

In this booklet you will find recipes for the prevention of urinary crystals for adult dogs weighing 2.5 kg–40 kg.

You can find recipes for other weight classes (upto 70 kg fully grown) on: [www.futtermedicus.com](http://www.futtermedicus.com)

### If you have any questions

you can reach us at  
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 or +498141/888930.



# Tips

## on feeding dogs with urinary crystals



### Calcium oxalate crystals:

Calcium oxalate crystals are mainly caused by oversaturation of calcium and oxalate acid in the urine. An oversupply of these nutrients and vitamin D should be avoided. Additionally, an acidic pH-level stimulates the development of urinary crystals. Although the crystals cannot be dissolved via diet, the dietary measures serve in favour of the prophylaxis.

### Cystine crystals:

Cystinuria is a genetic condition which affects some dogs: dachshunds, newfoundland dogs and basset hounds, to name a few. A targeted diet can help dissolve existing cystine crystals and prevent their regeneration. Therefore, cystine-rich food such as eggs, soy products, seitan, nuts & seeds as well as high amounts of meat should be avoided. The supply of protein and sodium should be purely as needed.

### INCREASE WATER INTAKE

- add a lot of water to the food: 15 ml of water per kg of body weight a day
- you may flavour the water with either 10 ml of cream, milk, tuna water or yoghurt in 90 ml of water or 1 Tbsp. of liver sausage in 200 ml hot water (puree thoroughly)
- refresh flavoured water at least 3 times a day
- increased water intake leads to increased urine output

### URINE CONTROL

- measure the pH-level of the urine two times a week during the first two weeks of switching up the diet
- the best time to measure is 4 hours after feeding
- measurement strips are available from your veterinarian or at a pharmacy
- desired pH-level with calcium oxalate crystals: 7.0–7.3
- desired pH-level with cystine crystals: > 7.3
- in the 4th and 8th week after starting the diet get the urine checked by your vet
- the urine sample should be examined within 30 minutes of recovery

### BENEFICIAL HINTS

- many short walks or access to a garden will allow frequent urination
- get drug treatment for bacterial urinary tract infections from your vet

### POSSIBLE RISK FACTORS

- incontinence: increased risk of ascending urinary tract infection
- overweight: little exercise leads to rare urination and lingering of the crystals in the urinary bladder

### CHEWS

- suitable: chewing roots made of mediterranean hardwood or coffee tree roots (in case of acceptance problems, flavouring with fried bacon/meat is possible)
- alternatively: beef hooves (reduce quantity if bloating occurs)
- please do not feed dry chews such as pig ears, ox pizzle or rumen in the first 6–8 weeks
- after that it is acceptable, as soon as the urine is free of crystals

### MEAT

- e. g. beef, lamb, chicken, turkey; possibly horse, goat or game
- generally there is a higher risk of infection with raw meat
- low nutrient losses due to cooking or frying
- never feed raw pork meat



### DAIRY PRODUCTS

- e. g. cottage cheese, curd, yoghurt
- contains lactose – too much can lead to diarrhea
- lactose free products may be needed

### CARBOHYDRATES

- easily digestible and well available energy source
- cook until very soft in order for your dog to utilize the starch
- suitable: potatoes & sweet potatoes
- it is acceptable to alternate between the two as long as they are well digested
- alternatively, soak flakes in four times the amount of water before feeding
- approx. 25 – 30 g dry flakes ≈ 100 g cooked (sweet) potatoes
- other carbohydrates are acceptable (individual calculation necessary)



### VEGETABLES

- provide fiber
- crushed, shredded, pureed or cooked for a better nutrient absorbability



- no avocado, garlic, leek or onions (poisonous)

#### Please feed potassium rich varieties:

- appropriate raw varieties: celery, endive, lamb's lettuce, fennel, carrot, butter lettuce, ripe tomatoes, curled lettuce, leaf lettuce
- appropriate cooked varieties: cauliflower, broccoli, celery root, turnip cabbage, pumpkin, parsnip, brussels sprouts, pointed cabbage; varieties rich in calories which may lead to bloating: green peas, chickpeas, lentils, white beans



### OILS

- to cover the essential fatty acids mix 3/4 sunflower, safflower or hemp oil and 1/4 salmon oil

### MINERAL POWDERS VITAMIN OPTIMIX OXALAT & CYSTIN

- do not heat up
- mix thoroughly with food
- during the first 4–5 days mix small portions into the food

### Feeding plan for adult dogs with calcium oxalate crystals supplemented with Vitamin Optimix Oxalat & Cystin (daily amount in gram)

weight (kg)	muscle meat (weighed raw)	(sweet) potatoes (weighed cooked)	potassium rich vegetables	Vitamin Optimix Oxalat & Cystin	oils
2.5	50–60	65–80	20–25	1	1.5–2
5	85–100	110–135	40–50	2	3–4
10	140–170	185–225	65–80	3.5	5–6
15	190–235	250–300	90–110	5	7–8
20	235–290	310–380	110–135	6	8–10
30	320–390	420–515	150–180	8	11–13
40	400–485	520–640	185–225	10	13–17

### Feeding plan for adult dogs with cystine crystals supplemented with Vitamin Optimix Oxalat & Cystin (daily amount in gram)

weight (kg)	muscle meat (weighed raw)	(sweet) potatoes (weighed cooked)	dairy products	potassium rich vegetables	Vitamin Optimix Oxalat & Cystin	oils
2.5	40–50	65–75	15–20	20–25	1	1.5–2
5	65–80	105–130	25–30	40–50	2	3–4
10	100–130	180–220	45–55	65–80	3.5	5–6
15	150–180	245–300	60–75	90–110	5	6–7
20	185–225	300–365	75–90	110–135	6	8–9
30	250–300	410–500	100–125	150–185	8	11–12
40	310–380	510–620	125–155	185–225	10	14–15

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### Struvite crystals:

Struvite crystals often occur in connection with urinary tract infections in dogs. The degradation of the bacteria increasingly shifts the pH-level of the urine into the alkaline region. This increase the formation of struvite crystals. An abundant supply of the main constituents (protein, phosphorus, magnesium) of the struvite crystals can promote their formation and should be reduced as needed in the context of a struvite diet.

### Urate and xanthine crystals:

Due to some dog breeds (e. g. dalmatians) genetic disposition they show a change in purine metabolism, as a result of which more uric acid accumulates that crystallizes in the form of urates. Prevention therefore requires nutrition low in purine. A Leishmania therapy with allopurinol also focuses on a low-purine diet to prevent xanthine crystals from forming.

#### INCREASE WATER INTAKE

- add a lot of water to the food: 15 ml of water per kg of body weight a day
- you may flavour the water with either 10 ml of cream, milk, tuna water or yoghurt in 90 ml of water or 1 Tbsp. of liver sausage in 200 ml hot water (puree thoroughly)
- refresh flavoured water at least 3 times a day
- increased water intake leads to increased urine output

#### URINE CONTROL

- measure the pH-level of the urine two times a week during the first two weeks of switching up the diet
- the best time to measure is 4 hours after feeding
- measurement strips are available from your veterinarian or at a pharmacy
- desired pH-level with **struvite crystals**: 6.5–6.8 during prevention, 6.2–6.5 upon resolution
- desired pH-level with **urate and xanthine crystals**: 6.8–7.2
- in the 4th and 8th week after starting the diet get the urine checked by your vet
- the urine sample should be examined **within 30 minutes of recovery**

#### BENEFICIAL HINTS

- every food intake increases the urine pH-level → feed a maximum of two meals a day, with little to no snacks
- many short walks or access to a garden will allow frequent urination
- get drug treatment for bacterial urinary tract infections from your vet during the resolution phase (bacteria survives within the stones)

#### POSSIBLE RISK FACTORS

- incontinence: increased risk of ascending urinary tract infection
- overweight: little exercise leads to rare urination and lingering of the crystals in the urinary bladder

#### CHEWS

- suitable: chewing roots made of mediterranean hardwood or coffee tree roots (in case of acceptance problems, flavouring with fried bacon/meat is possible)
- alternatively: beef hooves (reduce quantity if bloating occurs)
- please do not feed dry chews such as pig ears, ox pizzle or rumen in the first 6–8 weeks
- after that it is acceptable, as soon as the urine is free of crystals

#### URINE ACIDIFICATION UPON STRUVITE CRYSTALS

- after switching up the diet measure the pH-level of the urine four hours after feeding
- if pH-level > 6.5: add DL-methionine
- suitable for acidification: e.g. Astoral Methio tabs, Urocid paste, FeliGum Struvite Chewdrops
- the amount of DL-methionine depends on the pH-level of the urine
- after the resolution phase stop giving methionine (duration of 4 weeks usually)

#### MINERAL POWDER VITAMIN OPTIMIX STRUVIT & URAT

- do not heat up
- mix thoroughly with food
- in the beginning increase amount during the first 4–5 days

#### OILS

- to cover the essential fatty acids mix 3/4 sunflower, safflower or hemp oil and 1/4 salmon oil

#### MEAT

- e. g. beef, lamb, chicken, turkey; possibly horse, goat or game
- generally there is a higher risk of infection with raw meat
- low nutrient losses due to cooking or frying
- never feed raw pork meat

#### DAIRY PRODUCTS

- e. g. cottage cheese, curd, yoghurt
- contains lactose – too much can lead to diarrhea
- lactose free products may be needed

#### EGGS

- only feed cooked eggs, too many raw egg whites can cause biotin deficiency
- do not feed eggshells as they may result in calcium oversupply

#### VEGETABLES

- provide fiber
- crushed, shredded, pureed or cooked for better nutrient absorbability
- **no** avocado, garlic, leek or onions (poisonous)
- **appropriate raw varieties**: fennel, cucumber, turnip cabbage, carrot, ripe tomatoes, lettuce, zucchini
- **appropriate cooked varieties**: cauliflower, broccoli, chinese cabbage, green beans, pumpkin, red beet, celery, spinach; varieties rich in calories which may lead to bloating: green peas, corn, red/white beans

#### CARBOHYDRATES

- easily digestible and well available energy source
- cook until very soft in order for your dog to utilize the starch
- for **struvite crystals**:
  - suitable: noodles & rice
  - alternatively, soak flakes in three times the amount of water before feeding
  - approx. 35 g of dry flakes ≈ 100 g of cooked rice
  - no potatoes (rich in potassium)
- for **urat and xanthine crystals**:
  - suitable: potatoes & sweet potatoes
  - alternatively, soak flakes in four times the amount of water
  - approx. 25 – 30 g of dry flakes ≈ 100 g of cooked (sweet) potatoes
  - other carbohydrates are acceptable in some cases (individual calculation necessary)

#### Feeding plan for adult dogs to **dissolve struvite crystals** supplemented with Vitamin Optimix Struvit & Urat (daily amount in gram)

weight (kg)	muscle meat (weighed raw)	noodles & rice (weighed cooked)	vegetables	Vitamin Optimix Struvit & Urat	DL-methionine (mg)	oils
2.5	50–60	50–60	25–30	1	200–400	1.5–2
5	80–100	80–100	40–50	2	350–700	3–4
10	140–170	140–170	65–80	3	600–1200	5–6
15	190–230	190–230	90–110	4	800–1600	7–9
20	235–285	235–285	110–135	6	1000–2000	9–10
30	315–385	315–385	150–180	7	1400–2800	11–14
40	390–480	390–480	185–225	9	1700–3400	14–17

#### Feeding plan for adult dogs for the **prevention of struvite crystals** supplemented with Vitamin Optimix Struvit & Urat (daily amount in gram)

weight (kg)	muscle meat (weighed raw)	noodles & rice (weighed cooked)	vegetables	Vitamin Optimix Struvit & Urat	oils
2.5	50–60	50–60	25–30	1	1.5–2
5	80–100	80–100	40–50	2	3–4
10	140–170	140–170	65–80	3	5–6
15	190–230	190–230	90–110	4	7–9
20	235–285	235–285	110–135	6	9–10
30	315–385	315–385	150–180	7	11–14
40	390–480	390–480	185–225	9	14–17

#### Feeding plan for adult dogs with **urat/xanthine crystals** supplemented with Vitamin Optimix Struvit & Urat (daily amount in gram)

weight (kg)	muscle meat (weighed raw)	(sweet) potatoes (weighed cooked)	dairy products	cooked egg, a piece	vegetables	Vitamin Optimix Struvit & Urat	oils
2.5	35–40	40–50	30–35	1/week	25–30	1	2.5–3
5	65–80	60–70	45–55	2/week	40–50	2	4–5
10	95–120	110–135	75–90	1/day	65–80	3.5	6–8
15	130–160	150–180	100–125	1/day	90–110	4.5	9–11
20	160–195	185–230	125–155	1/day	110–135	5.5	11–13
30	220–265	250–310	170–210	1.5/day	150–180	7.5	15–18
40	270–330	315–380	210–260	1.5/day	185–230	9.5	18–23