The diagnosis of *Isospora* oocysts in piglets: a comparison of three coprological methods

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Aims and methods - Copromicroscopic examination carried out by sedimentation and flotation in a hypersaturated NaCl solution, with or without the addition of sugar, is commonly used to diagnose coccidian oocysts in swine. It has recently been pointed out that it would be preferable to use methods based on the elimination of the fatty matter, which is abundantly present in the faeces of piglets, for detecting these oocysts. The employment of suitable copromicroscopic methods would allow the investigator to identify the presence of oocysts even in farms where parasitosis occurs in a sub-clinical way. To identify the best copromicroscopic technique, a total of 155 faecal samples from unweaned piglets (4-27 days old) from 13 Sardinian farms were examined for coccidia using 3 different methods. The following coprological methods were carried out in parallel: (1) sedimentation and flotation in a hypersaturated NaCl solution (SA); (2) sedimentation and flotation in a hypersaturated NaCl solution, with the addition of 500 g of glucose per litre (SU) (Henriksen SA, Christensen JPB, 1992, Vet Rec, 131: 443-444); (3) Ridley-Allen concentration in ethyl acetate and formaldehyde (ET) (Gualdi V *et al*, 2003, Acta SIPAS, 29: 543-554). The samples were also examined using McMaster counting technique, in order to determine the number of oocysts per gram (OPG; cut-off: 50 oocysts) and to compare the above mentioned solutions. The Wilcoxon Signed-Rank Test and the Friedman Test were used for the comparison of 2 and 3 solutions, respectively (Siegel S, Castellan NJ, 1992, Statistica non parametrica, 2^ ed, McGraw-Hill Libri Italia, Milano). Pooled positive faecal samples were used for sporulation and identification of the oocysts.
Results and conclusions - Out of 155 samples, 98 (63.2%), 53 (34.2%) and 30 (19.4%) were positive for coccidian oocysts at ET, SU and SA, respectively. The species identified was *Isospora suis*. The ET method revealed the highest number of positive samples. The comparison of the results of SU and SA to those of ET was the following :

Table 1.

Coprological	Results				Relative Sensitivity	k	Mc Nemar Chi-square
methods	+ / +	+ / -	- / +	- / -	(95% CI)		
SU vs ET	53	0	45	57	0.541 (0.442-0.639)	0.45	43.02 (P < 0.001)
SA vs ET	30	0	68	57	0.306 (0.215-0.397)	0.24	66.01 (P < 0.001)

The SU and SA positivities were statistically lower with respect to those of ET, which seems to be the most accurate diagnostic method. Oocyst detection was also easier with ET, owing to a smaller presence of faecal debris on the slide. At McMaster counting technique, 49 samples were positive at the same time to ET and SU, 19 to ET and SA, and 19 to ET, SU and SA. The number of OPG found with ET (min 50 - max 803,400) was statistically higher when compared to those found with SU (z = -3.688) and SA (z = -3.823) (P < 0.001). SU showed a higher OPG number with respect to SA (z = -3.823). Comparison of the 3 solutions showed that ET was able to detect the highest OPG number (mean ranks: ET = 2.63; SU = 2.32; SA = 1.05; Chi-square: 26.52; P < 0.001). The mean number of OPG of the samples positive at the same time to 2 and 3 methods was the following:

Table 2.

Samples positive to	No.	Geometric mean of the number of OPG (min-max)		
		ET	SU	SA
ET and SU	49	3256 (50-803,400)	1206 (50-685,000)	-
ET and SA	19	9329 (200- 803,400)	-	992 (50-92,300)
SU and SA	19	-	6757 (150-685.400)	992
ET, SU and SA	19	9329	6757	992

The results show that the most effective coprological method for the diagnosis of *Isospora* oocysts in piglets is the Ridley-Allen concentration in ethyl acetate and formaldehyde method.

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