VetScan® Kidney Profile Plus

CE

For Veterinary use only
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1. Intended Use

The VetScan® Kidney Profile Plus reagent rotor used with the VetScan VS2 Chemistry Analyzer utilizes dry and liquid reagents to provide veterinary *in vitro* quantitative determination of albumin (ALB), calcium (CA^{++}), chloride (CL^{-}), creatinine (CRE), glucose (GLU), phosphorous (PHOS), potassium (K^{+}), sodium (NA^{+}), total carbon dioxide (tCO2), and urea nitrogen (BUN) in heparinized whole blood, heparinized plasma, or serum.

2. Summary and Explanation of Tests

The VetScan Kidney Profile Plus Reagent Rotor and the VetScan VS2 Chemistry Analyzer comprise an *in vitro* diagnostic system that aids the veterinarian in diagnosing the following disorders:

Albumin	Liver and kidney diseases.
Calcium	Parathyroid, bone and chronic renal disease; tetany.
Chloride	Chronic diarrhea, chronic vomiting, renal disease, parathyroid disease, chronic respiratory acidosis or alkalosis, hyperadrenocorticism, hypoadrenocorticism, and thiazide therapy.
Creatinine	Renal disease.
Glucose	Diabetes**,** hyperglycemia, hypoglycemia and liver disease.
Phosphorus	Kidney disease, hypoparathyroidism and nutritional disorders.
Potassium	Malnutrition and renal disease. This electrolyte is used to diagnose the causes of vomiting, diarrhea and cardiac symptoms.
Sodium	Dehydration, and diabetes. This electrolyte is used to diagnose the causes of vomiting, diarrhea and cardiac symptoms.
Total Carbon Dioxide	Primary metabolic alkalosis and acidosis, and primary respiratory alkalosis and acidosis.
Urea Nitrogen	Liver and kidney diseases.

As with any diagnostic test procedure, all other test procedures including the clinical status of the patient, should be considered prior to final diagnosis.

3. Principle of Procedure

Albumin
Dye binding techniques are the most frequently used methods for measuring albumin. Bromcresol green (BCG) is the most commonly used of the dye binding methods.[1]

$$\text{BCG + Albumin} \xrightarrow[\text{Acid pH}]{\text{Surfactants}} \text{BCG-Albumin Complex}$$

Bound albumin is proportional to the concentration of albumin in the sample. This is an endpoint reaction that is measured bichromatically at 630 nm and 405 nm.

Total Calcium

The reference method for calcium is atomic absorption spectroscopy; however, this method is not suited for routine use.[2] Spectrophotometric methods using either *o*-cresolphthalein complexone (CPC) or arsenazo III metallochromic indicators are most commonly used.[3,4,5] Arsenazo III has a high affinity for calcium and is not as temperature dependent as CPC.

Calcium in the patient sample binds with arsenazo III to form a calcium-dye complex.

$$Ca^{2+} + \text{Arsenazo III} \longrightarrow Ca^{2+}\text{-Arsenazo III Complex}$$

The endpoint reaction is monitored at 405 nm, 467 nm and 600 nm. The amount of calcium in the sample is proportional to the absorbance.

Chloride (Cl^-)

The method is based on the determination of chloride-dependent activation of α-amylase activity. Deactivated α-amylase is reactivated by addition of the chloride ion, allowing the calcium to re-associate with the enzyme. The reactivation of α-amylase activity is proportional to the concentration of chloride ions in the sample. The reactivated α-amylase converts the substrate, 2-chloro-*p*-nitrophenyl-α-D-maltotrioside (CNPG3) to 2-chloro-*p*-nitrophenol (CNP) producing color and α-maltotriose (G3). The reaction is measured bichromatically and the increase in absorbance is directly proportional to the reactivated α-amylase activity and the concentration of chloride ion in the sample.[6]

$$\text{CNPG3} \xrightarrow[Cl^-,\ Ca^{2+}]{\alpha\text{-Amylase}} \text{CNP + G3}$$

Creatinine (CRE)

The Jaffe method, first introduced in 1886, is still a commonly used method of determining creatinine levels in blood. The current reference method combines the use of Fuller's earth (floridin) with the Jaffe technique to increase the specificity of the reaction.[7, 8] Enzymatic methods have been developed that are more specific for creatinine than the various modifications of the Jaffe technique.[9, 10, 11] Methods using the enzyme creatinine amidohydrolase eliminate the problem of ammonium ion interference found in techniques using creatinine iminohydrolase.[12]

$$\text{Creatinine} + H_2O \xrightarrow{\text{Creatinine Amidohydrolase}} \text{Creatine}$$

$$\text{Creatine} + H_2O \xrightarrow{\text{Creatine Amidinohydrolase}} \text{Sarcosine + Urea}$$

$$\text{Sarcosine} + H_2O + O_2 \xrightarrow{\text{Sarcosine Oxidase}} \text{Glycine + Formaldehyde} + H_2O_2$$

$$H_2O_2 + \text{TBHBA + 4-AAP} \xrightarrow{\text{Peroxidase}} \text{Red Quinoneimine Dye} + H_2O$$

Two cuvettes are used to determine the concentration of creatinine in the sample. Endogenous creatine is measured in the blank cuvette, which is subtracted from the combined endogenous creatine and the creatine formed from the enzyme reactions in the test cuvette. Once the endogenous creatine is eliminated from the calculations, the concentration of creatinine is proportional to the intensity of the red color produced. The endpoint reaction is measured as the difference in absorbance between 550 nm and 600 nm.

Glucose (GLU)

Measurements of glucose concentration were first performed using copper-reduction methods (such as Folin-Wu[13] and Somogyi-Nelson[14, 15]). The lack of specificity in copper-reduction techniques led to the development of quantitative procedures using the

enzymes hexokinase and glucose oxidase. The Abaxis glucose is a modified version of the hexokinase method, which has been proposed as the basis of the glucose reference method.[16]

The reaction of glucose with adenosine triphosphate (ATP), catalyzed by hexokinase (HK), produces glucose-6-phosphate (G-6-P) and adenosine diphosphate (ADP). Glucose-6-phosphate dehydrogenase (G-6-PDH) catalyzes the reaction of G-6-P into 6-phosphogluconate and the reduction of nicotinamide adenine dinucleotide (NAD^+) to NADH.

$$\text{Glucose + ATP} \xrightarrow[Mg^{2+}]{HK} \text{G-6-P + ADP}$$

$$\text{G-6-P + } NAD^+ \xrightarrow{\text{G-6-PDH}} \text{6-Phosphogluconate + NADH + } H^+$$

Phosphorus

The Abaxis phosphorus method uses sucrose phosphorylase (SP) coupled with the phosphoglucomutase (PGM) and glucose-6-phosphate dehydrogenase (G-6-PDH) reactions.[17,18] Using the enzymatic system, for each mole of inorganic phosphorus present in the sample, one mole of NADH is formed. The amount of NADH formed is measured as an endpoint at 340 nm.

$$\text{Sucrose + } P_i \xrightarrow{SP} \text{Glucose-1-Phoshpate (G-1-P) + Fructose}$$

$$\text{G-1-P} \xrightarrow{PGM,\ Mg^{2+}} \text{Glucose-6-Phosphate}$$

$$\text{Glucose-6-Phosphate + } NAD^+ \xrightarrow{\text{G-6-PDH}} \text{NADH + 6-Phosphogluconate + } H^+$$

Potassium (K^+)

Spectrophotometric methods have been developed that allow the measurement of potassium concentration on standard clinical chemistry instrumentation. The Abaxis enzymatic method is based on the activation of pyruvate kinase with potassium shows excellent linearity and negligible susceptibility to endogenous substances.[19, 20, 21] Interference from sodium and ammonium ion are minimized with the addition of Kryptofix and glutamate dehydrogenase respectively.[19]

In the coupled-enzyme reaction, pyruvate kinase (PK) dephoshorylates phosphoenolpyruvate (PEP) to form pyruvate. Lactate dehydrogenase (LDH) catalyzes conversion of pyruvate to lactate. Concomitantly, NADH is oxidized to NAD^+. The rate of change in absorbance between 340 nm and 405 nm is due to the conversion of NADH to NAD^+, which is directly proportional to the amount of potassium in the sample.

$$\text{ADP + PEP} \xrightarrow{K^+,\ PK} \text{Pyruvate + ATP}$$

$$\text{Pyruvate + NADH + } H^+ \xrightarrow{LDH} \text{Lactate + } NAD^+$$

Sodium (Na^+)

Colorimetric and enzymatic methods have been developed that allow the measurement of sodium concentration on standard clinical chemistry instrumentation. [22, 23, 24] In the Abaxis enzymatic reaction, β-galactosidase is activated by the sodium in the sample. The activated enzyme catalyzes the reaction of o-nitrophenyl-β-D-galactopyranoside (ONPG) to o-nitrophenol and galactose. The reaction rate between 405 nm and 500 nm is proportional to sodium concentration.

$$\text{ONPG + } H_2O \xrightarrow[\beta\text{-Galactosidase}]{Na^+} \text{o-Nitrophenol + Galactose}$$

Total Carbon Dioxide (tCO_2)
Total carbon dioxide in serum or plasma exists as dissolved carbon dioxide, carbamino derivatives of proteins, bicarbonate and carbonate ions and carbonic acid. Total carbon dioxide can be measured by pH indicator, CO_2 electrode and spectrophotometric enzymatic methods, which all produce accurate and precise results.[25, 26] The enzymatic method is well suited for use on a routine blood chemistry analyzer without adding complexity.

In the enzymatic method, the specimen is first made alkaline to convert all forms of carbon dioxide (CO_2) toward bicarbonate (HCO_3^-). Phosphoenolpyruvate (PEP) and HCO_3^- then react to form oxaloacetate and phosphate in the presence of phosphoenolpyruvate carboxylase (PEPC). Malate dehydrogenase (MDH) catalyzes the reaction of oxaloacetate and reduced nicotinamide adenine dinucleotide (NADH) to NAD^+ and malate. The rate of change in absorbance due to the conversion of NADH to NAD^+ is directly proportional to the amount of tCO_2 in the sample.

$$PEP + HCO_3 \xrightarrow{PEPC} Oxaloacetate + Phosphate$$

$$Oxaloacetate + NADH + H^+ \xrightarrow{MDH} NAD^+ + Malate$$

Urea Nitrogen (BUN)
A coupled-enzymatic reaction is used by the Abaxis system. In this reaction, urease hydrolyzes urea into ammonia and carbon dioxide.[27] Upon combining ammonia with 2-oxoglutarate and reduced nicotinamide adenine dinucleotide (NADH), the enzyme glutamate dehydrogenase (GLDH) oxidizes NADH to NAD^+.

$$Urea + H_2O \xrightarrow{Urease} 2NH_3 + CO_2$$

$$NH_3 + NADH + H^+ + 2\text{-}Oxoglutarate \xrightarrow{GLDH} L\text{-}Glutamate + H_2O + NAD^+$$

The rate of change of the absorbance difference between 340 nm and 405 nm is caused by the conversion of NADH to NAD^+ and is directly proportional to the amount of urea present in the sample.

4. Principle of Operation

See the VetScan VS2 Chemistry Analyzer Operator's Manual, for the Principles and Limitations of the Procedure.

5. Description of Reagents

Reagents
Each VetScan Kidney Profile Plus Reagent Rotor contains dry test-specific reagent beads (described below). A dry sample blank reagent (comprised of buffer, surfactants, excipients, and preservatives) is included in each reagent rotor for use in calculating concentrations of albumin (ALB), calcium (CA^{++}), chloride (CL^-), glucose (GLU), phosphorus (PHOS), potassium (K^+), sodium (NA^+), total carbon dioxide (tCO2), and urea nitrogen (BUN). Dedicated sample blanks are included in the rotor to calculate the concentration of creatinine (CRE). Each reagent rotor also contains a diluent consisting of surfactants and preservatives.

Warnings and Precautions

- For Veterinary *In vitro* Diagnostic Use
- The diluent container in the reagent rotor is automatically opened when the analyzer drawer closes. A rotor with an opened diluent container cannot be re-used. Ensure that the sample or control has been placed into the rotor before closing the drawer.
- Reagent beads may contain acids or caustic substances. The operator does not come into contact with the reagent beads when following the recommended procedures. In the event that the beads are handled (e.g., cleaning up after dropping and cracking a reagent rotor), avoid ingestion, skin contact, or inhalation of the reagent beads.
- Some Reagent beads contain sodium azide, which may react with lead and copper plumbing to form highly explosive metal azides. Reagents will not come into contact with lead and copper plumbing when following recommended procedures.

However, if the reagents do come into contact with such plumbing, flush with a large volume of water to prevent azide buildup.

Instructions for Reagent Handling
Reagent rotors may be used directly from the refrigerator without warming. Open the sealed foil pouch and remove the rotor being careful not to touch the bar code ring located on the top of the reagent rotor. Use according to the instructions provided in the VetScan VS2 Operator's Manual. A rotor not used within 20 minutes of opening the pouch should be discarded. Rotors in opened pouches can not be placed back in the refrigerator for use at a later time.

Storage
Store reagent rotors in their sealed pouches at 2-8˚C (36-46˚F). Do not expose opened or unopened rotors to direct sunlight or temperatures above 32˚C (90˚F). Do not allow the rotors sealed in their foil pouches to remain at room temperature longer than 48 hours prior to use. Open the pouch and remove the rotor just prior to use.

Indications of Reagent Rotor Instability/Deterioration.
- All reagents contained in the reagent rotor, when stored as described above, are stable until the expiration date printed on the rotor pouch. Do **not** use a rotor after the expiration date. The expiration date is also encoded in the bar code printed on the bar code ring. An error message will appear on the VetScan VS2 Chemistry Analyzer display if the reagents have expired.

- A torn or otherwise damaged pouch may allow moisture to reach the unused rotor and adversely affect reagent performance. Do not use a rotor from a damaged pouch.

6. Instrument

See the VetScan VS2 Chemistry Analyzer Operator's Manual for complete information on use of the analyzer.

7. Sample Collection and Preparation

The minimum required sample size is ~100 µL of heparinized whole blood, heparinized plasma, serum or control. The reagent rotor sample chamber can contain up to 120 µL of sample.

- Specimens collected in a heparinized micropipette should be dispensed into the reagent rotor **immediately** following sample collection.

- Use only lithium heparin (green stopper) evacuated specimen collection tubes for whole blood or plasma samples. Use no-additive (red stopper) evacuated specimen collection tubes or serum separator tubes (red or red/black stopper) for serum samples.

- Whole blood samples obtained by venipuncture must be homogeneous before transferring a sample to the reagent rotor. Gently invert the collection tube several times just prior to sample transfer. Do not shake the collection tube; shaking may cause hemolysis.

- The test must be started within 10 minutes of transferring the sample into the reagent rotor.

- Whole blood venipuncture samples should be run within 60 minutes of collection; if this is not possible, separate the sample and transfer it into a clean test tube.[28] Run the separated plasma or serum sample within 5 hours of centrifugation. If this is not possible, refrigerate the sample in a stoppered test tube at 2-8°C (36-46°F) for no longer than 48 hours. A plasma or serum sample can be stored at -10°C (14°F) for up to 5 weeks in a freezer that does not have a self-defrost cycle.

- Glucose concentration decreases approximately 5-12 mg/dL in 1 hour in uncentrifuged samples stored at room temperature.[29]

- Refrigerating whole blood samples can cause significant changes in concentrations of **creatinine** and **glucose**.[30]

- Samples with amylase concentrations >4000 U/L will give falsely high chloride readings.

- The concentration of total carbon dioxide is most accurately determined when the assay is done immediately after opening the tube and as promptly as possible after collection and processing of the blood in the unopened tube. Ambient air contains far less carbon dioxide than does plasma, and gaseous dissolved carbon dioxide will escape from the specimen into the air, with a consequent decrease in carbon dioxide value of up to 6 mmol/L in the course of 1 hour.[31]

Known Interfering Substances

- The only anticoagulant recommended for use with the VetScan VS2 Chemistry Analyzer is lithium heparin. Sodium heparin must not be used when collecting blood samples for use with this panel. Abaxis has performed studies demonstrating that EDTA, fluoride, oxalate, and any anticoagulant containing ammonium ions will interfere with at least one chemistry in the VetScan Kidney Profile Plus reagent rotor.

- Physical interferents (hemolysis, icterus, and lipemia) may cause changes in the reported concentrations of some analytes. The sample indices are printed on the bottom of each result card to inform the operator about the levels of interferents present in each sample. The VetScan VS2 Chemistry Analyzer suppresses any results that are affected by >10% interference from hemolysis, lipemia, or icterus. "HEM", "LIP", "ICT" is printed on the result card in place of the result.

- Hemolysis may cause erroneously high results in potassium assays. This problem may go undetected when analyzing whole blood (release of potassium from as few as 0.5% of the erythrocytes can increase the potassium serum level by 0.5 mmol/L). In particular, even unhemolyzed specimens that are not promptly processed may have increased potassium levels due to intracellular potassium leakage.[32]

- Glucose concentrations are affected by the length of time since the patient has eaten and by the type of sample collected from the patient. To accurately interpret glucose results, samples should be obtained from a patient that has been fasted for at least 12 hours.[33]

- The potassium assay in the VetScan VS2 system is a coupled pyruvate kinase (PK) / lactate dehydrogenase (LDH) assay. Therefore, in cases of extreme muscle trauma or highly elevated levels of creatine kinase (CK), the VetScan may recover a falsely elevated potassium (K+) value. In such cases, unexpected high potassium recoveries need to be confirmed utilizing a different methodology

8. Procedure

Materials Provided

- One VetScan Kidney Profile Plus Reagent Rotor

Materials Required but not Provided

- VetScan VS2 Chemistry Analyzer

Test Parameters

The VetScan VS2 Chemistry Analyzer operates at ambient temperatures between 15°C and 32°C (59-90°F). The analysis time for each VetScan Kidney Profile Plus Reagent Rotor is less than 14 minutes. The analyzer maintains the reagent rotor at a temperature of 37°C (98.6°F) over the measurement interval.

Test Procedure

The complete sample collection and step-by-step operating procedures are detailed in the VetScan VS2 Chemistry Analyzer Operator's Manual.

Calibration

The VetScan VS2 Chemistry Analyzer is calibrated by the manufacturer before shipment. The barcode printed on the barcode ring provides the analyzer with rotor-specific calibration data. Please see the VetScan VS2 Chemistry Analyzer Operator's Manual.

Quality Control

Controls may be run periodically on the VetScan VS2 Chemistry Analyzer to verify the accuracy of the analyzer. Abaxis recommends that a serum-based commercially available control be run. Run controls on the reagent rotor in the same manner as for patient samples. See the VetScan VS2 Operator's Manual to run controls.

9. Results

The VetScan VS2 Chemistry Analyzer automatically calculates and prints the analyte concentrations in the sample. Details of the endpoint and rate reaction calculations are found in the VetScan VS2 Chemistry Analyzer Operator's Manual.

10. Limitations of Procedure

General procedural limitations are discussed in the VetScan VS2 Chemistry Analyzer Operator's Manual.

- **If a result for a particular test exceeds the assay range, the sample should be analyzed by another approved test method or sent to a referral laboratory.**

- Samples with hematocrits in excess of 60% packed red cell volume may give inaccurate results. Samples with high hematocrits may be reported as hemolyzed. These samples may be spun down to get plasma then re-run in a new reagent rotor.

Warning: Extensive testing of the VetScan VS2 Chemistry System has shown that in very rare instances, sample dispensed into the reagent rotor may not flow smoothly into the sample chamber. Due to the uneven flow, an inadequate quantity of sample may be analyzed and several results may fall outside the reference ranges. The sample may be re-run using a new reagent rotor.

11. Expected Values

These normal intervals are provided only as a guideline. The most definitive reference intervals are those established for your patient population. Test results should be interpreted in conjunction with the patient's clinical signs. To customize specific normal ranges in your VetScan VS2 Chemistry Analyzer for the "Other" bank, refer to your VetScan VS2 Operator's Manual under the Menu Key functions.

Table 1: VetScan Reference Intervals

Analyte	Canine	Feline	Equine
Albumin (ALB)	2.5 – 4.4 g/dL (25–44 g/L)	2.2 – 4.4 g/dL (22–44 g/L)	2.2 – 3.7 g/dL (22–37 g/L)
Calcium (CA++)	8.6 – 11.8 mg/dL (2.2–3.0 mmol/L)	8.0 – 11.8 mg/dL (2.0–3.0 mmol/L)	11.5 – 14.2 mg/dL (2.9–3.6 mmol/L)
Chloride (CL^-)	106 – 120 mmol /L	112 – 126 mmol /L*	92 – 104 mmol /L
Creatinine (CRE)	0.3 – 1.4 mg/dL (27–124 µmol/L)	0.3 – 2.1 mg/dL (27–186 µmol/L)	0.6 - 2.2 mg/dL (53-194 µmol/L)
Glucose (GLU)	60 – 110 mg/dL (3.3–6.1 mmol/L)	70 – 150 mg/dL (3.9–8.3 mmol/L)	65 – 110 mg/dL (3.6–6.1 mmol/L)
Phosphorous (PHOS)	2.9 – 6.6 mg/dL (0.94–2.13 mmol/L)	3.4 – 8.5 mg/dL (1.10–2.74 mmol/L)	1.9 – 4.3 mg/dL (0.61–1.39 mmol/L)
Potassium (K^+)	3.7 – 5.8 mmol/L	3.7 – 5.8 mmol/L	2.5 – 5.2 mmol/L
Sodium (Na^+)	138 – 160 mmol/L	142 – 164 mmol/L	126 – 146 mmol/L
Total Carbon Dioxide (tCO_2)	12 – 27 mmol/L	15 – 24 mmol/L	20 – 33 mmol/L
Urea Nitrogen (BUN)	7 – 25 mg/dL (2.0–9.0 mmol/urea/L)	10 – 30 mg/dL (4.0–11.0 mmol/urea/L)	7 – 25 mg/dL (2.0–9.0 mmol/urea/L)

**Feline reference interval is for adult cats only; kittens (cats younger than 6 months) may have lower chloride levels.*

12. Performance Characteristics (Linearity)

The chemistry for each analyte is linear over the dynamic range listed below when the VetScan VS2 System is operated according to the recommended procedure (see the VetScan VS2 Operator's Manual). The Dynamic Range table referenced below represents the spectrum that the VetScan VS2 System can detect. **The intervals below do not represent normal ranges**.

Table 2: VetScan Dynamic Ranges

Analyte	Common Units	SI Units
Albumin	1 – 6.5 g/dL	10 – 65 g/L
Calcium	4 – 16 mg/dL	1.0 – 4.0 mmol/L
Chloride	80 – 135 mmol/L	80 – 135 mmol/L
Glucose	10 – 700 mg/dL	0.56 – 38.9 mmol/L
Creatinine	0.2 – 20 mg/dL	18 – 1768 µmol/L

Table 2: VetScan Dynamic Ranges (continued)

Phosphorous	0 – 20 mg/dL	0 – 6.46 mmol/L
Potassium	1.5 – 8.5 mmol/L	1.5 – 8.5 mmol/L
Sodium	110 – 170 mmol/L	110 – 170 mmol/L
Total Carbon Dioxide	5 – 40 mmol/L	5 – 40 mmol/L
Urea Nitrogen	2 – 180 mg/dL	0.7 – 64.3 mmol/urea/L

Precision

Precision studies were conducted using NCCLS (CLSI) EP5-A and CLSI EP5-A2 guidelines[34, 35] with modifications based on NCCLS (CLSI) EP18-P and CLSI EP18-A2[36, 37] for unit-use devices. Results for within-run and total precision were determined by testing bi-level controls.

Table 3: Precision

Analyte	Sample Size	Within-Run	Total
Albumin-BCG (g/dL)	n=80		
Control 1			
Mean		3.9	3.9
SD		0.13	0.14
%CV		3.3	3.6
Control 2			
Mean		2.3	2.3
SD		0.09	0.10
%CV		3.9	4.3
Calcium (mg/dL)	n=80		
Control 1			
Mean		8.6	8.6
SD		0.21	0.25
%CV		2.4	2.9
Control 2			
Mean		11.8	11.8
SD		0.39	0.40
%CV		3.3	3.4
Chloride (mmol/L)			
Control 1	N = 160		
Mean		97.8	97.8
SD		1.63	1.74
%CV		1.7	1.7
Control 2			
Mean		113.6	113.6
SD		1.97	2.22
%CV		1.7	2.0
Creatinine (mg/dL)			
Control 1	N=80		
Mean		1.1	1.1
SD		0.14	0.14
%CV		12.7	12.7
Control 2			
Mean		5.2	5.2
SD		0.23	0.27
%CV		4.4	5.2

Table 3: Precision (continued)

Analyte	Sample Size	Within-Run	Total
Glucose (mg/dL)			
Control 1	N=80		
Mean		66	66
SD		0.76	1.03
%CV		1.2	1.6
Control 2			
Mean		278	278
SD		2.47	3.84
%CV		0.9	1.4
Phosphorus (mg/dL)	n=80		
Control 1			
Mean		6.9	6.9
SD		0.2	0.2
%CV		2.2	2.6
Control 2			
Mean		3.4	3.4
SD		0.1	0.2
%CV		4.1	4.9
Potassium (mmol/L)			
Control 1	N = 80		
Mean		6.7	6.7
SD		0.26	0.26
%CV		3.9	3.9
Control 2			
Mean		4.3	4.3
SD		0.22	0.22
%CV		5.1	5.1
Sodium (mmol/L)			
Control 1	N = 80		
Mean		148	148
SD		5.1	5.1
%CV		3.4	3.4
Control 2			
Mean		118	118
SD		3.2	3.2
%CV		2.7	2.7
Total Carbon Dioxide (mmol/L)			
Control 1	N = 80		
Mean		19	19
SD		1.39	1.39
%CV		7.3	7.3
Control 2			
Mean		9	9
SD		0.60	0.60
%CV		6.8	6.8
Urea Nitrogen (mg/dL)			
Control 1	N = 80		
Mean		19	19
SD		0.35	0.40
%CV		1.8	2.1

Table 3: Precision (continued)

Analyte	Sample Size	Within-Run	Total
Urea Nitrogen (mg/dL)			
Control 2			
Mean		65	65
SD		1.06	1.18
%CV		1.6	1.8

Correlation

Field studies were conducted at a veterinary teaching hospital. Serum samples were analyzed by the VetScan VS2 Chemistry Analyzer and a comparative method. Representative correlation statistics are shown in Table 4.

Table 4: Correlation of the VetScan VS2 Chemistry Analyzer with Comparative Method(s)

		Correlation Coefficient	Slope	Intercept	N	Sample Range
Albumin (g/dL)	Canine	0.96	0.99	0.1	22-180	1.3-4.6
	Feline	0.75	1.02	0	21-55	2.1-4.8
	Equine	0.89	0.99	-0.6	7-101	1.2-3.2
Calcium (mg/dL)	Canine	0.84	1.24	-1.9	22-180	7.3-13.0
	Feline	0.77	1.24	-2.1	21-55	6.3-12.4
	Equine	0.94	1.18	-0.8	7-101	7.2-15.1
Chloride (mmol/L)	Canine	0.935	0.875	15	38	78 – 132
	Feline	0.979	0.882	12	20	86 – 123
	Equine	NA	NA	NA	NA	NA
Creatinine (mg/dL)	Canine	0.99	1.00	0.0	22 – 180	0.6 – 10.6
	Feline	1.00	1.01	-0.1	21 – 55	0.3 – 13.6
	Equine	0.95	1.00	-0.4	7 – 101	0.3 – 6.2
Glucose (mg/dL)	Canine	0.96	1.01	-6	22 – 180	28 – 348
	Feline	1.00	0.97	3	21 – 55	52 – 607
	Equine	0.97	0.94	16	7 – 101	36 – 353
Phosphorous (mg/dL)	Canine	0.994	1.09	-0.19	22-180	0.8-87
	Feline	0.916	0.80	0.81	21-55	2.4-6.9
	Equine	0.971	0.991	-0.06	7-101	0.8-7.8
Potassium (mmol/L)	Canine	0.96	0.92	0.4	22 – 180	3.2 – 6.9
	Feline	0.91	0.92	0.5	21 – 55	2.7 – 5.3
	Equine	0.84	0.97	0.1	7 – 101	1.8 – 4.6
Sodium (mmol/L)	Canine	0.89	0.97	4.8	22 – 180	118 – 183
	Feline	0.86	1.08	-12.2	21 – 55	122 – 166
	Equine	0.86	1.00	-0.01	7 – 101	110 – 166
Total Carbon Dioxide (mmol/L)	Canine	0.81	0.86	3.5	22 – 180	6 – 23
	Feline	0.93	0.90	2.4	21 – 55	7 – 31
	Equine	0.97	0.93	2.1	7 – 101	9 – 39
Urea Nitrogen (mg/dL)	Canine	1.00	0.98	-2	22 – 180	4 – 117
	Feline	1.00	1.07	-5	21 – 55	14 – 165
	Equine	1.00	0.95	-1	7 – 101	3 – 64

13. Bibliography

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