NITROGEN METABOLISM IN THE OSTRICH,

(Struthio camelus)

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ABSTRACT

The thriving of the ostrich in an otherwise very harsh environment has been an intriguing question to many people. The objective of this study was to find out some of the physiological explanations to this question.

Some aspects of nitrogen metabolism were studied in the Ostrich: Major urinary nitrogen metabolites in ostrich urine (uric acid nitrogen, urea nitrogen and ammonia nitrogen) were partitioned. Plasma urea and urinary ammonia levels were also determined using commercial kits based on Berthelot's reaction while uric acid was determined by the decrease in absorbance at 292nm wavelenth before and after incubation with uricase. Nitrogen requirement for maintenance in these birds was determined by regressing apparently absorbed nitrogen on the retained nitrogen. The y-intercept of the regression equation gave the Nitrogen maintanance requirement. Nitrogen balance (the difference of nitrogen intake and nitrogen output (in faeces and in urine) was determined and used as a measure of efficiency of nitrogen metabolism.

It was found that uric acid nitrogen was the most abundant (76.60% ; as in other birds) followed by urea nitrogen (10.20%). Ammonia nitrogen (2.3%) was the least, unlike in chicken where the proportion of urea nitrogen is least (3%). Nevertheless in absolute terms, ammonia nitrogen in the ostrich urine (2.3%) was lower than in chicken (7%). Efficiency of nitrogen retention and the rate of nitrogen retention were found to be 50.0 and 32 % respectively. An amount of 419 mg of nitrogen per metabolic body weight was found to be required to maintain zero nitrogen balance, a value that is lower than for sheep(ruminant) and higher than that for the horse (non-ruminants).

It is concluded that, like other birds, an ostrich is uricotelic. The fact that the amount of ammonia excreted in the ostrich is less than in other birds may be a unique feature of the former and has a physiological backing as this may help to conserve water in the otherwise arid environment where it inhabits. Again, the apparently low nitrogen required for maintenance and the high efficiency of nitrogen retention recorded may be part of the explanation as to why the ostrich thrives in the arid and semi-arid environments where quality of grass and other herbage in terms of protein is very poor.