

SUMMARY

ROYAL CANIN Veterinary Diet^{TM/MC} canine URINARY SO^{TM/MC} (canned) and URINARY SO 13^{TM/MC} (dry) are complete and balanced diets for adult dogs formulated to aid in the management of canine lower urinary tract disease. These diets have been designed to ensure the production of urine that is undersaturated with respect to struvite and which have a level of calcium oxalate saturation at which spontaneous homogeneous crystallization will not occur.

INDICATIONS

- Dogs with or at risk of developing canine lower urinary tract disease
- Dissolution of struvite uroliths
- Struvite urolithiasis prevention
- Calcium oxalate prevention
- Brushite prevention

CONTRAINDICATIONS

- Growing puppies
- Pregnant or lactating bitches
- Dogs with pancreatitis or hypertriglyceridemia
- Concurrent use of urinary acidifiers

NUTRITIONAL DIFFERENCES

(as compared to typical commercial pet foods)

- Promotes the production of urine undersaturated (RSS < 1.0) for struvite
- Promotes the production of urine metastable (RSS < 12) for calcium oxalate
- Moderate acid load to encourage the production of a urine with pH between 5.5 and 6.0
- Formulated to promote increased urine volume and body water turnover
 - High moisture content in canned format
 - Increased sodium chloride content
- Moderately restricted magnesium levels
- Controlled levels of calcium and oxalate
- Moderately restricted phosphorus and protein content
- Enriched with antioxidants

**CANINE****RATIONALE**

Most veterinary diets for managing lower urinary tract disease in dogs are designed exclusively for managing canine struvite urolithiasis. Canine struvite uroliths are most commonly associated with microbial urease activity due to a concomitant urinary tract infection. Urolith formation relies on a favorable urinary pH (i.e., pH > 6.6). The current recommendation for managing canine struvite urolithiasis, therefore, involves eradicating the underlying urinary tract infection through the use of antibiotics while concurrently feeding a diet designed to maintain slightly acidic urine.

The management of calcium oxalate urolithiasis is far more challenging. In humans, calcium oxalate uroliths can form in urine across the full range of normal pH values (i.e., pH 4.8 to 7.4). Urine pH manipulation cannot be used to reliably manage calcium oxalate urolithiasis, nor is the restriction of dietary calcium and oxalate effective in preventing oxalate urolith formation. The desire to develop diets which effectively manage both struvite and calcium oxalate urolithiasis in pets led Waltham to explore more complex research methods for predicting urolithiasis risk.

The predominant urolith in humans is calcium oxalate. More than 30 years ago, human urologists began looking at ways of predicting the risk of calcium oxalate urolith formation in human patients. The result was the development of a research methodology known as Relative SuperSaturation (RSS). This methodology involves the analysis of 12 constituents of a collected urine sample and determination of urine pH. These data are analyzed using a computer program which calculates the concentrations of the large number of possible interactive complexes between all ions present in urine. Finally, the program calculates the activity product of the urine sample for a given urolith and divides this number by the known constant thermodynamic solubility product for that urolith to determine RSS. If the sample's activity product for a given urolith type is less than the constant, the RSS < 1.0 and the urine is "undersaturated" for that urolith.

Although more complicated than the historical approach of simply assessing urine pH, RSS is a much more powerful tool which is now considered the gold standard for urine assessment in humans. Its value derives from the fact that a single value incorporates all parameters which influence the likelihood of a urolith forming: urine pH, urine dilution, relevant urine constituents, and the possible interactions between them. RSS is a single value which can be used to describe the efficacy of a given diet in managing urolithiasis in pets.

Using RSS to assess the risk of struvite urolith formation in dogs

If a diet has an RSS for struvite of:	The urine produced by dogs fed that diet is:	The risk for struvite formation is:
Less than 1	Undersaturated	<ul style="list-style-type: none"> • New struvite uroliths will not form • Existing struvite uroliths will dissolve
Between 1 and 2.5	Metastable	<ul style="list-style-type: none"> • New struvite uroliths will not form • Any existing struvite uroliths will not dissolve and may grow
Over 2.5	Oversaturated	<ul style="list-style-type: none"> • New struvite uroliths may form • Any existing struvite uroliths will grow

Using RSS to assess the risk of calcium oxalate urolith formation in dogs

If a diet has an RSS for calcium oxalate of:	The urine produced by dogs fed that diet is said to be:	The risk for calcium oxalate formation is:
Less than 1	Undersaturated	<ul style="list-style-type: none"> • New calcium oxalate uroliths will not form • Existing calcium oxalate uroliths will not grow
Between 1 and 12	Metastable	<ul style="list-style-type: none"> • New calcium oxalate uroliths will not form • Any existing calcium oxalate uroliths may grow
Over 12	Oversaturated	<ul style="list-style-type: none"> • New calcium oxalate uroliths may form • Any existing calcium oxalate uroliths will grow



CANINE

The table below provides some important RSS values for struvite and calcium oxalate:

To achieve the following:	Choose a diet which has:	To avoid the risk of alternative urolith, this diet should also have:
Dissolve pure struvite uroliths	RSS for struvite < 1.0	RSS for calcium oxalate < 12
Minimize the risk of struvite uroliths	RSS for struvite < 2.5	RSS for calcium oxalate < 12
Dissolve calcium oxalate uroliths	It is not physiologically possible to dissolve calcium oxalate uroliths. They must be removed surgically.	
Minimize the risk of calcium oxalate uroliths	RSS for calcium oxalate < 12	RSS for struvite < 2.5

Urinary Relative SuperSaturation (RSS) values for struvite and calcium oxalate in dogs fed URINARY SO^{TM/MC} (canned) and URINARY SO 13^{TM/MC} (dry)

	ROYAL CANIN Veterinary Diet ^{TM/MC} canine URINARY SO ^{TM/MC} Canned	ROYAL CANIN Veterinary Diet ^{TM/MC} canine URINARY SO 13 ^{TM/MC} Dry
RSS for struvite	0.134 ± 0.011	Ask your sales representative*
RSS for calcium oxalate	2.37 ± 1.95	Ask your sales representative*

*Not available at time of print.

URINARY SO^{TM/MC} (canned) and URINARY SO 13^{TM/MC} (dry) are the only diets clinically proven to aid in the management of both struvite and calcium oxalate urolithiasis in dogs.

Special Tips:

- URINARY SO^{TM/MC} (canned) and URINARY SO 13^{TM/MC} (dry) are designed to increase water intake in the dog increasing the volume and frequency of urination. It is important to counsel owners to expect changes in drinking and urination behavior and to make sure they understand that these changes are desirable and beneficial for their dog.
- Fresh water should be readily available and owners should be prepared to offer their dog more frequent opportunities to urinate.
- While female dogs typically empty their bladders completely when they urinate, male dogs often urinate small amounts at a time keeping a reservoir available for marking territory. This means that urine can stay in the bladder longer increasing the opportunity for uroliths to form. It may help with male dogs to take them for a walk before going to work or bed allowing them to completely void their bladders.
- URINARY SO^{TM/MC} (canned) and URINARY SO 13^{TM/MC} (dry) are designed to undersaturate the urine for struvite, thereby promoting the dissolution of existing pure struvite uroliths (in conjunction with the administration of antibiotic therapy where appropriate).
- URINARY SO^{TM/MC} (canned) and URINARY SO 13^{TM/MC} (dry) will reduce urinary calcium oxalate RSS values to help reduce the risk of recurrence of calcium oxalate uroliths after existing uroliths have been completely surgically removed.



GENERAL FEEDING RECOMMENDATIONS

- Daily feeding recommendations may be divided into two to four meals.
- Fresh water should be available at all times.
- Individual requirements may vary depending on breed, age, sex, environment, and activity level.
- Mixed feeding of canned and dry products is NOT recommended.

FEEDING GUIDE

FEEDING RECOMMENDATIONS FOR ADULT DOGS

Body Weight		Suggested Caloric Intake kcal/day	Daily Feeding	
lb	kg		Canned Only (cans/day)	Dry Only (8-oz cups/day)
5	2.3	203	1/3	2/3
10	4.5	342	2/3	1 1/4
20	9.1	575	1	2
30	13.6	779	1 1/3	2 2/3
40	18.1	967	1 2/3	3 1/4
50	22.7	1143	2	3 3/4
60	27.2	1311	2 1/4	4 1/2
70	31.8	1471	2 1/2	5
80	36.3	1626	2 3/4	5 1/2
90	40.8	1777	3	6
100	45.4	1923	3 1/3	6 1/2
110	49.9	2065	3 1/2	7
120	54.4	2204	3 3/4	7 1/2
130	59.0	2341	4	8
140	63.5	2475	4 1/3	8 1/3
150	68.0	2606	4 1/2	8 3/4

PRODUCT DESCRIPTION

ROYAL CANIN Veterinary Diet™/MC canine URINARY SO™/MC is designed for the dietary management of canine urolithiasis. It has been formulated to reduce urinary RSS values for struvite, calcium oxalate, and brushite. Reduced RSS values help decrease the risk of urolith formation. The diet has been designed to undersaturate the urine for struvite, thereby, helping to promote dissolution (in conjunction with antibiotic therapy when appropriate).

NUTRITION STATEMENT

Animal feeding tests using AAFCO procedures substantiate that URINARY SO™/MC provides complete and balanced nutrition for the maintenance of adult dogs.



RELATIVE SUPER SATURATION
Relative SuperSaturation (RSS) methodology predicts the crystallization potential of urine. RSS is used to develop diets that control both struvite and calcium oxalate urolithiasis.



URINE DILUTION
Increasing the urine volume reduces the saturation of urine with calcium oxalate and struvite, thereby, preventing the two major types of urolithiasis.



STRUVITE DISSOLUTION
Effectively dissolves pure struvite uroliths.

GUARANTEED ANALYSIS

Crude Protein, (min)	5.3%
Crude Fat, (min)	8.5%
Crude Fiber, (max)	1.5%
Moisture, (max)	78.0%

METABOLIZABLE ENERGY

From Protein	14.2%
From Fat	55.3%
From Carbohydrate	30.5%

Approximately 575 kcal per 13.6 oz (385 g) can (150 kcal per 100 g).

INGREDIENTS

WATER, MEAT BY-PRODUCTS, CORN GRITS, CHICKEN BY-PRODUCTS, ANIMAL FAT (PRESERVED WITH BHA/BHT), TRACE MINERALS (SODIUM TRIPOLYPHOSPHATE, POTASSIUM CHLORIDE, DICALCIUM PHOSPHATE, CALCIUM SULFATE, CALCIUM CARBONATE, MAGNESIUM OXIDE, FERROUS SULFATE, ZINC SULFATE, MANGANESE SULFATE, COPPER SULFATE, CALCIUM IODATE), SALT, POWDERED CELLULOSE, DRIED EGG PRODUCT, VEGETABLE OIL, NATURAL FLAVOR, GUAR GUM, DL-METHIONINE, TAURINE*, CAROB GUM, VITAMINS (DL-ALPHA TOCOPHEROL ACETATE, CHOLINE CHLORIDE, VITAMIN A ACETATE, THIAMINE MONONITRATE [VITAMIN B1], BIOTIN, D-CALCIUM PANTOTHENATE, NIACIN, RIBOFLAVIN SUPPLEMENT [VITAMIN B2], VITAMIN D3 SUPPLEMENT, PYRIDOXINE HYDROCHLORIDE [VITAMIN B6], VITAMIN B12 SUPPLEMENT, FOLIC ACID, SELENIUM), CARRAGEENAN.

*Not recognized as an essential nutrient by the AAFCO Dog Food Nutrient Profiles.



CANINE

TYPICAL ANALYSIS

Nutrient	Unit	Per 100 g as fed	Per 1000 kcal
Moisture	g	66.1	
Protein	g	6.26	41.7
Fat	g	10	66.67
Carbohydrate	g	13.4	89.33
Ash	g	2.59	17.27
Crude Fiber	g	0.83	5.53
Minerals			
Calcium	g	0.33	2.20
Phosphorus	g	0.29	1.93
Sodium	g	0.49	3.27
Chloride	g	0.67	4.47
Potassium	g	0.27	1.80
Magnesium	g	0.021	0.14
Copper	mg	0.53	3.53
Iron	mg	8.13	54.21
Zinc	mg	5.07	33.82
Manganese	mg	3.47	23.13
Iodine	mg	0.147	0.98
Vitamins			
Vitamin A	IU	3300	22000
Vitamin D3	IU	19.4	129.3
Vitamin E	mg	19	127
Thiamine (B1)	mg	1.29	8.60
Riboflavin (B2)	mg	0.4	2.67
Niacin	mg	1.74	11.6
Pyridoxine (B6)	mg	0.26	1.73
Pantothenic Acid	mg	2.12	14.13
Folic Acid	mg	0.511	3.407
Cobalamin (B12)	mg	0.04	0.267
Biotin	mg	0.029	0.193
Choline	mg	52	347
Fatty Acids			
Linoleic acid	g	1.08	7.2
Amino Acids			
Arginine	g	0.22	1.45
Lysine	g	0.21	1.39
Methionine	g	0.24	1.59
Methionine + Cystine	g	0.32	2.10
Taurine	g	0.190	1.267



ORDERING INFORMATION

Can	Weight		Item Code
	oz	g	
24 per case	13.6	385	K60405

PRODUCT DESCRIPTION

ROYAL CANIN Veterinary Diet™^{TM/MC} canine URINARY SO 13™^{TM/MC} is designed for the dietary management of canine urolithiasis. It has been formulated to reduce urinary RSS values for struvite, calcium oxalate, and brushite. Reduced RSS values help decrease the risk of urolith formation. The diet undersaturates the urine for struvite, thereby, helping to promote dissolution of pure struvite uroliths (in conjunction with antibiotic therapy where appropriate).

NUTRITION STATEMENT

URINARY SO 13™^{TM/MC} is intended for intermittent or supplemental feeding only.



RELATIVE SUPER SATURATION
Relative SuperSaturation (RSS) methodology predicts the crystallization potential of urine. RSS is used to develop diets that control both struvite and calcium oxalate urolithiasis.



URINE DILUTION
Increasing the urine volume reduces the saturation of urine with calcium oxalate and struvite, thereby, preventing the two major types of urolithiasis.



STRUVITE DISSOLUTION
Effectively dissolves pure struvite uroliths.



NATURAL PRESERVATIVE
Naturally preserved with mixed tocopherols, rosemary extract, and citric acid.

GUARANTEED ANALYSIS

Crude Protein, (min)	13.2%
Crude Fat, (min)	13.2%
Crude Fiber, (max)	4.5%
Moisture, (max)	10.5%

METABOLIZABLE ENERGY

From Protein	15.3%
From Fat	34.4%
From Carbohydrate	50.4%

Approximately 297 kcal per 8-oz cup; 398 kcal per 100 g; 75 g per 8-oz cup.

INGREDIENTS

RICE, GROUND CORN, CHICKEN FAT, CHICKEN MEAL, CORN GLUTEN MEAL, NATURAL FLAVORS, DRIED EGG POWDER, SODIUM CHLORIDE, CELLULOSE POWDER, POTASSIUM CHLORIDE, DICALCIUM PHOSPHATE, CHOLINE CHLORIDE, CALCIUM CARBONATE, CALCIUM SULFATE, TAURINE*, VITAMINS [DL-ALPHA TOCOPHEROL ACETATE (SOURCE OF VITAMIN E), BIOTIN, D-CALCIUM PANTOTHENATE, NIACIN, PYRIDOXINE HYDROCHLORIDE (VITAMIN B6), VITAMIN A ACETATE, VITAMIN D3 SUPPLEMENT, THIAMINE MONONITRATE (VITAMIN B1), VITAMIN B12 SUPPLEMENT, RIBOFLAVIN (VITAMIN B2), FOLIC ACID], TRACE MINERALS [ZINC OXIDE, FERROUS SULFATE, COPPER SULFATE, MANGANOUS OXIDE, SODIUM SELENITE, CALCIUM IODATE], PRESERVED WITH NATURAL MIXED TOCOPHEROLS, ROSEMARY EXTRACT, AND CITRIC ACID.

*Not recognized as an essential nutrient by the AAFCO Dog Food Nutrient Profiles.



CANINE

TYPICAL ANALYSIS

Nutrient	Unit	Per 100 g as fed	Per 1000 kcal
Moisture	g	9	
Protein	g	15.2	38.2
Fat	g	15.2	38.2
Carbohydrate	g	50.1	125.9
Ash	g	8.0	20.1
Crude Fiber	g	2.5	6.3
Total Dietary Fiber	g	5.5	13.8
Minerals			
Calcium	g	0.9	2.26
Phosphorus	g	0.55	1.38
Sodium	g	1.2	3.02
Chloride	g	2.5	6.28
Potassium	g	0.85	2.14
Magnesium	g	0.06	0.15
Copper	mg	3.2	8.0
Iron	mg	11.5	28.9
Zinc	mg	24.5	61.6
Manganese	mg	7.5	18.8
Iodine	mg	0.49	1.23
Selenium	mg	0.033	0.083
Vitamins			
Vitamin A	IU	1800	4523
Vitamin D3	IU	150	377
Vitamin E	mg	75	188
Thiamine (B1)	mg	0.5	1.3
Riboflavin (B2)	mg	0.4	1.0
Niacin	mg	1.5	3.8
Pyridoxine (B6)	mg	0.9	2.3
Pantothenic Acid	mg	3.5	8.8
Folic Acid	mg	0.9	2.3
Cobalamin (B12)	mg	0.007	0.018
Biotin	mg	0.3	0.75
Choline	mg	400	1005
Fatty Acids			
Linoleic acid	g	3.5	8.8
Arachidonic acid	g	0.06	0.15
Amino Acids			
Arginine	g	0.95	2.4
Lysine	g	0.65	1.6
Methionine	g	0.35	0.9
Methionine + Cystine	g	0.56	1.4
Taurine	g	0.2	0.5



ORDERING INFORMATION

Bag Size	Weight		Item Code
	lb	kg	
Small	n/a	n/a	n/a
Medium	5.5	3.5	26006
Large	16.5	7.49	26017
Extra Large	35	15.89	26035

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