

Proficiency test for antithyroid agents in urine

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Introduction

A proficiency test for antithyroid agents in bovine and porcine urine was organized by Wageningen Food Safety Research (WFSR) on behalf of the European Union Reference Laboratory (EURL) for growth promoters, sedatives and antiviral drugs. Thirty-one European participants (of which 25 National Reference Laboratories) received two bovine (A and B) and two porcine urine (C and D) samples. The following analytes were spiked ranging from 3-35 µg/l:

- Material A: 2-thiouracil, 4-thiouracil, 6-methylthiouracil, 5-methylthiouracil, phenyl-thiouracil and tapazole
- Material B: phenyl-thiouracil and tapazole
- Material C: blank
- Material D: 2-thiouracil, 4-thiouracil, 6-methylthiouracil and 5-methylthiouracil

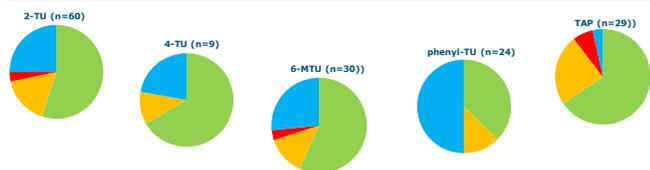
The Common EURL protocol for proficiency testing in the field of veterinary drugs [1] was used to evaluate the participants' results. In this protocol a scoring system for the evaluation of the participants is used. In short, points are assigned for a z-score <2 (1.5 point), z-score >2 (1 point) and one or two false positive results (-1 point). A first evaluation takes all analytes into account and when the first evaluation is not passed, a second evaluation takes place with only analytes in scope of the laboratory.

Results

Thirty participants reported results. Not only the spiked analytes were present; other antithyroid agents were present as well: -mercaptobenzimidazole in all samples, probably originating from the rubber stop that was used to close the vials; -material B contained 2-TU and 5-MTU in the 'blank' sample. The results are presented in the Table 1 and Figure 1.

Table 1: Results of antithyroid agents

Material	Analyte	# results	# quantitative	FN results	Consensus value µg/l	#correct results
A	2-TU	30	24	2	7,5	18
	4-TU	9	7		no statistical evaluation possible	
	5-MTU	14	12		no statistical evaluation possible	
	6-MTU	30	21	1	2,3	17
B	phenyl-TU	24	12		1,3	9
	TAP	29	26	2	5,1	19
	2-TU	30	19		2,9	15
D	5-MTU	14	11		no statistical evaluation possible	
	2-TU	30	12		no statistical evaluation possible	
	4-TU	9	7		1,4	6
	6-MTU	30	5		no statistical evaluation possible	



Green	z-score <2
Orange	z-score >2
Red	False negative result
Blue	Qualitative result

Figure 1: Overview of |z|-scores, false negative results and qualitative results

During homogeneity testing the concentrations were lower than the target concentrations and the consensus values of the results of the participants were lower than the homogeneity results (Figure 2). The instability was taken into account in the evaluation.

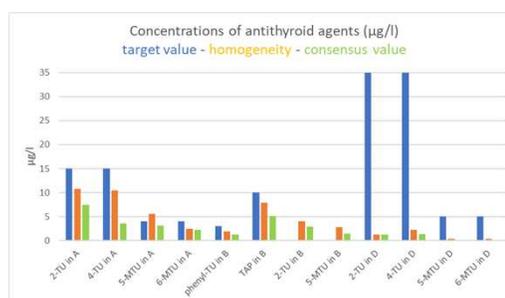


Figure 2: Concentrations of antithyroid agents: target value, homogeneity results and consensus values.

In total 25 questionable/unsatisfactory z-scores, 5 false negative and 20 false positive results were reported.

Conclusions

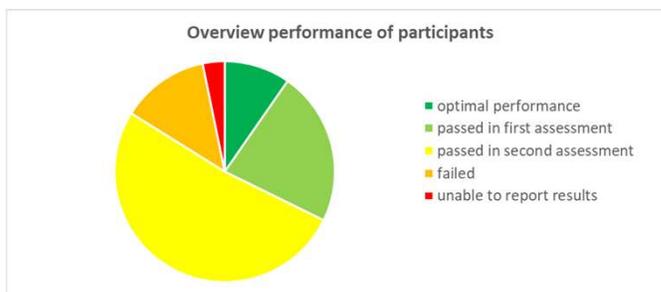


Figure 3: Overview of performance of participants according to EURL point score system [1]

Based on the results of this test it is concluded that:

- The stability of antithyroid agents in urine remains a point of attention for everybody working with antithyroid agents.
- Three participants passed the test with a perfect score, seven participants passed the first assessment, 16 passed after the second assessment, 4 failed the test and one did not report results.
- The detection and quantification of antithyroid agents in urine needs attention.

References

[1] Common EURL Protocol for Proficiency Testing in the Field of Veterinary Drug Residues, 30 April 2020.

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