

EVALUATION OF FECAL GLUCOCORTICOID METABOLITE ASSAYS FOR SHORT-
TERM STRESSORS AND
VALIDATION FOR STRESS MONITORING IN AFRICAN HERBIVORES

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ABSTRACT

During stressful periods, glucocorticoid production is increased. Glucocorticoid metabolites are found in blood, urine and feces. Our first goal was to determine if fecal glucocorticoid metabolite (FGM) measurements are a reliable means of detecting short-term (<30 min) stressors in two animal models. Using a double-antibody radioimmunoassay, we quantified FGM levels after short-term stressors and compared them to plasma glucocorticoid levels in captive raised New Zealand White rabbits (*Oryctolagus cuniculus*) and wild caught Mourning doves (*Zenaida macroura*). While both species showed increases in plasma corticosterone levels in response to short-term stressors, we did not detect corresponding changes in FGM levels. The inability to track changes in glucocorticoid production with fecal samples indicates FGM monitoring is not reliable for detecting short-term stressors.

In our second project, we validated FGM assays for multiple African herbivores. Species-specific differences in glucocorticoid metabolism require assay validation for each species. Standard validation includes laboratory and biological validation. Laboratory validation evaluates if the assay can detect FGM using parallelism and exogenous hormone recovery tests. Biological validations compare two groups with different levels of adrenal activity, due to exogenous stimulation. We collected samples from seven herbivore species, representing a wide taxonomic range. Our laboratory validation produced parallel sample dilution curves and acceptable exogenous recovery for all species. Our biological validation detected changes in FGM production associated with seasonal change. Samples collected during the dry season were higher than those collected in the wet season in all species. Others can use this information for future studies monitoring the effects management on stress levels.