

Test strips for rapid determination of blood, urobilinogen, bilirubin, protein, nitrite, ketone, glucose, pH value, density and leukocytes in urine of small animals

In General:

The examination of the urine of small animals / pets (dogs, cats, rabbits, guinea pigs etc.) can provide information leading to the diagnosis of disorders and diseases of the urinary tract. Ideally, a urine sample should be obtained through cystocentesis. However, the examination of spontaneous urine is often adequate for an initial diagnosis. First, all urine samples undergo a macroscopic examination. The urine volume, colour, transparency and smell are evaluated:

- **Urine volume:** The normal 24 hour amount for dogs and cats is 20–50 mL/kg, for rabbits 20–350 mL/kg.
- **Colour:** The colour differs depending on the animal. The colour also depends on the urine concentration (urine density).
- **Transparency:** In most cases fresh urine is clear. Turbidity can be caused by the presence of mucous, pus, blood, epithelia or bacteria.
- **Smell:** The smell of fresh urine is specific to each animal race. A sharp ammoniac smell, however, indicates a bacterial infection.

Through the use of Urispec Plus Vet 10 plus the urine status can be evaluated. With the test strip a semi-quantitative determination of blood parameters, urobilinogen, bilirubin, protein, nitrite, ketone, glucose, pH value, density and leukocytes in the urine of small animals is possible. Attention should be paid to the characteristics described in connection with the individual parameters.

Instructions for use:

Dip the test strip into the fresh urine sample for approximately 1 second. Wipe the edge of the strip on the cup or paper towel to remove excess urine. Compare the reaction colour with the colour scale after 30–60 seconds (leukocyte test field after 60–120 seconds). The best reading time is at 30 seconds (leukocytes at 90 seconds). Colour changes which occur after 2 minutes time, are irrelevant and should be ignored. The urine sample should not be older than 2 hours.

Evaluation – Sources of Error:

Blood: The test determines amounts from 5 erythrocytes/ μ L urine, equal to a concentration of approximately 0.015 mg haemoglobin, respectively, myoglobin/dL urine. Intact erythrocytes show up as coloured dots on the test field. The colour comparison fields correspond to the following values:

0 (negative), approx. 5–10, approx. 50, approx. 250 Ery/ μ L, equal to a haemoglobin concentration of approx. 10, approx. 50, approx. 250 Ery/ μ L.

Reference range: All pets are negative.

False positive reactions can occur due to traces of detergents containing peroxide or other interfering compounds.

Urobilinogen: Depending on the natural colour of the urine, concentrations from 0.5 to 1 mg urobilinogen/dL urine can be shown. The colour comparison fields correspond to the following values:

norm. (normal), 2, 4, 8, 12 mg/dL, respectively,
norm. (normal), 35, 70, 140, 200 μ mol/L.

Reference range: All pets negative or slightly positive.

The test is restricted through higher concentrations of formaldehyde. Prolonged exposure of the urine sample to light can cause oxidation resulting in lower or false negative values. Higher or false positive results can be caused by traces of dye or medication. Higher amounts of bilirubin show up yellow on the test field.

Bilirubin: The test determines values from 0.75 mg/dL urine. The colour fields correspond to the following concentrations of bilirubin:

0 (negative), 1(+), 2(++), 4(+++) mg/dL, respectively,
0 (negative), 17(+), 35(++), 70(+++) μ mol/L.

Reference range: Negative for all pets. Exception: In individual cases small amounts of bilirubin can be detected in urine samples from dogs, although there is no indication of illness.

High concentrations of nitrite inhibit the test. Prolonged exposure of the urine sample to light can cause oxidation resulting in lower or false negative values. Excreted traces of dye and medication of red colour can simulate a positive result.

Protein: The test determines values from 10 mg protein/dL urine. The colour fields correspond to the following albumin concentrations:

0 (negative), 30, 100 and 500 mg/dL, respectively,
negative, 0.3, 1.0 and 5.0 g/L.

Reference range: All pets negative.

Nitrite: The test determines values from 0.05 mg nitrite/dL urine. The reaction in the case of pets is not as sensitive as in the case of humans, because an adequate nitrate concentration, as provided by a vegetarian diet, is not always present with a carnivorous diet. Every pink colour change of the test field means that a possible bacterial urinary tract infection should be investigated through further examination (urine sediment, microbiology).

A false positive reaction could occur due to dye excreted in the urine. False negative results can occur during antibiotic therapy.

Ketone: Acetic acid reacts with the test strip more sensitively than acetone. Values from 10 mg/dL acetic acid, respectively, 50 mg/dL acetone are determined. The colour scale shows the following acetic acid concentrations:

0 (negative), 25(+), 100(++) and 300 (+++) mg/dL, respectively,
0 (negative), 2.5(+), 10(++) and 30(+++) mmol/L.

Reference range: All pets negative.

A ketoacidosis can also be caused through β -hydroxy butyrate, which however, is not determined by the test strip. High concentrations of phenyl ketones interfere, altering the colour reaction. Phthalein compounds produce red colour tones on the test field.

Glucose: Pathologic glucose concentrations are shown by a colour change from green to blue-green. Yellow to light green test field reactions should be classified negative (normal). The colour fields correspond to the following glucose concentrations:

neg. (yellow), neg., respectively, normal (yellow-green), 50, 150, 500 and $\geq$ 1000 mg/dL, respectively

neg. (yellow), neg. respectively, normal (yellow-green), 2.8, 8.3, 27.8, and $\geq$ 55.5 mmol/L.

Reference range: All pets negative.

False positive reactions can be caused by traces of detergents containing peroxide or other interfering ingredients.

pH: The pH value of urine can be greatly influenced by nutrition. The urine of vegetarians shows an alkaline pH value, however the urine of carnivores lies in an acid to neutral pH-range.

Reference range: dogs: pH 5.5–7.0; cats: pH 5.0–7.0; rabbits: pH 8.2; guinea pigs: pH 8.0–9.0

Highly alkaline urine (pH > 9) can lead to a false positive reaction on the protein test field.

Density: The test determines the urine density between 1.000 and 1.030.

Reference range: The reference range varies greatly dependent on water intake and output.

The following values were determined in the case of pets:

dogs 1.001–1.065 ; cats 1.001–1.080; rabbits 1.003–1.035; guinea pigs: 1.000–1.040.

The test determines the ionic concentrations in urine. Non-ionic elements such as glucose or urea are not analyzed. Therefore it is recommended that the urine density is checked using a refractometer or a hydrometer.

Leukocytes: The test is based on the determination of esterase, which are found in high concentration in human leukocytes. In order to evaluate the colour reaction of the leukocyte test field (positive or negative), a detailed examination of the urine (e.g. sediment analysis) should have been done to prevent an incorrect positive reaction, for example, in the case of cats' urine. The colour comparison fields correspond to the following leukocyte concentrations:

negative (normal), approx. 25, approx. 75, approx. 500 leukocytes/ μ L.

Reference range: All pets negative.

A weak reaction can be expected in the case of protein excretions of over 500 mg/dL and a glucose concentration over 2 g/dL. Excretion of dyed compounds could cover up the reaction colour.

Remarks:

Individual test strip results can only lead to a definite diagnosis and specific therapy when used in connection with other medical results.

The influence of medication or its metabolites on the test is not known in all cases. Use hygienic containers for the collection of urine samples.

Remove only the required number of test strips. Reseal the container immediately after removing the test strips. Do not touch the reaction zones on the strip! Protect the test strips from sunlight and moisture. Store the container in a cool, dry place (store not over +30 °C). Proper storage ensures that the test strips do not expire before the expiry date printed on the package

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