

## What tells Routine Urine Examination

### Specific gravity

Animals producing large volume of urine have low specific gravity where as very small volume of urine has high specific gravity (animal with oliguric acute intrarenal failure that has a low urine volume and low specific gravity). Fluid therapy, diuretics, glucocorticoids and diet affect urine specific gravity. Sp. gr. is higher in morning samples and was observed to decrease as the age of the animal increased.

### Urine pH

**Acidic urine:** - ingestion of meat, respiratory and metabolic acidosis, severe vomiting, severe diarrhea, starvation, pyrexia, other protein catabolic states and administration of urinary acidifiers.

**Alkaline urine:-** recent meal, ingestion of alkali, UTI with urease-producing bacteria, renal tubular acidosis, diets rich in vegetables and cereals, and metabolic and respiratory alkalosis, urine allowed to stand open to air at room temperature.

### Proteinuria

Trace or 1+ protein level is considered normal with a specific gravity greater than 1.035. Highly alkaline urine (>8) can produce a false positive result. The most common cause of inflammatory proteinuria is urinary tract infection (UTI). If hematuria and pyuria is ruled out, then another urinalysis should be performed to determine the persistent proteinuria. Transient proteinuria is due to strenuous exercise, fever, seizures, and venous congestion of the kidneys and it is insignificant. Persistent proteinuria is usually due to glomerulonephritis or amyloidosis. The urine protein:creatinine ratio helps to determine the magnitude and significance of proteinuria.

### Glucosuria

False negative results come due to large quantity of ascorbic acid, contaminated with H<sub>2</sub>O<sub>2</sub>, Cl, hypochlorite, formaldehyde or fluorides in urine. Cats with cystitis may give a false positive reaction. A positive reaction for glucose in the urine demands test of blood glucose level (marked hyperglycemia is usually due to diabetes mellitus, in cats it may be transient, stress-induced or chronic diseases unrelated to the kidney and administration of glucose-containing fluids). If the blood glucose level is normal, the glucose level in the urine should be re-evaluated. If glucosuria is still present, proximal renal tubular dysfunction may be the cause.

### Ketonuria

Lipolysis, starvation, fasting diabetic ketoacidosis, persistent fever, persistent hypoglycaemia produces ketones. Ketonuria and glucosuria together in same patient strongly indicates diabetes mellitus (blood glucose should be measured). Ketonuria without glucosuria suggests excessive lipid catabolism and but normal patient, is not significant.

### Bilirubinuria

Normal dogs (esp. males) may have small amounts of bilirubin in the urine if the sp. gr. is greater than or equal to 1.030. Normal cats do not have bilirubinuria. This test may give false negative results if urine exposed to air or light for long periods of time or it has a dark colour (hemoglobinuria). The most common causes are hepatic diseases, post hepatic bile duct obstruction, and haemolytic diseases, fever, prolong fasting or starvation. Mild bilirubinuria can possibly result from anorexia, especially in the horse.

### Urobilinogen

The test results are of little significance. A small amount (0.0002 g/L) is normal. **Increased amount:** --Usually spurious, may be seen with haemolytic or hepatobiliary disease, **Decreased amount:**--Spurious, Diurnal variation, bile duct obstruction. **False Negative:** Photodegradation of urobilinogen due to exposure of the urine sample to light, Oxidized by acidic urine to urobilin (green), **Drugs:** Formaldehyde formed from methenamine (hexamine). **False Positive: Drugs:** aminosalicyclic acid, aminobenzoic acid, phenazopyridine and sulphonamides.

### RBCs

Excessive RBCs in urine is called hematuria. Causes of hematuria include cystitis/urethritis (UTI, Idiopathic cystitis, urolithiasis, Cyclophosphamide, Parasites), Urinary tract neoplasia, Genital tract contamination (oestrus, Prostatic disease, uterine disease, vaginal disease and Preputial disease), Renal problems (Nephritis, Nephrosis, Renal infarct, Renal pelvic hematoma, Benign renal hematuria, Renal parasites), Systemic coagulopathy, Strenuous exercise, Trauma etc.

### WBCs

Increased WBCs in the urine sediment is called pyuria and usually indicates urinary tract inflammation or contamination from the genital tract. UTI is the most common cause of pyuria, with calculi and neoplasia being others.