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Pregnancy testing in dairy cows using a PAG test in milk samples: Different thresholds for different stages of the pregnancy

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Pregnancy testing DHI milk samples is widely used by Canadian dairy producers. Valacta and CanWest DHI, the two milk- recording agencies in Canada, currently use a Pregnancy Associated Glycoprotein (PAG) test manufactured by IDEXX (Idexx Milk Pregnancy Test). The result of the test is obtained from the optical density (OD) of the sample minus the OD of the negative control. According to the manufacturer's recommendation, test results are classified as pregnant (≥ 0.25), not pregnant (< 0.1) or inconclusive (≥ 0.1 and <0.25), irrespective of the stage of pregnancy. Using the same thresholds for all stages of gestation might not be optimal. For example, most pregnant cows between 26 and 40 days post-breeding have PAG values substantially above 0.25 but pregnant cows between 50 and 70 days post-breeding generally have lower values. Embryonic losses are more frequent early in gestation. Using a higher threshold to determine pregnancy early post- breeding, when PAG results of pregnant cows should be higher, could possibly reduce the number of false positive results and enhance the specificity of the test. The objective of this study was to establish the best PAG thresholds to use with the IDEXX Milk Pregnancy Test in DHI samples at each stage of gestation. Data originated from 100,000 dairy cows with a known breeding date, PAG test date, and subsequent calving date. Cows with a subsequent calving date (270 - 290 days) matching the breeding date were considered pregnant at test date. Cows calving later than expected (> 295 days) were considered as either open at test date or to have underwent a pregnancy loss later in the gestation with subsequent rebreeding. Our objective was to establish, for each stage of gestation, a "pregnancy" threshold associated with the highest likelihood of calving from that breeding as well as an "open" one associated with a likelihood of calving below 1 %. PAG values falling in between the "open" and "pregnant" thresholds were considered as inconclusive results. An interpretation grid containing more than 50 combinations of days since breeding and PAG level was created to maximize the predictive value of the test using the likelihood of calving as a reference. For example, our data showed that a higher threshold for open cows (< 0.15) could be use between 28 and 37 days, but a lower one (< 0.01) is needed between 50 and 90 days. Using a higher threshold for pregnant cows early in pregnancy and gradually reducing it until 60 days provides a higher likelihood of calving than using the same threshold for all stages of gestation. Preliminary results suggest thresholds ≥ 0.50, ≥ 0.45, ≥ 0.35 and ≥ 0.25 at 28 - 37, 38 - 45, 46 - 49 and 50 - 90 days post-breeding, respectively. For test results in the inconclusive range, information on the likelihood of calving is provided on the report . Adjusting the interpretive thresholds of the IDEXX Milk Pregnancy Test at different stages of gestation improves the predictive value of the test.

Keywords: milk pregnancy test thresholds