IDENTIFICATION AND MORPHOLOGIC ANALYSIS OF A UROLITH FROM A UROMASTYX LIZARD (Uromastyx maliensis) USING SCANNING ELECTRON MICROSCOPIC TECHNIQUES AND ENERGY DISPERSIVE X-RAY MICROANALYSIS

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ABSTRACT

An adult female Mali uromastyx lizard (Uromastyx maliensis) was presented with a history of straining and cloacal prolapse. Radiographs revealed a mineral density in the region of the bladder. Two uroliths were removed via cystotomy and an ovariectomy was performed at the same time. Recovery was uneventful and the animal is doing well approximately 8 mo post surgery.

One of the uroliths was submitted to an environmental laboratory for a detailed analysis of morphology and elemental composition using scanning electron microscopic techniques and energy dispersive x-ray microanalysis. In addition, an ICP (inductively coupled plasma) metal analysis was performed. This revealed the presence of the following metals: potassium 16.79%, calcium 0.45%, sodium 0.18%, magnesium 0.05%, copper 0.0011%, iron 0.00099%, manganese not detected (minimum detection limit [MDL] = 0.28 ppm), lead not detected (MDL = 1.42 ppm), arsenic not detected (MDL = 1.42 ppm), unknown others 72.93%.

Analysis using scanning electron microscopic techniques and energy dispersive x-ray microanalysis appears to have a number of advantages over conventional methods currently used in reptilian urolith analysis. One of the major advantages of this method is the simplicity of preparation of the sample allowing rapid generation of results. In addition, the nondestructive character of the analysis allows both the exterior and interior of the same stone to be separately analyzed. To the author’s knowledge, this method is currently the only technique in which information about spatial relationships between various crystals in a stone can be easily obtained, potentially shedding new light on the dynamics of urolith formation. Scanning electron microscopic techniques can also detect minor components of the sample, such as cellular debris, which may help elucidate the role of organic materials, such as nanobacteria, as initiators of urolith formation. In addition, the analysis is not limited to chemical composition only, but can include detailed descriptions of a wide variety of materials including organic substances or descriptions of the structure of microcrystals within the urolith.

These techniques have been described multiple times in the human literature and appear to be...
commonly used in human urolith analysis. As urolith formation is a well-described phenomenon in reptiles, use of this analytic method with reptilian uroliths appears to have the potential to be of significant value to herpetologic medicine by helping to increase our understanding of the formation and composition of the stones found in reptilian urinary tracts.

Please contact the primary author if you have reptilian uroliths for analysis. (joerg.mayer@tufts.edu)

LITERATURE CITED
