

- Urolitiazis  
İdrar Taşları

## Purin Urolithiasis- DNA ve RNA katabolitleri (Ürat)

- Adenin, Guanin, Hipoksantin, Ksantin, anhidroz ürik asit,
  - Dalmaçyalılar predispoze.
  - Normal köpeklerde nükleik asitler üratlara indirgenir ve karaciğerde allantoinine çevrilir.
  - Dalmaçyalı' larda hepatik ürikaz enzimi eksikliği sonucu üratlar İdrarla değişmeden atılır.
  - Üratlar idrarda relatif olarak çözünmeyen bileşikler olan ürik asit veya amonyum ürat şeklinde bulunur.
- ✓ Su
  - ✓ Protein: Düşük protein %10-18 KM
  - ✓ Sodyum: İdrar hacmini artırmak
  - köpeklerde hipertansiyona dikkat.
  - ✓ **Allopurinol**
  - ✓ **İdrar yolu enfeksiyonu**

**Table 39-6.** Levels of key nutritional factors in selected veterinary therapeutic foods used for dissolution and to minimize recurrence of urate urolithiasis in dogs compared to recommended levels.\*

<b>Dry foods</b>	<b>Protein (%)</b>	<b>Restricted purines (Yes/No)**</b>	<b>Sodium (%)</b>	<b>Urinary pH***</b>
<b>Recommended levels</b>	<b>10-18</b>	<b>Yes</b>	<b>&lt;0.3</b>	<b>7.1-7.5</b>
Hill's Prescription Diet u/d Canine	11.2	Yes	0.23	7.70
Medi-Cal Reduced Protein	13.7	Yes	0.2	na
Medi-Cal Renal LP	14.7	Yes	0.1	na
Medi-Cal Renal MP	18.4	Yes	0.1	na
Medi-Cal Vegetarian Formula	20.9	Yes	0.4	na
Purina Veterinary Diets NF KidNey Function	15.9	Yes	0.22	6.7-7.5
Purina Veterinary Diets HA HypoAllergenic	21.3	Yes	0.24	na
Royal Canin Veterinary Diets Vegetarian Formula	19.1	Yes	0.15	6.78
<b>Moist foods</b>	<b>Protein (%)</b>	<b>Restricted purines (Yes/No)**</b>	<b>Sodium (%)</b>	<b>Urinary pH***</b>
<b>Recommended levels</b>	<b>10-18</b>	<b>Yes</b>	<b>&lt;0.3</b>	<b>7.1-7.5</b>
Hill's Prescription Diet u/d Canine	13.3	Yes	0.28	7.4
Medi-Cal Reduced Protein	16.5	No	0.2	na
Medi-Cal Renal LP	16.8	No	0.1	na
Medi-Cal Renal MP	28.2	No	0.2	na
Medi-Cal Vegetarian Formula	26.4	Yes	0.5	na
Purina Veterinary Diets NF KidNey Function	16.5	No	0.24	6.7-7.5

Key: na = information not available from manufacturer.

\*Manufacturers' published values; nutrients expressed as % dry matter; moist foods are best.

\*\*Restricted purines = products having low-purine ingredients (Table 39-3) as the first three non-water ingredients on the ingredient panel of the product label.

\*\*\*Protocols for measuring urinary pH may vary.

**Table 40-8.** Levels of key nutritional factors in selected veterinary therapeutic foods used to minimize recurrence of calcium oxalate urolithiasis in dogs compared to recommended levels.\*

	<b>Protein</b>	<b>Calcium</b>	<b>Phosphorus</b>	<b>Sodium</b>	<b>Magnesium</b>	<b>Urinary</b>
	<b>(%)</b>	<b>(%)**</b>	<b>(%)**</b>	<b>(%)</b>	<b>(%)</b>	<b>pH***</b>
<b>Dry foods</b>						
<b>Recommended levels</b>	<b>10-18</b>	<b>0.4-0.7</b>	<b>0.3-0.6</b>	<b>&lt;0.3</b>	<b>0.04-0.15</b>	<b>7.1-7.5</b>
Hill's Prescription Diet u/d Canine	11.2	0.34	0.15	0.23	0.046	7.70
Medi-Cal Urinary SO 13	16.7	1.0	0.6	1.3	0.2	5.5-6.0
Purina Veterinary Diets NF KidNey Function	15.9	0.76	0.29	0.22	0.07	6.7-7.5
Royal Canin Veterinary Diet Urinary SO 14	17.0	0.80	0.63	1.38	0.066	5.5-6.0
<b>Moist foods</b>						
<b>Recommended levels</b>	<b>10-18</b>	<b>0.4-0.7</b>	<b>0.3-0.6</b>	<b>&lt;0.3</b>	<b>0.04-0.15</b>	<b>7.1-7.5</b>
Hill's Prescription Diet u/d Canine	13.3	0.35	0.17	0.28	0.049	7.4
Medi-Cal Urinary SO	18.7	1.0	0.8	1.1	0.10	5.5-6.0
Purina Veterinary Diets NF KidNey Function	16.5	0.50	0.30	0.24	0.08	6.7-7.5
Royal Canin Veterinary Diet Urinary SO	18.5	0.97	0.86	1.45	0.059	5.5-6.0

\*Manufacturers' published values. Nutrients expressed as % dry matter, unless otherwise stated; moist foods are best; avoid foods with added vitamin C (ascorbic acid); avoid foods with high oxalate ingredients (**Table 40-3**).

\*\*Calcium-phosphorus ratio should be in the range of 1.1:1 to 2:1.

\*\*\*Protocols for measuring urinary pH may vary.

**Table 43-5. Key nutritional factors in selected commercial veterinary therapeutic foods used for dissolution of struvite uroliths in dogs compared to recommended levels.\***

<b>Dry foods</b>	<b>Protein (%)</b>	<b>Phosphorus (%)</b>	<b>Magnesium (%)</b>	<b>Urinary pH**</b>
<b>Recommended levels</b>	<b>≤8</b>	<b>≤0.1</b>	<b>&lt;0.02</b>	<b>5.9-6.1</b>
Royal Canin Veterinary Diet Control Formula	23.9	0.84	0.130	6.0-6.3
Royal Canin Veterinary Diet Urinary SO 14	17.0	0.63	0.066	5.5-6.0
<b>Moist foods</b>	<b>Protein (%)</b>	<b>Phosphorus (%)</b>	<b>Magnesium (%)</b>	<b>Urinary pH**</b>
<b>Recommended levels</b>	<b>≤8</b>	<b>≤0.1</b>	<b>&lt;0.02</b>	<b>5.9-6.1</b>
Hill's Prescription Diet s/d Canine	7.9	0.10	0.024	5.935
Royal Canin Veterinary Diet Control Formula	22.8	0.66	0.078	6.0-6.3
Royal Canin Veterinary Diet Urinary SO	18.5	0.66	0.059	5.5-6.0

\*Manufacturers' published values; nutrients expressed on a dry matter basis; moist foods are best.

\*\*Protocols for measuring urinary pH may vary.

**Table 43-9.** Key nutritional factors in selected commercial veterinary therapeutic food used to minimize recurrence of struvite urolithiasis in dogs compared to recommended levels.\*

<b>Dry foods</b>	<b>Protein (%)</b>	<b>Phosphorus (%)</b>	<b>Magnesium (%)</b>	<b>Urinary pH**</b>
<b>Recommended levels</b>	<b>&lt;25</b>	<b>&lt;0.6</b>	<b>0.04-0.1</b>	<b>6.2-6.4</b>
Hill's Prescription Diet c/d Canine	22.3	0.59	0.111	6.22
Hill's Prescription Diet w/d Canine	18.9	0.56	0.088	6.40
Hill's Prescription Diet w/d with Chicken Canine	19.1	0.56	0.080	6.30
Medi-Cal Preventive Formula	23.9	0.8	na	na
Medi-Cal Urinary SO	16.7	0.6	0.2	5.5-6.0
Medi-Cal Weight Control/Mature	19.5	0.8	na	6.4
Purina Veterinary Diet DCO Dual Fiber Control	25.3	0.93	0.130	6.0-6.2
Purina Veterinary Diet OM Overweight Management	31.1	0.89	0.130	6.2-6.4
Royal Canin Veterinary Diet Control Formula	23.9	0.84	0.130	6.0-6.3
Royal Canin Veterinary Diet Urinary SO 14	17.0	0.63	0.066	5.5-6.0
<b>Moist foods</b>	<b>Protein (%)</b>	<b>Phosphorus (%)</b>	<b>Magnesium (%)</b>	<b>Urinary pH**</b>
<b>Recommended levels</b>	<b>&lt;25</b>	<b>&lt;0.6</b>	<b>0.04-0.1</b>	<b>6.2-6.4</b>
Hill's Prescription Diet c/d Canine	23.6	0.51	0.079	6.16
Hill's Prescription Diet w/d Canine	17.9	0.52	0.088	6.40
Medi-Cal Preventive Formula	23.8	0.7	na	na
Medi-Cal Urinary SO	18.7	0.8	0.1	5.5-6.0
Medi-Cal Weight Control/Mature	21.5	0.6	na	6.6
Purina Veterinary Diet OM Overweight Management	44.1	1.06	0.190	6.2-6.4
Royal Canin Veterinary Diet Control Formula	22.8	0.66	0.078	6.0-6.3
Royal Canin Veterinary Diet Urinary SO	18.5	0.86	0.059	5.5-6.0

Key: na = information not available from the manufacturer.

\*Manufacturers' published values; nutrients expressed on a dry matter basis; moist foods are best.

\*\*Protocols for measuring urinary pH may vary.

**Table 42-2.** Levels of key nutritional factors in selected commercial veterinary therapeutic foods used for dissolution and to minimize recurrence of cystine uroliths in dogs compared to recommended levels.\*

<b>Dry foods</b>	<b>Protein (%)</b>	<b>Sodium (%)</b>	<b>Urinary pH**</b>
<b>Recommended levels</b>	<b>10-18</b>	<b>&lt;0.3</b>	<b>7.1-7.7</b>
Hill's Prescription Diet u/d Canine	11.2	0.23	7.70
Medi-Cal Reduced Protein	13.7	0.2	na
Medi-Cal Renal LP 11	14.7	0.1	na
Medi-Cal Renal MP 14	18.4	0.1	na
Medi-Cal Vegetarian Formula	20.9	0.4	na
Royal Canin Veterinary Diet Hypoallergenic HP 19	23.1	0.44	na
Royal Canin Veterinary Diet Vegetarian Formula	19.1	0.15	6.78
<b>Moist foods</b>	<b>Protein (%)</b>	<b>Sodium (%)</b>	<b>Urinary pH**</b>
<b>Recommended levels</b>	<b>10-18</b>	<b>&lt;0.3</b>	<b>7.1-7.7</b>
Hill's Prescription Diet u/d Canine	13.3	0.28	7.40
Medi-Cal Reduced Protein	16.5	0.2	na
Medi-Cal Renal LP	16.8	0.1	na
Medi-Cal Renal MP	28.2	0.2	na
Medi-Cal Vegetarian Formula	28.4	0.5	na

Key: na = information not available from the manufacturer.

\*Manufacturers' published values; protein and sodium expressed as % dry matter; when possible chose moist foods.

\*\*Protocols for measuring urinary pH may vary.

# Ürolitiyazisli kedi ve köpekler için diyet gereksinimleri

Kedi aşağı üriner sistem hastalığı	Diyet; İdrar miktarını arttırmalı, düşük magnezyum sağlamalı ve asit İdrar oluşumunu sağlamalıdır.
Köpek ürolitiasis (struvit)	Diyet; protein, magnezyum ve fosfat bakımından düşük, sodyum seviyesi ise yüksek olmalı, İdrar asitleşmelidir.
Amonyum urat	Alkali İdrar oluşumu sağlayan düşük protein (%11 KM) miktarı, alkali İdrar oluşturmak için günde üç kez 5kg canlı ağırlık için 1g sodyum bikarbonat kullanımı gerekebilir, 10 mg/kg miktarında günde üç kez alloprinol.
Sistin	Amonyum urat için gerekli diyet, penicillamine 15 mg/kg günde iki kez.
Oksalat	Amonyum urat için kullanılan diyet ile düşük kalsiyum ve fosfat, hydrochlorthiazine 2-4 mg/kg günde iki kez, potasyum sitrat 100-150 mg/kg/gün.

- **Sodyum**

- Sodyum: İdrar hacmini artırmak
- Fazla sodyum, idrarda kalsiyum atılımını artırır. Özellikle idrar pH'ı yüksekse, kalsiyum oksalat ve kalsiyum fosfat ürolitiazis için bir risk faktörüdür.
- köpeklerde hipertansiyona dikkat.

- **Magnezyum**

- Magnezyum takviyesi kedilerde magnezyum amonyum fosfat ürolit oluşumuna katkıda bulursa da, idrardaki Mg kalsiyum oksalat kristallerinin oluşumunu bozmakta
- Bu nedenle, kalsiyum oksalat ürolitlerinin tekrarını en aza indirmek amacıyla insanlarda Mg ilavesi kullanılmıştır
- Bununla birlikte, magnezyum takviyesi verilen normal köpeklerde idrarda kalsiyum atılımı artmakta.
- Köpek kalsiyum oksalat ürolitlerinin tedavisi için Mg kısıtlaması veya takviyesi önerilmemektedir.
- % 0,04 ila % 0,15 KM aralığı önerilir.
- Sağlıklı yetişkin köpekler için minimum Mg %0,06 KM

- **Askorbik Asit (C Vitamini)**

- Askorbik asit (bir oksalat öncüsü) ilavesinden kaçınılmalı

- **Pridoksin:** Min 1.5 mg/kg KM

- **Vitamin D:** Yüksek düzey risk faktörü. 500-1.500 IU/kg KM

# Canine Urolithiasis

## Prevalence (%)

	1986	1990	1994
✓ Struvite	67.0	57.0	49.5
✓ Calcium oxalate	6.8	19.8	32.7
✓ Urate	5.1	5.5	8.0
✓ Cystine	2.4	1.6	1.0
✓ Calcium phosphate	3.0	1.6	0.6
✓ Mixed/Compound	11.9	12.6	7.4

# Feline Urolithiasis Prevalence (%)

	1986	1990	1996
✓ Struvite	85.0	66.0	36.4
✓ Calcium oxalate	3.0	16.0	53.4
✓ Urate	1.8	6.1	4.9
✓ Cystine	0.0	0.1	0.1
✓ Calcium phosphate	2.0	2.9	0.6
✓ Mixed/compound	5.2	5.9	3.4