standard error mean

REFERENCES

N. Rawle. 2010. XDE-208 Livestock Feeding Study Magnitude of Residue in Milk, Muscle, Liver and Fat of Lactating dairy cattle. Dow AgroSciences Reference ID 090117. pp 1~667