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Measuring faecal glucocorticoid metabolites as a non-invasive tool for monitoring adrenocortical activity in South American camelids

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Abstract

*The welfare and productivity of South American camelids may be affected by stressful events. The purpose of this study was to validate a non-invasive method for stress monitoring using faecal samples and to apply it to evaluate a stressful event, such as confinement. For physiological validation, nine alpacas (*Vicugna pacos*) and six llamas (*Lama glama*) were subjected to pharmacological stimulation of their adrenal cortex. Serial faecal samples were collected during 48 h before and after stimulation. During confinement, faecal samples from six llamas were collected twice per day during six consecutive days. Faeces belonging to 18 vicuñas (*Vicugna vicugna*) were collected before and one day after their capture for confinement (*Chacu*). Faecal cortisol metabolites (FCM) were extracted from each sample and quantified by an 11-oxoaetiocholanolone enzyme immunoassay. Thirty-three and 28 h (median) after ACTH stimulation, FCM concentrations peaked with a ten- and eight-fold increase (median) above baseline in alpacas and llamas, respectively. There were no significant differences in FCM concentrations between sexes. In llamas, FCM concentrations peaked (4.7 times higher than baseline) after five days of confinement in females and after three days (2.7 times) in males. In vicuñas, three times higher FCM levels were observed the day after the start of confinement (in comparison to the starting values). Based on our findings, this non-invasive method is well suited to measure adrenocortical activity in alpacas, llamas and vicuñas. Thus, this method could help to improve management, handling and welfare in wild and domesticated South American camelids.*

Keywords: *animal welfare, faeces, glucocorticoids, New World camelids, plasma, stress*