



OCCURRENCE OF VETERINARY DRUG RESIDUES IN LIVESTOCK FROM PENINSULAR MALAYSIA

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ABSTRACT

Results of the monitoring programme in livestock conducted by the Department of Veterinary Services Malaysia in the period of 2010 to 2011 are presented. Over a 2-year period, tissue samples were analyzed for a number of veterinary drugs. These included tetracycline, sulphonamide, quinolones, β -lactam, aminoglycoside, macrolide chloramphenicol and nitrofurantoin. More than 86 and 97 % of the samples screened were found to be free of any veterinary drugs residue in porcine and poultry, respectively.

Keywords: Monitoring program, livestock, residue

INTRODUCTION

The purpose of veterinary drugs used in animal husbandry practices is to protect animals from diseases, to enhance livestock breeding, production and their welfare (Cannavan, 2004). These include a large number of different types of compounds which can be administered in the feed or in the drinking water. Improper use of these drugs may lead to residues in milk, eggs and in edible tissues which can lead to health problems. These residues may include the non-altered parent compounds as well as metabolites and/or conjugates (Yamada *et al.*, 2006). The monitoring of animal products is accomplished through the Food Safety and Hygiene Monitoring Program, which was established by the Department of Veterinary Services (DVS) to provide control for the presence of residues resulting from the use of veterinary drugs, agro-chemicals and environmental contaminants, thus ensuring the safety of food offered for consumption. The objective of this paper was to report the occurrences of residues of antibacterial and banned drugs from the monitoring program.

MATERIALS AND METHODS

Samples

The meat and organ samples were collected throughout Peninsular Malaysia by veterinary meat inspectors from DVS. Total number of samples collected each year is based on the earlier year's production, prescribed by the yearly Sampling Manual. The Sampling Manual is designed to ensure sampling number is representative for yearly production. Samples were randomly collected from abattoirs and poultry processing plants.

Analytical Methods

Screening of veterinary drugs of sulphonamide (Sulfa), tetracycline (TC) and quinolones (Quins), β -lactam, aminoglycoside and macrolide was carried out by Six Plate Test (Myllyniemi *et al.*, 2001). In the case of a positive screening test result for TC, Sulfa and Quins, further confirmatory test was conducted using high-performance liquid chromatography (HPLC) or liquid chromatography-mass spectrometry (LC-MS/MS). The determination of the banned drug nitrofurantoin and chloramphenicol (CAP) were carried out



using LC-MS/MS.

RESULTS AND DISCUSSION

A total of 1,138 samples of animal tissue were analysed in the period January 2010 to December 2011. The total number of samples collected from the residue program and positive findings at screening and confirmation, from 2010 – 2011, are presented in Tables 1 and 2.

Table 1: Antibacterial Residue Monitoring Program Results in Porcine, Poultry and Bovine, 2010 -2011

Species	Year	Total no. of samples	No. of samples positive at screening	Substance identified (N)
				> MRL / > Limit of Detection
Porcine	2010	70	45	Oxytetracycline (4), Tetracycline (2)
				Sulfamerazine (1)
				Nitrofurantoin (3)
	2011	23	8	Enrofloxacin (1), Ciprofloxacin (1)
				Oxytetracycline (1) Doxycycline (1)
				Sulfamethazine (1)
Poultry	2010	365	70	Nitrofurantoin (2)
				Chloramphenicol (1)
				Enrofloxacin (1), Flumequine (1), Ciprofloxacin (1)
	2011	406	50	Oxytetracycline (10)
				Enrofloxacin (1), Ciprofloxacin (1)
				Oxytetracycline (4), Chloramphenicol (1), Doxycycline (1)
Bovine	2010	143	None	Chloramphenicol (1)
				None



2011 131 None None

Table 2: Summary of Drug Residue Results in Porcine and Poultry, 2010 -2011

Spesis	Veterinary drugs	2010		2011	
		No of tested samples	No. of confirmed positives (%)	No. of tested samples	No. of confirmed positives (%)
Porcine	Tetracyclines	70	6 (9)	23	2 (9)
	Sulfonamide	70	1 (1)	23	2 (9)
	Quinolone	70	0	23	1 (4)
	Macrolide	70	0	23	0
	Aminoglycoside	70	0	23	3*
	B-lactam	70	0	23	0
	CAP	14	3 (21)	21	2 (10)
	Nitrofurantoin	18	0	23	1 (4)
Poultry	Tetracyclines	365	10 (3)	406	6 (1)
	Sulfonamide	365	0	406	0
	Quinolone	365	3 (1)	406	2 (0.5)
	Macrolide	365	0	406	0
	Aminoglycoside	365	0	406	4*
	B-lactam	365	0	406	0
	CAP	91	0	98	1 (1)
	Nitrofurantoin	91	0	101	0

*Positive samples at screening and not confirmed

Porcine: Out of 93 samples screened for antimicrobials, 14% (13 samples) were found positives. The presence of sulphonamide residues was detected in 3 samples (3 %), tetracycline residues in 8 samples (9%) and quinolones residues in 1 sample (1%). The occurrence of different type antimicrobial residues in the sample was higher in year 2011 compared to 2010. Banned drug CAP was detected in 2010 and nitrofurantoin in both years.

Poultry: A total number of 771 samples were analysed for antimicrobial test, 21 samples (3 %) were detected positive, of which 16 were found positive for tetracycline (2 %), 5 samples for quinolones (0.6%) and none was detected for sulphonamides. For banned substances, 189 and 192 samples were analysed for chloramphenicol and nitrofurantoin,



respectively. Only 1 (0.5%) samples were found positive for chloramphenicol and none was detected for nitrofurantoin (Tables 1 and 2).

Bovine: 274 samples were analysed for antibacterial and banned substances. None of the samples was detected positive.

Results from the monitoring of antibacterial residues in tissue of porcine, poultry and bovine for 2010 – 2011 showed that 86, 97 and 100 % samples of pig, poultry and bovine, respectively, collected from slaughter houses and processing plants were in compliance with Malaysian Food Regulation 1985. Risk-based approach for residue surveillance recommended by EU could be introduced to increase the cost-effectiveness of the current monitoring program. This could promote further reduction in antibacterial residue prevalence in Malaysia, particularly in porcine.

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