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Using commercial pregnancy associated-glycoproteins (PAG) for pregnancy detection at day 28 of gestation in high producing dairy cows

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Background

The detection of nonpregnant cows, as early as possible, its relevant to make decisions about rebreeding cattle and to manage calving intervals to maximize milk production and revenue for the farm. Currently, in Perú, pregnancy detection is determined by rectal palpation at D45 or transrectal ultrasound at D35. The detection of pregnancy associated-glycoproteins (PAG) produced by the ruminant trophoblast has been proved to be a good pregnancy detector at D28 post breeding.

Aim

The aim of these study is to validate commercial PAG pregnancy detection results with transrectal ultrasonography and assessed the benefits of PAG testing.

Methods

A total of 64 blood samples were taken from high producing dairy cows (>35 kg/d) (Breed: Holstein and Brown Swiss). Blood samples were collected from each cow from the coccygeal at day 28 after artificial insemination, and stored at -20°C to asses circulating blood concentration of PAG ELISA using IDDEX Rapid Visual Pregnancy test. Transrectal ultrasonography (TRUS) was performed 40 days after artificial insemination and will be used for this study as reference for assessing pregnancy.

Accuracy is defined as the proportion of pregnant and nonpregnant cows correctly identified by the test. Results were classified as (a) correct positive diagnosis, (b) incorrect positive diagnosis, (c) correct negative diagnosis, (d) incorrect negative diagnosis. Sensitivity, specificity, positive predictive value and negative predictive value were calculated. A Receiver Operating Curve (ROC) was used to validate the PAG ELISA test.

Results

		Transrectal Ultrasound				Total	
		Pregnant		Open			
IDDEX PAG ELISA test	Prengant	13	20,8%	11	17,2%	24	38,0%
	Open	4	6,3%	36	56,3%	40	62,5%
	Total	17	27,0%	47	73,4%		

Fig. 1. Overall performance of the IDDEX Visual Rapid Pregnancy Test on bovine plasma samples

	PAG ELISA TEST
Sensitivity	76,9% (13/17)
Specificity	76,6% (11/47)
Predictive positive value	54,7% (13/24)
Predictive negative value	90,0% (36/40)
Accuracy	76,7% (49/64)

Fig. 2. Sensitivity and Specificity of the IDEXX ELISA Kit for pregnancy diagnosis at day 28 post breeding

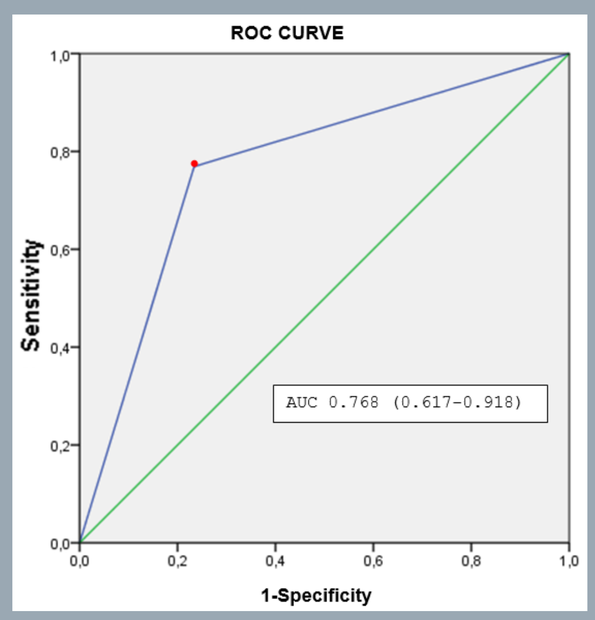

Fig. 3. Receiver operating characteristic (ROC) curve for rapid visual test (area under the curve = 0,768).

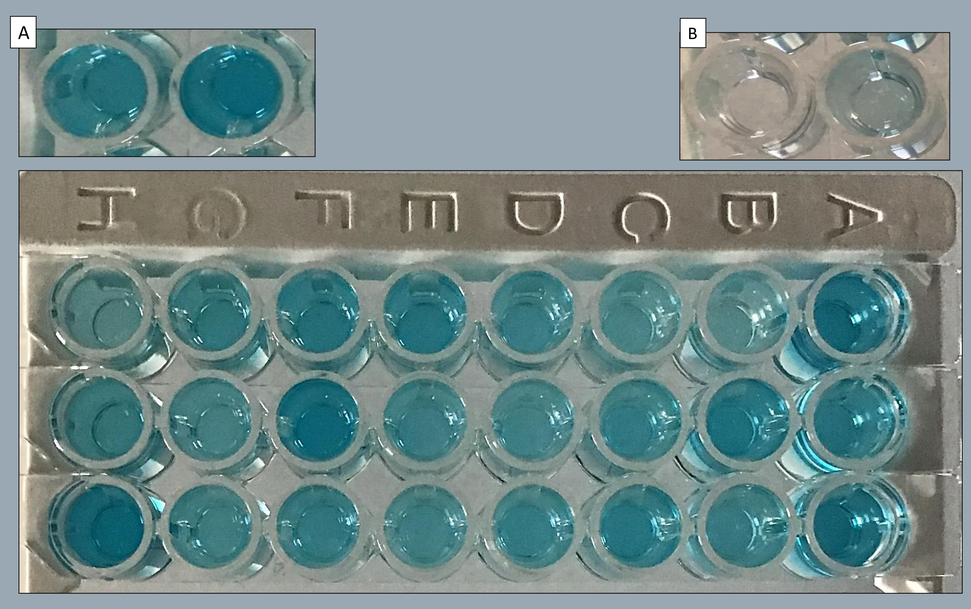

Fig. 4. PAG Rapid Visual pregnancy Test results
[A] Control positive result- Pregnant
[B] Control negative result-Open

Conclusion

In summary, the data shows that commercial pregnancy-associated glycoproteins are a reliable marker for early pregnancy detection in high producing dairy cows. However, the high rate of pregnancy loss could be a factor that reduces the sensitivity of the method.

Acknowledgement

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