

Comparison of Process Slaughtered on Beef Cattle Based on Level of Cortisol and Fourier Transform Infrared Spectroscopy (FTIR)

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Abstract : Stress of slaughter animals starting long before until at the time of process of slaughtering which cause misery and decrease of meat quality. Meanwhile, determination of animal stress using hormonal such as cortisol is expensive and less practical so that portable stress indicator for cows based on Fourier Transform Infrared Spectroscopy (FTIR) must be provided. The aims of this research are to find out the comparison process of slaughter between Rope Casting Local (RCL) and Restraining Box Method (RBM) by measuring of cortisol and wavelength in FTIR methods. Thirty two of male Ongole crossbred cattle were used in this experiment. Blood sampling was taken from jugular vein when they were rested and repeated when slaughtered. All of blood samples were centrifuged at 3000 rpm for 20 minutes to get serum, and then divided into two parts for cortisol assayed using ELISA and for measuring the wavelength using FTIR. The serum then measured at the wavelength between 4000-400 cm^{-1} using MB3000 FTIR. Band data absorption in wavelength of FTIR is analyzed descriptively by using FTIR Horizon MBTM. For RCL, average of serum cortisol when the animals rested were 11.47 ± 4.88 ng/mL, when the time of slaughter were 23.27 ± 7.84 ng/mL. For RBM, level of cortisol when rested animals were 13.67 ± 3.41 ng/mL and 53.47 ± 20.25 ng/mL during the slaughter. Based on student t-Test, there were significantly different between RBM and RCL methods when beef cattle were slaughtered ($P < 0.05$), but no significantly different when animals were rested ($P > 0.05$). Result of FTIR with the various of wavelength such as methyl group ($=\text{CH}_3$) 2986cm^{-1} , methylene ($=\text{CH}_2$) 2827 cm^{-1} , hydroxyl ($-\text{OH}$) 3371 cm^{-1} , carbonyl (ketones) ($\text{C}=\text{O}$) 1636 cm^{-1} , carboxyl (COO^{-1}) 1408 cm^{-1} , glucosa 1057 cm^{-1} , urea 1011 cm^{-1} have been obtained. It can be concluded that the RCL slaughtered method is better than the RBM method based on the increase of cortisol as an indicator of stress in beef cattle ($P < 0.05$). FTIR is really possible to be used as stub of stress tool due to differentiate of resting and slaughter condition by recognizing the increase of absorption and the separation of component group at the wavelength.

Keywords : cows, cortisol, FTIR, RBM, RCL, stress indicator

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