Accuracy of pregnancy specific protein-b test for early pregnancy diagnosis in dairy cattle

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Early pregnancy diagnosis is vital for efficient reproductive management of cattle. Ideally, the diagnostic test used should correctly identify both pregnant and non-pregnant females. The objective of this study was to evaluate the accuracy of the pregnancy specific protein B test (PSP-B) for early pregnancy diagnosis in dairy cattle. Plasma samples from two hundred forty six lactating cows more than 80 days postpartum were collected three times at days 28, 30 and 35 after breeding (estrus= day 0). Each plasma sample was analyzed in duplicate using an ELISA test for PSP-B. Test results for PSP-B were reported as: pregnant, non-pregnant or uncertain (repeat open or repeat pregnant). At the same time, each female was examined by transrectal ultrasonography (TRUS) with a linear 5-7.5 MHz transducer. TRUS was used as a criterion standard test for comparison with PSP-B results. A positive pregnancy diagnosis was made when an embryo plus extra embryonic membranes was observed by TRUS. The agreement between PSP-B and TRUS diagnoses was compared by using Kappa values. The prevalence of pregnancy at days 28 determined by TRUS was 46.3% (114/246). Sensitivity of PSP-B test at days 28, 30 and 35 was 93.9%, 96.0% and 97.2%, respectively ($P>0.05$). Specificity of PSP-B test for the same days was 95.5%, 93.9% and 93.6% ($P>0.05$). The positive predictive values for days 28, 30 and 35 were 94.7%, 92.2% and 92.0%, respectively ($P>0.05$). The negative predictive values for the same days were 94.7 %, 96.8% and 97.8% ($P>0.05$). The accuracy of PSP-B at days 28, 30 and 35 was 96.0 %, 95.4% and 97.5%, respectively ($P>0.05$). However, when compared at the same days with TRUS differences were detected ($P<0.001$). The percentage of uncertain samples among the entire number of specimens analyzed was 5.6% (40/721). A significant reduction in the percentage of samples that required repetition from days 28, 30 to 35 post-AI was detected [8.5 % (21/246), 4.8 % (11/229) and 3.3 % (8/246), respectively ($P<0.01$)]. Kappa value at days 28, 30 and 35 was 0.89 (CI 95%: 0.84-.95), 0.89 (0.84-0.95) and 0.90 (0.85-0.96) ($P>0.05$). It was concluded that the agreement between PSP-B and TRUS was very good. PSP-B test was not a 100% accurate test of pregnancy compared with TRUS at days 28, 30 or 35 after breeding. False negative results were due to low levels of PSP-B in pregnant animals. False positive results were due to persistence of pregnant levels of PSP-B in females with pregnancy loss.

Key words: Cattle, pregnancy diagnosis, PSP-B, transrectal ultrasonography, accuracy