

# THE EFFECT OF URINARY pH ON CALCIUM OXALATE RELATIVE SUPERSATURATION IN HEALTHY CATS

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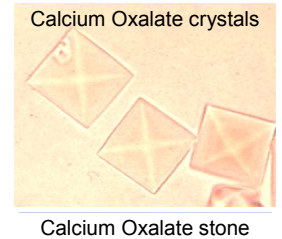
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## INTRODUCTION

Over the last 20 years, the prevalence of calcium oxalate (CaOx) uroliths has dramatically increased in cats (Fig. 1, Osborne et al., 2000). Epidemiological studies have also found an association between strongly acidifying diets and prevalence of CaOx uroliths (Lekcharoensuk et al., 2001; Kirk et al., 1995). Based on those findings, the current leading opinion is that urinary pH is the most important factor in the prevention of CaOx uroliths and that it is impossible to prevent both struvite and CaOx uroliths with a same diet.

**Relative supersaturation (RSS)** is a method that allows to measure the potential for a urine to dissolve and to form crystals and that has been validated in cats (Robertson et al., 2002). The aim of this study was therefore to assess if urine pH is a good predictor of CaOx RSS in healthy adult cats.



## MATERIALS AND METHODS

- **Animals & Diets:** Twenty-three commercial complete dry diets were fed successively to 7 Chartreux cats (3 neutered males, 4 females,  $6.7 \pm 1.4$  years old, weight :  $4.6 \pm 1.7$ kg ) for 2 weeks.
- **Parameters recorded:** pH and concentrations of 10 solutes (Ca, Mg, Na, K,  $\text{NH}_4^+$ , phosphate, citrate, sulfate, oxalate, uric acid) were measured on the pooled urine of each cat for the last five days of each study period. Based on those data, the urinary relative supersaturation (RSS) for calcium oxalate (CaOx) was calculated using the software SUPERSAT (Robertson et al., 2002)
- **Statistic:** The effect of urinary pH on CaOx RSS was assessed using simple regression ( $P < 0.05$  for significant correlation).

Figure 1 : Changing trend in the mineral composition of feline uroliths from 1983 to 1999 (Osborne et al, 2000)

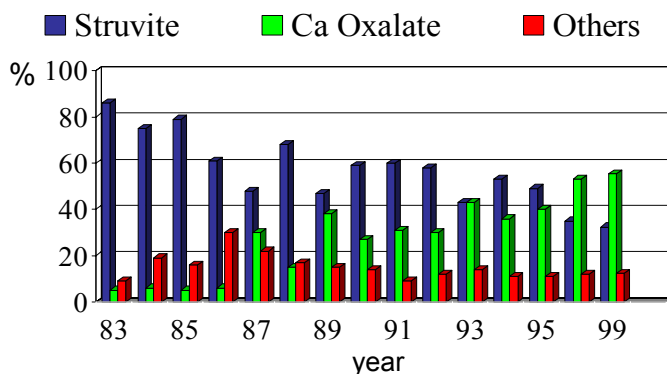
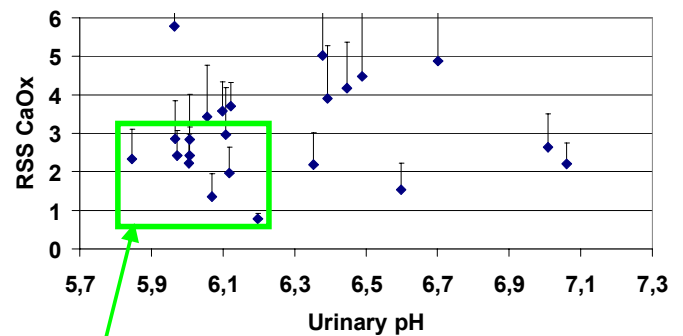


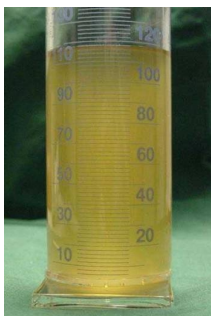
Figure 2 : Mean CaOx RSS  $\pm$  SD vs urinary pH

Each point represents mean CaOx RSS for 7 cats fed one diet



Diets with mean urinary pH < 6.2 & mean CaOx RSS < 3

## RESULTS & CONCLUSION



• **Results:** Urinary pH varied from 5.8 to 7.1 (mean:  $6.26 \pm 0.33$ ) representing the commonly observed range of urinary pH in cats. No correlation was found between urinary pH and CaOx RSS ( $R^2 = 0.0049$  ; Fig. 2). No correlation was found between urinary calcium concentration and urinary pH. Nine diets inducing a urinary pH below 6.2 presented a CaOx RSS < 3.

• **Conclusion:** This study demonstrates that urinary pH is not a good predictor of CaOx RSS and therefore is a poor predictor of the risk of forming CaOx crystals and stones in the urinary tract of cats. RSS takes into account many parameters aside pH and has been developed to assess the risk of forming CaOx crystals.

Our work strongly suggests that in cats, it is possible to formulate an acidifying diet that will minimize CaOx urine saturation and therefore, to formulate a diet that will both prevent CaOx and struvite urolith formation.

## REFERENCES

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