

# The incidence of urolithiasis in Iranian Raeni kids fed different levels of metabolisable energy and metabolisable protein

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Urolithiasis is a well recognized disorder affecting male sheep and goats. The pathophysiology of urolithiasis is multifactorial with environmental, hormonal and nutritional factors implicated (Blood *et al.* 1989). The formation of phosphatic calculi is stimulated by high concentrate, low roughage, low Ca:P ratio, pelleted diets and alkaline urine (Emerick *et al.* 1963). An experiment was designed to assess the occurrence of urolithiasis in Raeni kids offered various levels of metabolisable energy (ME) and metabolisable protein (MP) was assessed.

Seventy five male kids (liveweight, 20 kg) were used in a two factorial experiment with a complete randomized design. Five levels of ME (8.20, 8.92, 9.65, 10.37 and 11.10 MJ/kg DM) and MP (67.1, 76.5, 82.9, 90.9 and 99.1 g/kg DM) were assessed with 3 replications of kids. Diets were pelleted and consisted of barley, lucerne hay, wheat straw, wheat bran and cottonseed meal. The Ca:P ratio of diets was 2:1.

After 3 months of ad libitum feeding, 12 cases of urolithiasis were observed. Seventy five percent of the cases of uroliths were in goats fed the rations containing the highest levels of ME (10.37 and 11.10 MJ/kg DM). In these animals, mean urinary pH was 8.36. Offering ammonium chloride (0.25 g/kg liveweight) significantly ( $P < 0.001$ ) reduced the urinary

pH to 6.5 and led to the recovery of three of the affected kids. In the dead animals, phosphorus (P) and calcium (Ca) made up 10 and 5% of the urolithic ash, respectively. After introducing a dietary Ca:P ratio of 3.5:1, by including 10 g/kid/day of limestone in the drinking water, no further incidences of urolithiasis were noted. The level of dietary MP had no significant effect on urolithiasis ( $P > 0.05$ ).

It can be concluded that maintaining a dietary Ca:P ratio of 3.5:1 may be effective in minimising the formation of phosphorous uroliths in Raeni kids being fed diets consisting of more than 60% high energy pelleted concentrate.

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**Table 1** Urinary pH of the affected (dead) and recovered kids following supplementation with 0.25 g/kg liveweight of ammonium chloride.

Items	No. of replications	Urinary pH	
		Mean	SE
Dead kids	9	8.36 <sup>a</sup>	0.033
Recovered kids	3	6.51 <sup>b</sup>	0.098

<sup>a,b</sup> Within columns, means with a different superscript differ significantly ( $P < 0.01$ )