DTU Food
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EU Proficiency test EUPT-CF7, 2013 – Incurred and Spiked Pesticide Residues in a Feed for Laying Hens

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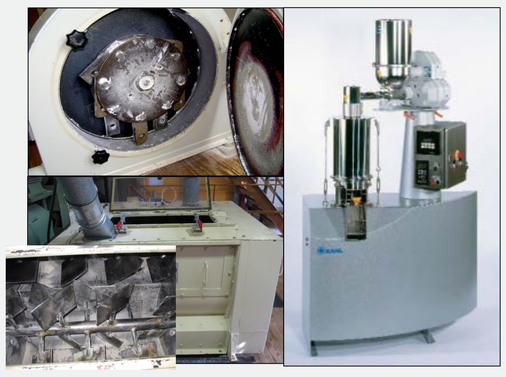
Introduction: The EU Reference Laboratory for pesticide residues in Cereals and Feedingstuff in Copenhagen (EURL-CF) has in 2013 organised a proficiency test (PT) on pesticide residues in feed for laying hens. EU National Reference Laboratories and Official laboratories from EU, EFTA and Third Countries were invited to participate in the PT. In total, 106 EU and EFTA laboratories, and 14 Third Country laboratories registered for the PT, see Table 1.

Table 1 Participant in EUPT-CF7.

Country	# labs	Country	# labs	Country	# labs
Argentina	1	Germany	16	Poland	12
Austria	1	Ghana	1	Portugal	2
Belgium	3	Greece	3	Romania	5
Brazil	2	Hungary	5	Serbia	1
Bulgaria	2	Ireland	1	Singapore	1
Chile	1	Italy	16	Slovakia	2
Costa Rica	2	Kenya	2	Slovenia	4
Cyprus	1	Latvia	1	Spain	10
Czech Republic	2	Lithuania	1	Sweden	2
Denmark	1	Luxembourg	0	Switzerland	1
Egypt	1	Malta	NB	Turkey	1
Estonia	1	Netherlands	4	United Kingdom	2
Finland	1	Norway	1		
France	6	Peru	1	**Total**	**120**

Production of test material: A feed was produced by IFF Braunschweig, by milling, mixing and pelleting 100 kg raw materials. The cereal raw material (wheat, rye and barley) was field treated with pesticides. The other raw materials were maize, soy bean cake and meal, lime and vitamins/minerals. It was provided from the feed producer DLG (Denmark). The composition of the feed was done according to an industrial recipe. See Picture1 and 2

Picture 1. Raw materials used for the feed, the feed in pellets and after milling to EUPT-CF8 Test Material



Picture 2. Mill, mixer and pelleting instruments used for production of the feed

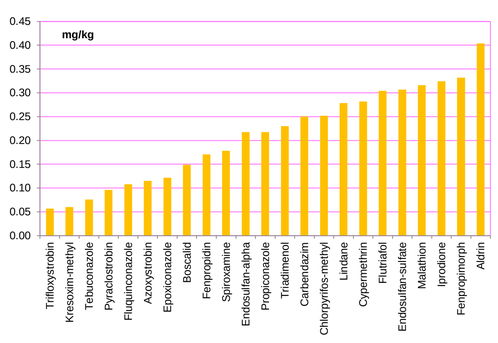


Figure 1 Consensus assigned values of the 23 pesticides

Pesticides: The participants was asked to identify and quantify the pesticide residues in the feed from a Target List with 116 pesticides. The test material contained 23 pesticide residues in levels from 0.057-0.404 mg/kg; 14 was incurred, 4 spiked and 5 was both incurred and spiked. The consensus assigned values were calculated as medians of the results from EU and EFTA participants, excluding outliers with z-scores above 5. The assigned values can be seen in Figure 1.

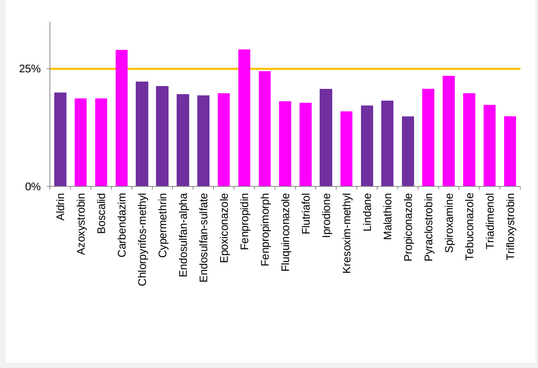


Figure 2 Robust standard deviations, Qn. Pink bars: incurred pesticides. Purple bars: spiked pesticides

Results

Qn-RSD: The average Qn-RSD (robust RSD) was 20 %, with a range from 15 to 29 %. This was below the FFP-RSD of 25% used to calculate z-scores. See Figure 2.

Acceptable z-scores For 14 pesticides 90-96% of the laboratories obtained acceptable results, and for the rest only 84-89% of the laboratories obtained acceptable results. Figure 3 shows the performance for all 23 pesticides.

False negatives and positives: Both the number of false positives and false negatives were relatively high in comparison with EUPTs on cereals. In total, 15 false positive results of 9 different pesticides were reported and 50 false negative results of 17 different pesticides.

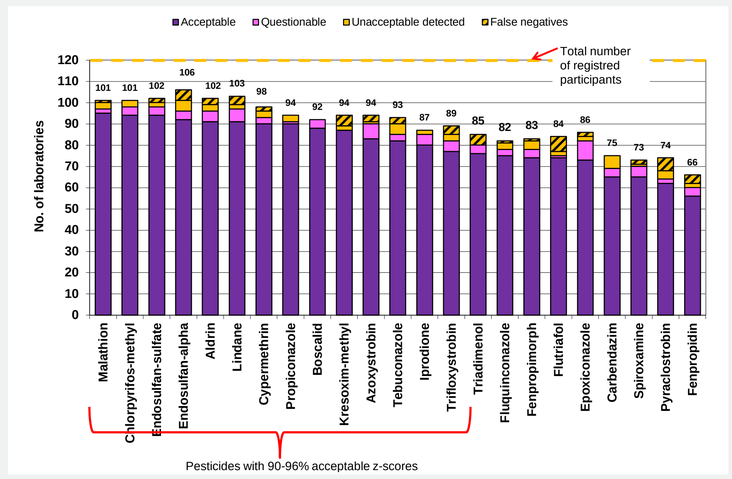


Figure 3 Acceptable, questionable, unacceptable z-scores

Performance of incurred and spiked pesticides: Nine pesticides were spiked and 14 pesticides were incurred. Looking at the distribution of the z-scores, no major differences are seen. However, the standard deviation of the z-scores for the incurred pesticides were higher than for the spiked pesticides. This could indicate that the z-scores for the spiked pesticides are closer to 0 than z-scores for the incurred pesticides. However, the data is too limited be considered significant (Figure 4).

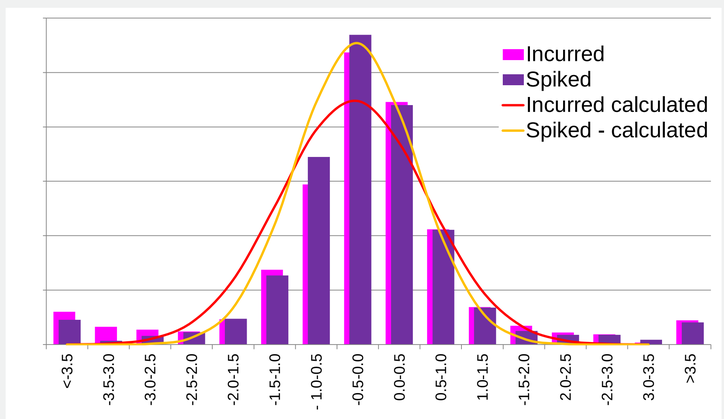


Figure 4 Histograms of the z-scores and calculated normal distribution for the z-scores for incurred and spiked pesticides

PT performance of feed compared to cereals: The percentage of acceptable z-scores has increased from 86% to 90% from the first cereal PT in 2007 (EUPT-C1) to the sixth in 2012 (EUPT-C6). In this PT on feed (EUPT-CF7) the percentage of acceptable z-scores were also 90%. So with regards to acceptable z-scores, the performance in the feed EUPT was comparable to the performance of the most successful EUPT on cereals.

[1] **EURL-CF: EU Reference Laboratory for pesticide Residues in Cereals and Feeding stuff . DTU National Food Institute, Moerkhoej Bygade 19, DK-2860 Soeborg, Denmark**
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