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Level of Cortisol and Catecholamines using Enzyme Linked Immunosorbent Assay (ELISA) and Fourier Transform Infra Red (FTIR) in Dairy Cattle

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Abstract: Animal stress is commonly determined by measuring cortisol levels in blood, saliva, feces or urine. Samples used in this study were blood serum from cows that have already known their cortisol levels. Blood samples were taken from the three different times of milking process: one minute (just before milking), 50 minutes after milking, and 100 minutes after milking. The samples were measured at 4000-400cm⁻¹ wavelength using MB3000 FTIR. Data absorption band at a wavelength of FTIR was descriptively analyzed using Horizon MB[™] FTIR software. The results of FTIR analysis were hydroxyl (-OH) at 3294-3321 cm⁻¹, ketone (CO) at 1636 cm⁻¹ and the amine (-NH₂) at 1551 cm⁻¹. A methyl group (-CH₃) was absorbed at a low level, thus it cannot get the absorbance peak at 2880 to 2950 cm⁻¹ wavelength. The mean of catecholamines levels using ELISA on ± 1 minute before milking, 50 minutes after milking and 100 minutes after milking were 0.0469 ± 0.00546 ng/mL, 0.0467 ± 0.00263 ng/mL and 0.0502 ± 0.00308 ng/mL respectively. Two way ANOVA test results showed that the mean of catecholamines were not significantly different (p>0.05) among three milking treatments. Measurement of cortisol and catecholamine levels using ELISA and FTIR showed the same result, and no significant differences were found in ELISA assay and no wavelengths difference were found in FTIR.

Keyword: milking stress, FTIR, ELISA, cortisol, catecholamines.

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