

Correlation Study

30 Biochemical Indicators of InSight V-CHEM's Panels

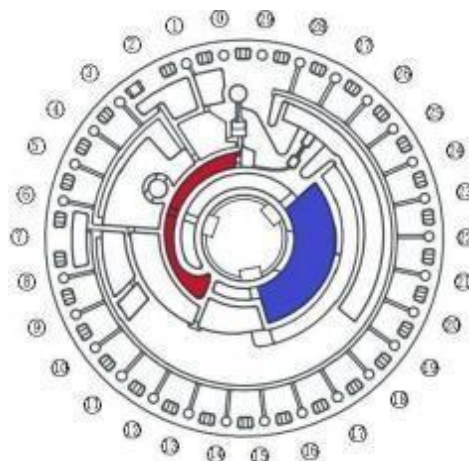
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1. Clinical evaluation purposes

This clinical evaluation trial is to compare the accuracy of 30 biochemical parameters of InSight V-CHEM's Panels to other analysers in the veterinary market.

2. Product introduction



Each independently packaged reagent disc is formed by injection moulding a transparent material, a freeze-dried spherical biochemical detection reagent is arranged in the outer peripheral small hole, and the small hole is equivalent to a colorimetric device of a conventional biochemical analyser when the optical detection is performed. All blood separation, the mixing of the sample with the diluent and the biochemical reaction were performed on the reagent disc.

There is a device on the disc to separate the whole blood, so the sample can use serum, plasma or anticoagulant whole blood. The disc can accurately quantify the samples and diluents, and the quantitative samples and diluents can be mixed in the mixing tank. Under the action of centrifugal force and capillary force, the sample will be filled to the outer cuvettes of the disc, and the cuvettes will be detected optically after the reaction is completed.

The Chem 24 Panel, General Health Panel, General Health Plus Panel, Preanaesthetic Panel, Preanaesthetic Plus Panel, Liver & Renal Panel, Electrolytes Panel, Critical Care Panel, Avian & Reptile Panel, Large Animal Panel, Equine Panel, Diabetes Panel and Quad Test Panel are used to quantitatively test the concentration of the thirty biochemical indicators in the sample, which is based on the spectrophotometry. The principles are as follows:

a) Total Protein (TP)

The total protein method is a Biuret reaction, the protein solution is treated with cupric [Cu(II)] ions in a strong alkaline medium. The Cu(II) ions react with peptide bonds between the Carbonyl oxygen and amide nitrogen atoms to form a coloured Cu-protein complex.

The amount of total protein present in the sample is directly proportional to the absorbance of the Cu-protein complex. The total protein test is an endpoint reaction and the absorbance is measured as the difference in absorbance between 546 nm and 800 nm.



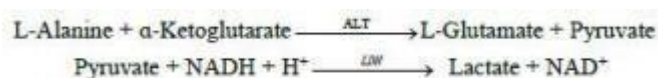
b) Total Bilirubin (TBIL)

In the enzyme procedure, bilirubin is oxidised by bilirubin oxidase (BOD) into biliverdin. Bilirubin is quantitated as the difference in absorbance between 450nm and 546 nm. The initial absorbance of this endpoint reaction is determined from the bilirubin blank cuvette and the final absorbance is obtained from the bilirubin test cuvette. The amount of bilirubin in the sample is proportional to the difference between the initial and final absorbance measurements.



c) Alanine Aminotransferase (ALT)

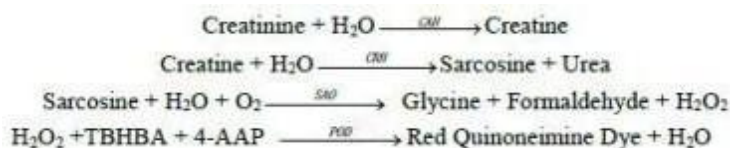
ALT catalyses the transfer of an amino group from L-alanine to α -ketoglutarate to form L-glutamate and pyruvate. Lactate dehydrogenase catalyses the conversion of pyruvate to lactate. Concomitantly, NADH is oxidised to NAD^+ , as illustrated in the following reaction scheme.



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

d) Creatinine (CRE)

In the coupled enzyme reactions, creatinine amidohydrolase (CAH) hydrolyses creatinine to creatine. A second enzyme, creatine amidinohydrolase (CRH), catalyses the formation of sarcosine from creatine. Sarcosine oxidase (SAO) causes the oxidation of sarcosine to glycine, formaldehyde and hydrogen peroxide (H_2O_2). In a Trinder finish, peroxidase (POD) catalyses the reaction among the hydrogen peroxide, 2, 4, 6-tribromo-3-hydroxybenzoic acid (TBHBA) and 4-aminoantipyrine (4-AAP) into a red quinoneimine dye. Potassium ferrocyanide and ascorbate oxidase are added to the reaction mixture to minimize the potential interference of bilirubin and ascorbic acid respectively.



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 colour produced. The endpoint reaction is measured as the difference in absorbance at 546 nm and 700 nm.

e) Amylase (AMY)

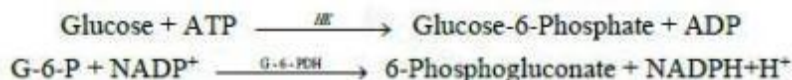
In the coupled-enzyme reaction, amylase in the sample hydrolyses 2-chloro-4-nitrophenyl- β -1,4-galactopyranosylmaltoside (CNP-G2) to 2-chloro-4-nitrophenol (CNP) producing colour and 1, 4-galactopyranosylmaltoside. The change in absorbance of the CNP is directly proportional to the amylase activity in the sample at 405 nm and 505 nm.



f) Glucose (GLU)

The reaction of glucose with adenosine triphosphate (ATP) catalysed by hexokinase (HK), produces glucose-

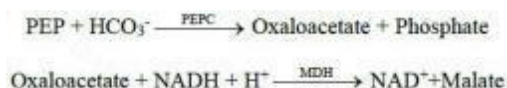
6- phosphate (G-6-P) and adenosine diphosphate (ADP). Glucose-6- phosphate dehydrogenase (G-6- PDH) catalyses the reaction of G-6-P into 6-phosphogluconate and the reduction of nicotinamide adenine dinucleotide phosphate (NADP⁺) to NADPH.



The absorbance is measured bichromatically at 340 nm and 405 nm. The production of NADPH is directly proportional to the amount of glucose present in the sample.

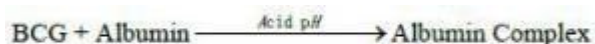
g) Total Carbon Dioxide (tCO₂)

In the enzymatic method, the specimen is first made alkaline to convert all forms of Carbon dioxide (CO₂) to bicarbonate (HCO₃⁻). Phosphoenolpyruvate (PEP) and HCO₃⁻ then react to form oxaloacetate and phosphate in the presence of phosphoenolpyruvate Carboxylase (PEPC). Malate dehydrogenase (MDH) catalyses 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 CO₂ in the sample.



h) Albumin (ALB)

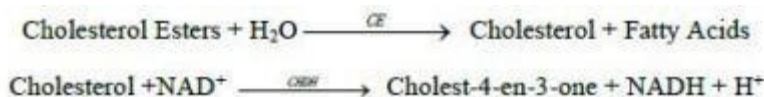
Bromocresol green (BCG), when bound with albumin, changes colour from a yellow to green colour. The absorbance maximum changes with the colour shift.



Bound albumin is proportional to the concentration of albumin in the sample. This is an endpoint reaction that is measured as the difference in absorbance between 600 nm and 700 nm.

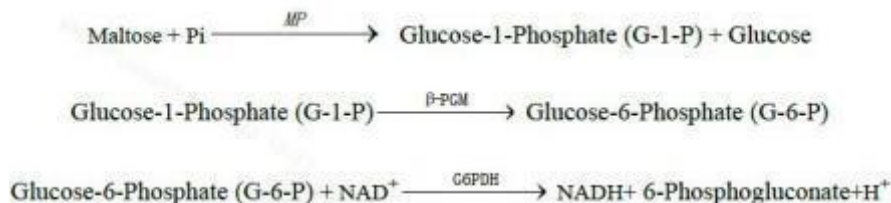
i) Total Cholesterol (CHOL)

The reaction of CHOL is an enzymatic end-point method that uses cholesterol esterase (CE) and cholesterol dehydrogenase (CHDH). CE hydrolyses cholesterol esters to form cholesterol and fatty acids. The CHDH reaction converts cholesterol to cholest-4-en-3-one. The NADH is measured bichromatically at 340 nm and 405 nm. NADH production is directly proportional to the amount of cholesterol present. An assay-specific blank is also monitored to ensure no extraneous reactions interfere with the calculations of CHOL levels.



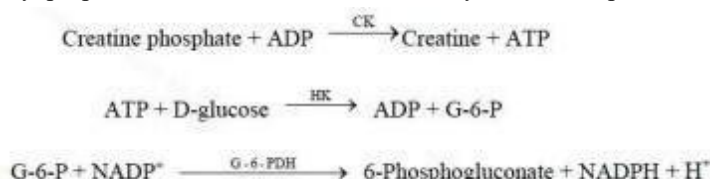
j) Phosphorus (P)

The enzymatic method for the InSight V-CHEM system uses maltose phosphorylase (MP) coupled through β-phosphoglucomutase (β-PGM) and glucose-6-phosphate dehydrogenase (G6PDH). The amount of NADH formed can be measured as an endpoint at 340/405 nm.



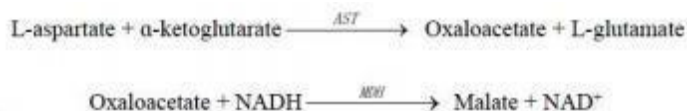
k) Creatine Kinase (CK)

Creatine kinase catalyses the formation of creatine and adenosine triphosphate (ATP) from creatine phosphate and adenosine diphosphate (ADP). With hexokinase (HK) as a catalyst, ATP reacts with D-glucose to form ADP and D- glucose-6-phosphate (G-6-P), which is reacted with nicotinamide adenine dinucleotide phosphate (NADP⁺) in the presence of glucose-6-phosphate dehydrogenase (G-6-PDH) to produce 6-Phosphogluconate (6-PG) and NADPH. The formation of NADPH is measured as a change in absorbance at 340 nm relative to 405 nm. This absorbance change is directly proportional to creatine kinase activity in the sample.



l) Aspartate Aminotransferase (AST)

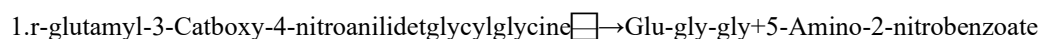
AST catalyses the reaction of L- aspartate and α - ketoglutarate into oxaloacetate and L- glutamate. Oxaloacetate is converted to malate and NADH is oxidised to NAD⁺ by the catalyst MDH.



The rate of absorbance change at 340/405 nm caused by the conversion of NADH to NAD⁺ is directly proportional to the amount of AST present in the sample.

m) Gamma Glutamyl Transferase (GGT)

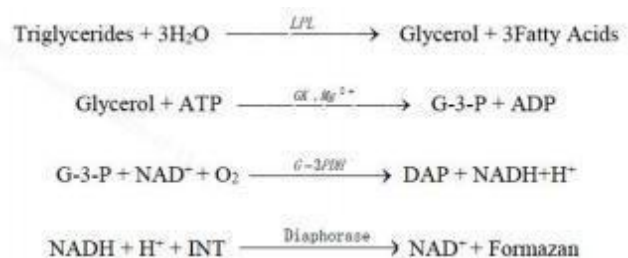
The addition of sample containing gamma glutamyl transferase to the substrates L- γ - glutamyl- 3 - Catboxy-4 - nitroanilide and glycylglycine causes the formation of L-γ-glutamyl-glycylglycine (glu-gly-gly) and 5-Amino-2-nitrobenzoate.



The absorbance of this rate reaction is measured at 405/505nm. The production is directly proportional to the GGT activity in the sample.

n) Triglycerides (TG)

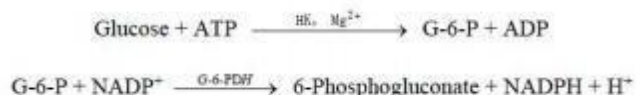
The TRIG assay is an enzymatic end- point method that makes use of four enzymes. The reaction mechanism follows:



In the first step, the triglycerides are hydrolysed into glycerol and fatty acids in a reaction catalysed by lipoprotein lipase. Glycerol is then phosphorylated in an ATP- requiring reaction catalysed by glycerol kinase (GK). The glycerol phosphate is then oxidised to dihydroxyacetone phosphate with the simultaneous reduction of NAD^+ to NADH in a reaction catalysed by glycerol- 3 - phosphate dehydrogenase (G-3 - PDH). The NADH is then oxidised with the simultaneous reduction of INT in a reaction catalysed by diaphorase. The intensity of the highly coloured formazan is measured bichromatically at 505/800 nm and is directly proportional to the concentration of triglycerides in the sample.

o) Magnesium (Mg)

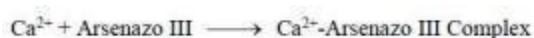
The hexokinase (HK) activation method is described as:



The rate limiting reaction is the HK reaction. Magnesium from the sample activates HK, which in turn catalyses the breaking down of glucose to form glucose- 6 - phosphate (G- 6 - P) and ADP. G- 6 - P reacts with nicotinamide adenine dinucleotide phosphate (NADP^+) to form reduced nicotinamide adenine dinucleotide phosphate (NADPH) and 6-phosphogluconate in the presence of glucose- 6 - phosphate- dehydrogenase (G- 6 - PDH). This is a first- order rate reaction. The rate of production of NADPH is directly proportional to the amount of magnesium present in the sample. Absorbance is measured bichromatically at 340 nm and 405 nm.

p) Calcium (Ca)

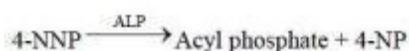
Calcium in the patient sample binds with Arsenazo III to form a calcium-dye complex.



It is an endpoint reaction. The amount of total calcium in the sample is proportional to the absorbance.

q) Alkaline Phosphatase (ALP)

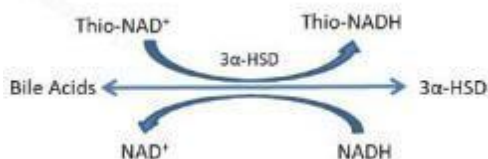
Under the catalysis of ALP, the Phosphoric acid on nitrobenzene (4-NNP) was turned into Para nitro phenol (4 - NP). 4 - NP shows a yellow colour in alkaline solution. At the wavelength of 405 /505 nm, the ALP activity can be calculated by monitoring the absorbance change rate.



r) Total Bile Acids (TBA)

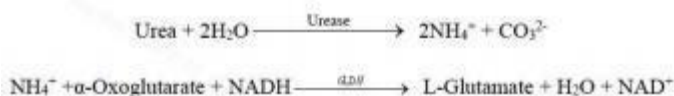
In the presence of the thio-derivative of nicotinamide adenine dinucleotide (Thio- NAD^+) the enzyme 3 - α - Hydroxysteroid Dehydrogenase (3 - α - HSD) reversibly oxidizes bile acids to oxidised bile acids (3 - α - keto forms) with the concomitant conversion of Thio- NAD^+ to its reduced form Thio-NADH. In a cycling reaction, the

oxidised bile acids are returned to their reduced state when excess NADH is present. The NADH is converted to NAD⁺. The rate of increase in absorbance at 405 nm (Thio-NADH) is measured and is proportional to the concentration of bile acids in the sample. The rate is measured bichromatically at 405 and 500nm.



s) Urea (BUN)

In the coupled-enzyme reaction, urease hydrolyses urea into ammonia and Carbon dioxide. Upon combining ammonia with α -oxoglutarate and reduced nicotinamide adenine dinucleotide (NADH), the enzyme glutamate dehydrogenase (GLDH) oxidizes NADH to NAD⁺.

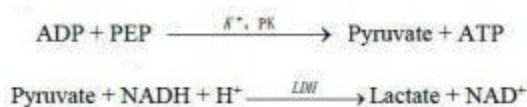


The rate of change of the absorbance difference between 340 nm and 405 nm is caused by the conversion of NADH to NAD⁺ and is directly proportional to the amount of urea present in the sample.

t) Potassium (K⁺)

In the coupled enzyme reaction, pyruvate kinase (PK) dephosphorylates phosphoenolpyruvate (PEP) to form pyruvate. Lactate dehydrogenase (LDH) catalyses conversion of pyruvate to lactate. Concomitantly, NADH is oxidised to NAD⁺. The rate of change in absorbance due to the conversion of NADH to NAD⁺ is directly proportional to the amount of potassium in the sample.

Interferences from other ions are minimized with the addition of some special ingredients.



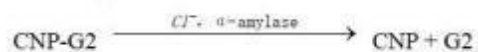
u) Sodium (Na⁺)

In the enzymatic reaction, β -D-galactosidase is activated by the sodium in the sample. The activated enzyme catalyses the reaction of o-nitrophenyl- β -D-galactopyranoside (ONPG) to o-nitrophenol and galactose.



v) Chloride (Cl⁻)

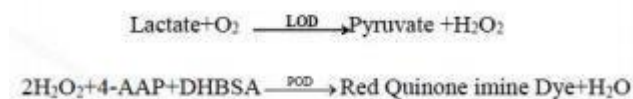
The method is based on the determination of chloride-dependent activation of α -amylase activity. Deactivated α -amylase is reactivated by addition of the chloride ion. The reactivation of α -amylase activity is proportional to the concentration of chloride ion in the sample. The reactivated α -amylase converts the substrate, 2-chloro-4-nitrophenyl- β -1,4-galactopyranosyl maltoside (CNP-G2) to 2-chloro-4-nitrophenol (CNP) producing colour and 1,4-galactopyranosylmaltoside. 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.



w) Lactate (LAC)

LAC is oxidised by lactate oxidase (LOD) to pyruvate and hydrogen peroxide (H₂O₂). Peroxidase

(POD)catalyses the reaction H_2O_2 , 4-amino antipyrine (4-AAP) and 3,5-dichloro-2-hydroxy benzenesulfonic acid (DHBSA) to form a red quinoneimine dye.



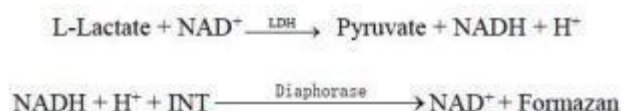
The rate of formation of the red dye is proportional to the LAC concentration in the sample. The reaction is measured bichromatically at 505 nm and 600 nm.

x) pH

The phenol red indicator was used to detect the acidity and alkalinity of blood under different pH conditions.

y) Lactate Dehydrogenase (LDH)

Lactate dehydrogenase (LDH) catalyses the oxidation of L-lactate to pyruvate with the concurrent reduction of nicotinamide adenine dinucleotide (NAD^+) to reduced nicotinamide adenine dinucleotide (NADH). The NADH is then oxidised with the simultaneous reduction of INT in a reaction catalysed by diaphorase. The intensity of the highly coloured formazan is measured bichromatically at 505 / 800 nm and is directly proportional to the concentration of triglycerides in the sample.



z) Fructosamine (FRU)

Serum glucose can react with the amino group at the end of albumin and other serum proteins to produce the polymer structure of Keto-amine. This Keto-amine structure reacts with nitro blue tetrazolium (NBT) to form a blue complex in an alkaline environment. The absorbance of 546/800nm wavelength is proportional to the concentration of fructosamine in the sample.

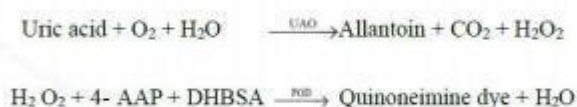
aa) Ammonia (NH_3)

The ammonia in the serum converts NADH to NAD^+ under the action of excess α -ketoglutaric acid, NADH and sufficient GLDH, and the rate of decrease in absorbance is proportional to the concentration of ammonia.



bb) Uric Acid (UA)

The uricase method is coupled through a Trinder peroxidase finish. In this method, uricase catalyses the oxidation (UAO) of uric acid to allantoin and hydrogen peroxide. Peroxidase (POD) catalyses the reaction among the hydrogen peroxide (H_2O_2), 4-aminoantipyrine (4-AAP) and 3,5-dichloro-2-hydroxybenzenesulfonic acid (DHBSA) into a red quinoneimine dye. Sodium ferrocyanide and ascorbate oxidase are added to the reaction mixture to minimize the potential interference of bilirubin and ascorbic acid.



2.1. Normal Reference Ranges

These ranges are provided as a guideline only. It is recommended that your office or institution establish normal ranges for your particular patient population.

Parameter	SI Units	Common Units
TP	Dog: 52 ~ 82g/L	Dog: 5.2 ~ 8.2g/dL
	Cat: 54 ~ 89g/L	Cat: 5.4 ~ 8.9g/dL
TBIL	Dog: 2 ~ 15µmol/L	Dog: 0.1 ~ 0.9mg/dL
	Cat: 2 ~ 15µmol/L	Cat: 0.1 ~ 0.9mg/dL
ALT	Dog: 10 ~ 140U/L	Dog: 10 ~ 140U/L
	Cat: 8.2 ~ 123U/L	Cat: 8.2 ~ 123U/L
CRE	Dog: 27 ~ 149µmol/L	Dog: 0.3 ~ 1.7mg/dL
	Cat: 27 ~ 223µmol/L	Cat: 0.3 ~ 2.5mg/dL
AMY	Dog: 400 ~ 3000U/L	Dog: 400 ~ 3000U/L
	Cat: 400 ~ 3000U/L	Cat: 400 ~ 3000U/L
GLU	Dog: 3.89 ~ 7.95mmol/L	Dog: 70 ~ 143mg/dL
	Cat: 4.11 ~ 8.84mmol/L	Cat: 74 ~ 159mg/dL
tCO ₂	Dog: 12 ~ 27mmol/L	Dog: 12 ~ 27mmol/L
	Cat: 15 ~ 24mmol/L	Cat: 15 ~ 24mmol/L
ALB	Dog: 22 ~ 44g/L	Dog: 2.2 ~ 4.4 g/dL
	Cat: 22 ~ 45g/L	Cat: 2.2 ~ 4.5 g/dL
CHOL	Dog: 2.84 ~ 8.26mmol/L	Dog: 110 ~ 320mg/dL
	Cat: 1.68 ~ 5.81mmol/L	Cat: 65 ~ 225mg/dL
P	Dog: 0.81 ~ 2.2mmol/L	Dog: 2.5 ~ 6.8mg/dL
	Cat: 1 ~ 2.74mmol/L	Cat: 3.1 ~ 8.5mg/dL
CK	Dog: 20 ~ 200U/L	Dog: 20 ~ 200U/L
	Cat: 50 ~ 450U/L	Cat: 50 ~ 450U/L
AST	Dog: 8.9 ~ 48.5U/L	Dog: 8.9 ~ 48.5U/L
	Cat: 9.2 ~ 39.5U/L	Cat: 9.2 ~ 39.5U/L
GGT	Dog: 0 ~ 7U/L	Dog: 0 ~ 7U/L
	Cat: 0 ~ 2U/L	Cat: 0 ~ 2U/L
TG	Dog: 0.10 ~ 0.90mmol/L	Dog: 9 ~ 80mg/dL
	Cat: 0.10 ~ 0.90mmol/L	Cat: 9 ~ 80mg/dL
Mg	Dog: 0.6 ~ 1.09mmol/L	Dog: 1.5 ~ 2.6 mg/dL
	Cat: 0.7 ~ 1.21mmol/L	Cat: 1.7 ~ 2.9 mg/dL
Ca	Dog: 1.98 ~ 2.95mmol/L;	Dog: 7.9 ~ 11.8mg/dL
	Cat: 1.95 ~ 2.95mmol/L	Cat: 7.8 ~ 11.8mg/dL
ALP	Dog: 20 ~ 150U/L	Dog: 20 ~ 150U/L
	Cat: 10 ~ 90U/L	Cat: 10 ~ 90U/L
TBA	Dog: 0 ~ 15µmol/L	Dog: 0 ~ 15µmol/L
	Cat: 0 ~ 15µmol/L	Cat: 0 ~ 15µmol/L
BUN	Dog: 2.5 ~ 11.5mmol/L	Dog: 7 ~ 32 mg/dL
	Cat: 3.6 ~ 15.5mmol/L	Cat: 10 ~ 43 mg/dL
K ⁺	Dog: 3.7 ~ 5.8 mmol/L	Dog: 3.7 ~ 5.8 mmol/L
	Cat: 3.7 ~ 5.8 mmol/L	Cat: 3.7 ~ 5.8 mmol/L

Na ⁺	Dog: 138 ~ 160 mmol/L	Dog: 138 ~ 160 mmol/L
	Cat: 142 ~ 164 mmol/L	Cat: 142 ~ 164 mmol/L
Cl ⁻	Dog: 106 ~ 130 mmol/L	Dog: 106 ~ 130 mmol/L
	Cat: 100 ~ 126 mmol/L	Cat: 100 ~ 126 mmol/L
LAC	Dog: 0.5 ~ 3 mmol/L	Dog: 4.53 ~ 27 mg/dL
	Cat: 0.5 ~ 3 mmol/L	Cat: 4.53 ~ 27 mg/dL
pH	7.25 ~ 7.55	7.25 ~ 7.55
LDH	Dog: 40 ~ 400U/L	Dog: 40 ~ 400U/L
	Cat: 0 ~ 800U/L	Cat: 0 ~ 800U/L
FRU	Dog: 150 ~ 331μmol/L	Dog: 150 ~ 331μmol/L
	Cat: 190 ~ 383μmol/L	Cat: 190 ~ 383μmol/L
NH ₃	Dog: 0 ~ 99μmol/L	Dog: 0 ~ 168.3μg/dL
	Cat: 0 ~ 99μmol/L	Cat: 0 ~ 168.3μg/dL
UA	N/A	

3. Validation Method

For this clinical evaluation study, the InSight V-CHEM provided by Woodley Equipment Company, is composed of an automatic biochemical analyser and its associated Panels containing 30 biochemical detection items. The control system used was the Abaxis VS2 biochemical analyser, except the NH₃ and FRU were the IDEXX Catalyst One biochemical analyser was used as a comparison and the pH was tested on the ABBOTT i-STAT biochemical analyser.

The number of samples tested in each project is in line with statistical requirements.

Table 1-1 Number of completed parameters in this clinical evaluation

	Number of Completed Tests for this Evaluation
TP	100
TBIL	100
ALT	100
CRE	100
AMY	100
GLU	100
tCO ₂	100
ALB	100
CHOL	100
P	100
CK	100
AST	100
GGT	100
TG	100
Mg	100
Ca	100
ALP	100
TBA	100
BUN	100
K ⁺	100
Na ⁺	100
Cl ⁻	100
LAC	100
pH	100
LDH	100
FRU	100
NH ₃	100
UA	100

4. Experimental procedure

4.1. Sample selection basis, inclusion criteria, exclusion of specimens, rejection criteria

The samples used in this clinical evaluation were the routine animal blood samples for the laboratory's biochemical testing.

According to the routine test results of the veterinary laboratory and the requirements of the test plan for data distribution, select the samples that meet the requirements. When a range of samples is difficult to collect, two (but no more than two) samples of different concentrations can be mixed to obtain a specific range of results. When it is still difficult to collect a suitable sample using the above mixing method, it can be detected by dilution or concentration of samples to obtain a specific range of results.

Exclude selected samples according to the following a~b criteria:

- a) The remaining sample size is less than 0.5mL, which is not enough to complete the test;
- b) The number of samples has exceeded the number of planned tests for the day.

4.2. Quality Control Method

During the clinical evaluation process, the comparison analyser and the InSight V-CHEM were QC tested before measurement of samples to ensure analysers were under control.

4.3. Test operation

Select the standard samples that meet the criteria, divide them into two equal parts, and perform operation tests according to analyser operating instructions, and record the test results.

4.4. Data and statistical management

All test results of this evaluation are automatically recorded by the analyser. After the test, export to an Excel spreadsheet for statistical analysis.

The data statistics of this test follow the following requirements:

- a) Do not use inconsistencies that have been identified due to samples, analysers and other reasons not related to the test product itself;
- b) When confirming and testing each batch of samples, the quality control products are tested in the same batch. The test results of the quality control products are under control.
- c) Record all data that expressly excludes samples, analysers, and other inconsistencies resulting from causes unrelated to the test product itself.

The steps of data statistics are as follows: d) mapping

- d-1) The measured values of the experimental group and the corresponding measured values of the control group are distributed;

Above, the measured value of the experimental group is used as the Y-axis, and the corresponding measured values of the control group is used as the X-axis, and the dispersion diagram is used.

- d-2) The difference between the measured values of the two groups and the measured values of the control group are plotted (the centre horizontal line is zero).

- e) Analysis of linear correlation and linear regression

- e-1) Analysis of linear correlation

Calculate correlation coefficient r

$$r = \frac{\sum (X - \bar{X})(Y - \bar{Y})}{\sqrt{\sum (X - \bar{X})^2 \sum (Y - \bar{Y})^2}}$$

Wherein, X is the measured values of the control group, Y is the measured values of the experimental group. The correlation coefficient should meet $r > 0.975$.

e-2) Analysis of linear regression
e-2-1) Establish linear regression equation

$$P=a+bx$$

Wherein:

$$b = \frac{\sum (X - \bar{X})(Y - \bar{Y})}{\sum (X - \bar{X})^2}$$

$$a = \bar{Y} - b\bar{X}$$

e-2-2) T test for linear regression equation

$$t = \frac{|b - 0|}{S_b}$$

$$v = n - 2$$

$$S_b = \frac{\sqrt{\frac{\sum (Y - \bar{Y})^2}{v}}}{\sqrt{\sum X^2 - \frac{(\sum X)^2}{n}}}$$

Determine whether the linear regression equation is meaningful based on the T test conclusion.

5. Test results

5.1. Evaluation test results:

V- CHEM TP g/L	Abaxis VS2 TP g/L	V- CHEM TBIL μmol/L	Abaxis VS2 TBIL μmol/L	V- CHEM ALT U/L	Abaxis VS2 ALT U/L	V- CHEM CRE μmol/L	Abaxis VS2 CRE μmol/L	V- CHEM AMY U/L	Abaxis VS2 AMY U/L	V- CHEM GLU mmol/L	Abaxis VS2 GLU mmol/L	V- CHEM tCO2 mmol/L	Abaxis VS2 tCO2 mmol/L
61	61.5	9	9.2	48	50	45	47	77	78	5.73	5.56	27.6	26.9
92.8	93.3	8.6	8.8	62	64	216	218	79	80	5.61	5.29	28.3	28.6
62.2	62.7	46.8	47.6	38	39	92	93	72	74	5.4	5.19	26.3	26.8
58.5	58.9	34.2	34.6	67	68	31	32	327	330	14.59	14.51	19	18.6
64.1	64	2.8	2.9	89	88	168	167	328	329	14.62	14.02	24	24.1
48.6	48.5	2.8	2.8	985	982	63	60	331	330	14.66	14.89	21	21.5
83.7	83.8	36.5	36.5	111	114	45	48	746	741	11.06	11.31	19.8	19.7
73.4	73.5	30	29.5	87	92	72	77	895	891	5.94	6.27	24.7	24.8
60.7	60.6	24.8	24.3	716	721	172	177	790	787	6.17	6.6	29.5	30.3
68.4	68.9	10.4	10.1	40	45	119	124	305	309	13.25	13.17	27.8	28.2
67.9	68.3	2.8	2.8	39	43	117	121	576	574	6.52	5.86	29	30.1
69.9	69.8	17.9	17.7	264	263	74	73	795	798	5.26	5.81	30.8	30
84.6	84.5	8.8	8.7	37	36	85	84	565	568	6.15	5.56	25.3	25.2
64.5	64.6	2.1	2.1	41	43	85	87	660	662	6.32	5.73	28.2	28.9
79.4	79.5	12.2	11.9	67	69	115	117	610	606	3.91	3.79	28.4	28
81.6	81.5	2.5	2.5	66	64	65	63	924	927	11.93	12.38	23.4	24.2
68.1	68.6	24.4	24.5	25	30	44	49	906	903	7.32	7.84	33	33

57.7	58.2	34.2	34.7	28	33	80	85	570	574	2.82	2.51	21.2	21.5
62.3	62.8	2.9	2.9	43	48	366	371	755	753	12.19	12.8	29.6	30.1
64.3	64.7	8.3	8.1	13	17	160	164	861	863	6.85	7.36	23	22.5
67.9	68	6.9	7.1	84	83	235	234	739	740	16.23	16.58	25.8	25.8
68.6	68.7	21.8	21.6	26	25	187	186	927	928	7.68	7.63	33.3	33.8
68.8	68.7	16.4	16.1	71	69	67	65	445	446	7.48	6.94	27.4	26.6
75.8	76.3	17.3	17.6	53	55	78	80	638	639	5.65	5.53	27.8	28.2
60.7	61.2	2.4	2.4	47	46	131	130	719	717	5.84	6.03	24	24.3
71.8	71.9	2.5	2.5	77	79	89	91	948	946	6.47	6.97	24.3	23.8
69.9	70.3	26.3	26.4	47	51	153	157	635	637	6.43	6.99	30.4	30.4
66.8	67.2	33.6	33	50	54	188	192	691	693	4.75	5.05	28.2	28.1
51.1	50.8	12.8	12.5	239	236	328	325	786	791	4.79	4.57	24.9	25.1
72.3	72.4	20	20.6	45	46	43	44	788	789	5	5.35	26.2	26.1
68.1	68.4	20.8	21.1	61	64	99	102	878	883	6.47	6.15	31.9	31.2
58.5	58.6	2.3	2.3	38	39	68	69	636	636	5.3	5.58	21	21.4
70.6	70.7	9.3	9.3	15	16	145	146	653	649	8.1	7.57	27.9	28
64.2	64.7	11.9	11.9	27	28	131	132	391	396	22.51	21.9	25.5	25.7
82.5	83	18.7	18.2	105	106	160	161	818	823	4.96	4.33	31.2	31.3
71.7	72.1	26.5	26.8	42	40	167	165	926	924	6.25	6.17	33.9	34.2
67.8	67.9	3	2.9	75	77	138	140	949	951	3.12	3.41	24.1	23.5
63.2	63.3	5.6	5.5	69	67	64	62	931	927	4.42	4.92	32	32.7
64	63.9	14.5	14.4	73	71	45	43	748	749	5.39	5.97	23.5	24.1
66.5	67	2.9	2.9	56	57	73	74	846	846	6.2	5.64	25.3	25.8
62.6	63.1	32.3	31.7	55	60	152	157	857	852	8.16	8.35	22.3	22.7
61.2	61.1	21.8	21.7	62	61	90	89	800	805	6.19	6.53	32.8	32.7
64.3	64.4	34.7	34.8	41	42	64	65	894	893	6.49	6	26.5	26.9
62.5	63	23.5	23.3	8	7	68	67	872	870	5.82	6.1	33.5	33.9
64.7	65.2	2.5	2.5	40	39	57	56	915	915	5.76	5.43	17.9	18.4
53.8	54.2	24.3	25	151	152	111	112	932	932	4.54	4.64	24.9	24.7
49.9	49.8	14.1	13.9	247	248	203	204	670	666	5.85	5.5	24.5	25.2
44.2	44.3	18.7	19.2	565	566	218	219	562	564	6.9	7.03	25.7	28
72.9	73	19.5	19.4	63	64	132	133	607	604	5.96	5.66	21.9	21.6
76.9	76.8	18	17.9	59	57	40	38	918	916	5.67	6.17	24.8	24.3
65.6	66.1	3.1	3.2	45	47	138	140	799	795	5.12	5.06	19.2	19
81.2	81.7	18.6	19	63	61	39	37	746	750	5.93	5.39	22.9	23
73.1	73	2.8	2.8	258	257	98	97	943	948	5.35	4.89	24.2	24.4
81.8	81.9	23.8	24.4	78	79	327	328	477	479	3.73	3.83	24	23.5
53.6	53.7	20	19.5	37	38	116	117	747	750	5.56	5.05	24.3	24.1
59.7	59.8	24.8	24.5	31	32	134	135	638	635	7.31	6.74	26	25.7
63	63.5	12.4	12.7	184	185	154	155	619	615	5.35	5.63	34.3	33.4
79.4	79.9	23.9	23.4	285	284	234	233	318	313	7.78	7.72	22.2	22.3
77.6	78	2.1	2.1	22	24	81	83	867	864	7	6.87	20.5	19.9

71.8	71.7	15.8	15.8	116	115	313	312	871	872	10.86	11.44	32	31.5
69.7	69.8	24.9	25.1	108	106	31	29	926	929	6.58	6.81	23.6	23.2
84	84.1	14.7	14.4	43	42	102	101	685	683	8.5	9.05	28.5	28.5
68.6	68.5	7.7	7.6	39	44	112	117	905	902	5.16	4.67	20.7	20.5
83.4	83.9	39.6	40.3	531	533	118	120	841	837	15.74	16.05	25.4	25.5
79.2	79.7	2.3	2.3	150	155	146	151	924	927	6.63	6.71	31.6	30.4
59.4	59.3	2.6	2.6	133	132	228	227	465	469	6.1	5.5	31.5	31.1
75	75.1	21	20.8	57	59	101	103	858	856	4.26	3.73	34	33.8
62.5	62.2	3.7	3.8	148	145	95	92	913	916	6.26	6.71	20	19.5
56.3	56.7	3.1	3	69	73	97	101	896	899	4.91	5.28	23.3	23.9
71.6	71.7	2.4	2.4	131	132	288	289	840	836	6.25	6.42	22.4	21.8
57.7	57.8	2.1	2.1	77	79	73	75	903	902	4.96	4.98	26.8	27.1
66.8	66.9	2.7	2.7	246	247	239	240	676	675	5.21	5.2	25.7	26.3
62.5	62.6	5.2	5.3	90	92	314	316	71	70	5.67	5.75	18.9	19.5
65.8	66.3	12.3	11.9	211	212	67	68	72	74	5.36	5.18	22.7	22.3
48.1	48.6	2.8	2.7	344	345	347	348	804	805	4.84	5.25	27.9	28.1
66	66.4	3.3	3.3	34	33	122	121	888	886	5.38	5.98	32.5	32.3
70.7	70.8	11.1	10.9	64	67	59	62	813	813	5.51	5.18	24.9	24.3
64.5	64.6	25.2	25.3	23	24	84	85	865	862	4.85	4.77	24.3	24
36.6	36.5	10.4	10.3	205	203	267	265	866	869	11.47	11.64	27.6	27.7
41.8	42.3	2.1	2.1	346	349	393	396	822	825	6.12	6.32	22.5	21.9
62.6	63.1	2.6	2.6	107	106	180	179	851	848	5.51	5.4	34.4	34.1
75.6	76.1	2.2	2.2	166	171	145	150	917	917	6.14	6.68	20.1	20.4
79.8	80.3	1.8	1.8	77	82	76	81	677	676	6.45	6.08	24.4	23.7
69.2	69.6	7.1	7.1	313	317	231	235	589	592	5.85	6.37	23.1	23.2
56.5	56.6	14.4	14.7	33	35	44	46	806	807	4.71	5.28	33.6	32.8
67.8	68.3	28.4	27.7	31	36	114	119	862	860	7.84	7.56	31.1	30
67	66.9	33.9	34.4	28	26	184	182	942	940	4.55	4.43	30.7	31
51.9	52	3	3	77	78	50	51	654	652	7.54	7.88	23.8	24.2
65.2	65.3	4.4	4.3	16	17	101	102	109	111	5.57	5.39	17.8	18
44	43.9	2.6	2.6	397	402	105	110	694	694	16.66	16.51	33.5	34.1
40.8	41.3	2.9	2.9	241	240	280	279	452	453	3.22	2.97	33.8	34.3
61.8	62.3	2.6	2.6	48	50	86	88	891	892	9.23	8.67	22.7	22.6
68.8	68.5	6.2	6	64	61	84	81	878	877	5.47	5.81	28.6	27.9
54.8	54.7	2.2	2.2	39	38	65	64	800	800	6.45	6.27	33.2	33.7
63.8	64.3	13.2	13.3	70	75	79	84	879	883	9.59	10.21	31.5	30.7
73	73.5	2.3	2.3	80	85	149	154	349	347	5.94	5.33	32.1	33
71.7	72.1	2.7	2.7	216	220	37	41	557	552	8.95	8.8	27.7	28.3
72.2	72.3	19.2	18.8	43	45	253	255	859	862	5.82	6.06	27.1	26.4
64.9	65.4	2.6	2.6	70	75	76	81	692	690	14.57	14.96	22.3	22.9
62.9	62.8	39.1	39.9	36	34	92	90	908	908	4.37	4.26	31.8	32.7

V- CHEM ALB g/L	Abaxis VS2 ALB g/L	V- CHEM CHOL mmol/L	Abaxis VS2 CHOL mmol/L	V- CHEM P mmol/L	Abaxis VS2 P mmol/L	V- CHEM CK U/L	Abaxis VS2 CK U/L	V- CHEM AST U/L	Abaxis VS2 AST U/L	V- CHEM GGT U/L	Abaxis VS2 GGT U/L	V- CHEM TG mmol/L	Abaxis VS2 TG mmol/L
23.7	23.9	3.86	4.05	2.15	2.18	197	202	23	25	78	81	3.33	3.36
19.4	19.6	4.1	4.18	1.51	1.54	196	192	15	21	45	44	7.07	7.1
30.4	30.5	3.65	3.14	5.82	5.83	183	181	21	24	13	13	2.63	2.66
21.1	21.2	7.18	7.21	2	2.03	570	571	39	47	9	8	7.77	7.79
29.4	29.3	7.13	7	1.12	1.11	546	551	32	38	4	4	0.34	0.36
25.2	24.9	7.18	6.53	1.79	1.76	569	572	23	30	36	34	8.15	8.18
38.6	38.9	3.12	2.93	1.87	1.9	285	281	29	33	98	99	0.07	0.1
33.4	33.9	3.52	3.18	2.46	2.48	206	213	35	41	24	23	0.81	0.83
23.7	24.2	7.29	7.61	1.76	1.73	96	92	5	7	32	31	8.58	8.57
27	27.5	5.33	5.45	1.02	1	59	66	45	46	5	5	1.03	1.04
25.7	26.1	9.45	8.92	1.53	1.58	96	93	7	7	36	37	0.46	0.46
25.3	25.2	5.47	4.88	0.9	0.95	143	149	7	7	82	81	8.08	8.06
21.1	21	5.31	5.36	2.03	2.08	156	156	43	51	38	38	3.06	3.09
37.7	37.9	8.19	8.66	3.84	3.88	34	34	44	49	31	31	4.78	4.8
32.1	32.3	8.62	8.65	1.03	1	95	96	233	225	5	5	4.59	4.6
31.2	31	5.15	5.2	2.92	2.91	523	522	42	45	45	47	1.25	1.24
31.5	32	7.63	7.49	0.45	0.48	96	92	28	29	70	73	7.95	7.93
30.3	30.8	4.38	4.37	2.71	2.74	164	161	43	49	51	53	8.58	8.62
27.1	27.6	3.29	3.36	3.22	3.25	399	395	200	206	6	5	1.72	1.7
28.9	29.3	4.66	4.39	4.28	4.29	341	343	41	47	106	102	0.19	0.16
32.7	32.6	7.09	7.15	2.24	2.22	259	264	24	26	96	92	0.6	0.59
34.6	34.5	5.8	5.6	1.61	1.65	213	220	4	5	68	69	7.64	7.63
36.5	36.3	4.66	4.55	3.74	3.78	240	245	127	135	98	97	1.33	1.36
23.1	23.3	6.46	6.73	0.3	0.28	180	175	19	21	5	5	3.61	3.57
30.9	30.8	6.24	6.52	3.79	3.81	200	199	2	3	7	5	0.11	0.14
33.4	33.6	4.91	4.65	1.13	1.1	75	77	98	94	6	5	2.74	2.77
30	30.4	4.54	4.32	1.21	1.23	200	207	7	9	142	143	8.89	8.9
32.6	33	3.23	3.61	1.6	1.64	185	186	427	417	8	7	1.04	1.03
20.1	19.8	3.13	2.69	0.73	0.77	239	238	23	22	132	127	2.38	2.4
29.5	29.6	4.44	4.93	1.89	1.86	68	70	17	18	78	80	0.75	0.71
29.8	30.1	4.57	4.78	1.42	1.43	166	163	43	50	37	39	1.37	1.36
27	27.1	4.93	4.33	0.69	0.72	428	428	40	42	34	33	1.57	1.6
31.1	31.2	4.7	4.52	1.79	1.77	147	146	14	15	50	49	0.26	0.25
30.3	30.8	3.42	3.5	5.69	5.73	579	582	322	329	29	29	1.01	0.97
28.5	29	7.47	7.26	1.73	1.78	102	103	128	119	6	5	0.3	0.32
21.9	22.3	6.05	5.45	0.31	0.29	277	284	232	240	63	65	8.62	8.58
28.4	28.3	3.6	3.51	3.22	3.24	48	52	155	162	6	4	4.98	4.95
33	32.9	4.83	4.58	5.86	5.85	99	105	21	27	77	76	1.25	1.28

27	26.8	6.34	6.09	1.62	1.59	94	97	26	33	26	27	1.61	1.61
26.1	26.2	4.61	4.12	6.52	6.53	184	181	26	29	80	81	0.94	0.95
33	33.5	4.24	4.29	1.63	1.65	538	544	14	15	5	6	8.6	8.62
33.4	33.3	5.17	5.31	1.16	1.18	83	88	30	29	27	28	0.16	0.14
25.1	25.2	7.01	6.45	1.53	1.54	225	221	5	7	6	5	1.68	1.64
28.7	29.2	7.62	7.49	0.4	0.38	113	117	42	45	12	14	1.5	1.5
36.1	36.6	3.01	2.41	4.29	4.32	90	85	31	36	63	62	0.32	0.36
29.5	29.9	6.44	6.15	1.49	1.47	202	202	187	191	5	6	0.75	0.76
20.6	20.5	5.65	5.9	0.63	0.61	104	102	14	17	56	54	0.84	0.84
20.8	20.7	6.12	6.13	1.14	1.15	388	390	6	7	7	6	6.78	6.82
30.9	31	6.26	6.42	1.74	1.73	142	149	12	15	110	111	5.92	5.9
32.9	32.7	4.24	4.17	1.39	1.4	154	161	45	47	11	13	1.65	1.63
28.3	28.5	6.51	6.36	2.79	2.82	114	116	44	41	74	74	7.5	7.52
35.3	35.1	4.36	4.61	1.88	1.87	164	166	10	13	91	93	3.03	3.04
35.4	35.3	3.32	3.58	0.67	0.7	642	649	11	13	57	58	4.2	4.21
39.3	39.4	4.28	4.62	1.68	1.65	93	97	44	46	6	5	0.68	0.67
16.2	16.3	3.69	3.51	1.68	1.65	136	143	6	8	133	131	0.03	0.04
33.5	33.6	6.4	6.76	5.85	5.84	230	237	26	25	5	4	6.15	6.14
32.3	32.8	4.39	4.15	1.51	1.56	71	70	27	29	19	19	1	0.99
36.1	36.6	6.59	6.12	1.64	1.67	230	234	21	19	10	11	2.77	2.81
33.3	33.7	3.81	3.77	1.02	1.06	116	118	32	35	51	52	4.22	4.25
27.3	27.2	3.73	3.67	1.69	1.74	184	187	18	23	6	4	5.8	5.83
29.3	29.2	4.21	3.87	2.28	2.33	83	79	7	9	71	67	7.96	7.95
28	27.9	5.12	5.55	0.87	0.89	119	122	32	31	7	5	2.93	2.97
30.9	31.4	5.18	5.59	1.77	1.82	191	188	56	58	170	174	3.57	3.57
27.6	27.8	2.35	2.42	5.89	5.92	57	53	12	13	66	65	8.98	8.99
32.8	33.3	4.18	4.07	2.53	2.51	118	116	45	48	8	6	0.33	0.31
35.3	35.2	5.51	5.32	1.88	1.93	45	40	38	45	42	40	7.03	7.06
34.9	35.1	5.69	5.25	1.13	1.15	64	63	33	37	106	111	0.11	0.09
37	36.7	7.07	6.69	3.87	3.86	116	123	44	46	55	56	6.69	6.67
35.4	35.8	3.69	3.62	0.78	0.76	142	143	39	43	9	10	4.76	4.79
25.1	25.2	5.81	5.69	1.79	1.76	32	28	45	49	53	54	0.13	0.14
24	24.2	2.15	2.24	1.01	1.04	154	155	43	36	15	16	3.74	3.72
28.8	28.9	6.76	6.51	0.9	0.92	109	114	5	7	75	78	1.19	1.22
28.5	28.7	3.48	3.55	0	-0.03	218	220	32	36	7	6	1.64	1.63
26.6	27.1	3.28	3.42	0.52	0.55	209	216	45	41	29	30	0.21	0.19
21.6	22.1	3.72	3.44	1.62	1.6	87	90	24	28	82	83	5.56	5.52
25.7	26.1	5.83	5.63	1.21	1.26	32	32	18	19	77	74	7.94	7.9
29.8	29.7	7.91	8.14	1.55	1.6	300	298	5	6	52	52	6.61	6.58
31.5	31.4	2.81	3.04	1.97	2.01	187	192	24	26	111	115	0.8	0.81
20.7	20.5	2.67	2.88	1.21	1.24	740	740	22	21	134	130	1.29	1.32
26.5	26.8	7.6	7.44	1.66	1.71	177	177	27	30	45	43	0.51	0.54

35.7	35.6	7.44	7.27	1.28	1.25	304	309	45	51	41	42	8.38	8.34
33.2	33.7	4.45	4.55	1.21	1.22	156	159	6	8	124	118	3.53	3.54
36.9	37.4	10.61	10.91	2.68	2.7	36	33	16	21	196	199	3.94	3.93
30.1	30.5	5.85	5.67	1.86	1.91	367	367	11	12	121	118	1.14	1.13
27.4	27.6	4.54	3.93	2.01	1.99	153	148	44	46	41	43	0.87	0.86
29.4	29.9	4.55	5.08	2.34	2.36	282	283	35	34	6	5	0.11	0.14
31.4	31.2	3.65	4.14	2.92	2.89	105	109	33	38	106	107	1.62	1.65
21.7	21.8	4.35	4.78	1.05	1.09	298	298	35	32	110	115	3.89	3.93
19.3	19.4	4.59	4.05	5.06	5.09	176	182	25	22	123	124	6.07	6.05
25.2	25.7	9.52	9.7	0.89	0.91	429	430	38	46	6	5	8.18	8.17
21.3	21.2	6.61	6.02	2.07	2.1	370	372	25	26	21	21	5.58	5.61
33.4	33.6	6.28	5.89	1.46	1.48	137	135	14	16	48	50	1.46	1.42
28	27.7	6.86	6.45	4.5	4.51	189	193	12	16	18	15	0.7	0.7
25.9	25.8	5.45	5.21	1.53	1.54	690	691	40	39	55	56	7.29	7.29
21.9	22.4	6.18	6.04	0.79	0.77	429	424	45	49	81	77	3.48	3.51
27.3	27.8	6.54	6.62	1.65	1.69	61	60	5	5	96	99	1.26	1.26
34.6	35	3.34	3.03	2.05	2.03	704	701	22	25	6	5	0.46	0.42
35.7	35.9	6.48	6.99	2.49	2.54	70	74	9	12	24	25	4.39	4.38
33.7	34.2	3.35	3.28	1.26	1.25	394	401	14	14	47	48	6.3	6.26
23	22.8	5	4.7	1.18	1.15	143	139	12	14	40	38	5.34	5.37

V- CHE M Mg mmol/L	Abaxis VS2 Mg mmol/L	V- CHE M Ca mmol/L	Abaxis VS2 Ca mmol/L	V- CHE M ALP U/L	Abaxis VS2 ALP U/L	V- CHE M TBA μmol/L	Abaxis VS2 TBA μmol/L	V- CHE M BUN mmol/L	Abaxis VS2 BUN mmol/L	V- CHE M K+ mmol/L	Abaxis VS2 K+ mmol/L	V- CHEM Na+ mmol/L	Abaxis VS2 Na+ mmol/L
1.24	1.25	2.68	2.67	24	26	6.5	6.2	5.86	6.06	4.24	4.3	158	156
1.26	1.28	2.24	2.22	23	25	2.8	2.3	7	7.2	3.8	3.78	131	132
1.58	1.59	2.07	2.05	56	57	4.3	4.6	5.83	5.93	6.35	6.46	148	146
1.23	1.23	2.2	2.22	160	161	12.4	12.9	2.83	2.93	3.45	3.43	141	143
0.95	1.01	2.79	2.77	58	57	4.5	4.3	21.2	21.1	2.94	2.97	167	168
1.08	1.11	2.56	2.61	66	65	12.5	12.4	5.44	5.14	3.33	3.35	148	146
0.11	0.14	2.43	2.48	24	25	15.8	15.2	4.22	4.52	6.42	6.36	141	140
1.21	1.22	2.61	2.62	30	32	8.7	9.4	4.25	4.75	3.4	3.5	144	142
0.98	0.94	2.12	2.13	27	29	12.6	12.9	20.5	21	6.47	6.5	137	135
1.16	1.09	2.36	2.39	60	62	8.7	8.8	7.88	8.38	3.83	3.86	151	153
1.16	1.11	2.38	2.41	16	17	2.3	2.2	4.82	5.22	4.89	4.8	149	147
1.09	1.13	2.48	2.45	18	17	2.4	2.6	11.5	11.4	7.19	7.12	138	140
1.49	1.48	2.19	2.18	20	19	10.8	10.5	3.98	3.88	5.8	5.79	144	143
1.08	1.12	1.79	1.84	14	16	7.8	7.5	6.9	7.1	5	4.95	131	132
1.07	1.09	1.96	1.93	152	154	15.5	15.2	8.11	8.31	4.01	4.03	135	136
1.38	1.39	2.17	2.14	30	28	9.8	9.7	2.55	2.35	3.26	3.33	139	140
0.96	1.04	1.04	1.03	20	22	11.6	11.4	4.42	4.92	5.61	5.61	143	144

1.06	1.08	3.06	3.04	24	26	11.4	11.3	6.1	6.6	7.16	7.08	144	143
1.2	1.13	2.58	2.61	63	65	7.3	7.7	24.6	25.1	3.99	3.94	157	156
1.58	1.58	2.49	2.52	32	33	11.4	11.5	14	14.4	6.51	6.4	150	152
1.13	1.16	2.11	2.12	32	31	8.5	8.6	29.9	29.8	5.03	4.94	140	138
0.83	0.94	2.67	2.7	50	49	6.3	6.2	18.9	18.8	3.41	3.49	152	151
1.35	1.37	3.06	3.05	59	57	8.7	8.4	4.09	3.89	3.78	3.86	146	145
1.08	1.09	1.27	1.24	151	153	8.3	8.9	7.37	7.57	5.06	5.14	165	163
1.42	1.35	3.56	3.59	122	121	9.3	9.3	14	13.9	4.66	4.75	153	153
1.55	1.48	2.64	2.66	14	16	7.5	8.5	4.48	4.68	4.78	4.7	145	146
1.23	1.17	2.54	2.51	53	54	11.5	11.8	8.36	8.76	7.05	6.9	140	141
0.47	0.37	2.47	2.45	25	26	15.3	15.9	6.62	7.02	3.51	3.6	138	140
1.32	1.25	2.45	2.5	121	118	4.7	5.2	29.5	29.2	4.76	4.75	136	135
1.03	1.07	2.16	2.21	26	27	10.2	10.3	2.14	2.24	4.61	4.58	145	143
1.16	1.18	2.99	3.04	33	36	3.5	3.4	4.46	4.76	5.11	5.06	159	160
1.36	1.38	2.62	2.66	24	25	13.8	13.9	6.29	6.39	5.6	5.7	143	145
1.21	1.21	1.31	1.28	21	22	11.9	11.5	6.34	6.44	7.11	6.98	144	143
1.08	1.11	1.82	1.81	30	31	5.8	5.9	4.4	4.5	4.41	4.37	155	153
1.36	1.29	2.67	2.7	14	15	11.3	10.8	7.11	7.21	4.04	4.08	156	157
1.37	1.31	1.38	1.41	231	229	9.5	9.7	15.9	15.7	5.46	5.34	138	140
1.08	1.09	2.3	2.33	131	133	6.7	6.4	6.12	6.32	5.71	5.57	144	146
1.44	1.45	2.31	2.32	24	22	12.7	12.2	4	3.8	4.61	4.5	149	151
1.55	1.52	2.04	2.02	54	52	14.8	14.3	6.5	6.3	3.54	3.58	136	135
1.49	1.51	2.26	2.3	24	25	4.6	4.9	5	5.1	3.81	3.91	139	138
0.8	0.68	2.08	2.12	528	530	11.7	11.5	7.64	8.14	4.79	4.69	158	159
1.12	1.06	3.12	3.1	30	29	13.4	13.7	13.2	13.1	3.7	3.69	150	151
1.19	1.14	2.51	2.53	22	23	7.2	7.6	7.66	7.76	4.4	4.47	132	133
1.47	1.48	1.78	1.75	25	24	8.7	8.4	2.69	2.59	5.56	5.71	135	136
0.06	0.01	1.76	1.78	25	24	14.9	14.7	3.29	3.19	5.22	5.15	161	159
1.24	1.26	2.85	2.89	209	210	12.8	12.8	7.33	7.43	4.45	4.57	149	151
1.5	1.42	0.8	0.84	332	333	13.8	13.6	11.9	12	6.39	6.46	152	153
1.54	1.57	2.87	2.84	202	203	12.2	12.3	8.72	8.82	4.07	3.95	147	145
1.48	1.49	2.54	2.55	203	204	4.3	4.7	6.86	6.96	5.75	5.62	143	145
1.21	1.19	2.52	2.55	33	31	5.8	6.6	1.01	0.81	6.72	6.6	167	167
1.29	1.21	2.87	2.85	27	29	6.4	6.6	9.04	9.24	6.09	5.92	147	149
1.27	1.28	2.27	2.31	38	36	11.9	12.3	6.3	6.1	6.53	6.34	141	143
0.91	0.78	2.48	2.53	308	307	14.2	14.8	4.16	4.06	3.53	3.48	138	139
0.68	0.69	2.23	2.21	14	15	8.8	9.2	29.4	29.5	6.56	6.39	154	153
0.96	0.83	2.71	2.73	26	27	11.7	11.5	5.03	5.13	6.81	6.91	160	161
0.61	0.54	1.57	1.56	75	76	7.3	7.7	6.63	6.73	5.95	6.07	149	149
1.18	1.1	2.47	2.44	47	48	13.9	13.7	9.29	9.39	4.42	4.48	158	156
0.83	0.75	2.67	2.68	164	163	14.2	14.5	7.76	7.66	5.39	5.26	160	162
0.66	0.56	2.27	2.29	15	17	11.4	11.9	4.91	5.11	6.84	6.92	148	150

0.92	0.79	2.06	2.08	28	27	7.9	7.8	15.3	15.2	6.93	6.96	143	141
0.05	0.03	2.15	2.16	32	30	13.8	13.2	3.88	3.68	7.18	7.31	137	139
1.33	1.31	2.37	2.35	19	18	5.9	5.6	3.15	3.05	4.81	4.77	170	169
1.52	1.42	2.33	2.36	70	72	7.4	7.9	7.07	7.57	3.39	3.44	150	149
0.62	0.63	1.65	1.63	1044	1046	5.7	5.3	9.47	9.67	6.41	6.51	160	161
0.56	0.57	2.7	2.68	132	134	4.4	4.3	7.35	7.85	3.4	3.37	144	146
0.09	0.15	2.29	2.3	109	108	6.7	6.7	8.39	8.29	5.05	5.06	135	137
1.45	1.4	2.61	2.6	28	30	7.4	7.7	3.2	3.4	4.64	4.66	148	149
1.15	1.07	3.28	3.29	163	162	4.9	5.4	12.2	11.9	5.23	5.09	145	143
1.38	1.39	2.62	2.65	133	134	11.9	12.3	5.04	5.44	7.18	7.14	144	145
0.61	0.62	2.07	2.06	24	25	10.7	10.7	34.2	34.3	6.91	6.83	146	144
1.15	1.07	1.99	2.02	30	32	11.8	11.7	4.32	4.52	5.44	5.48	133	131
1.22	1.15	2.55	2.52	842	843	11.5	10.8	9.02	9.12	5.73	5.59	138	139
0.82	0.72	2.37	2.34	21	23	8.4	8.7	32.2	32.4	3.84	3.93	147	146
1.31	1.24	2.52	2.51	82	83	15.2	15.7	5.6	5.7	4.64	4.59	140	141
0.88	0.84	2.65	2.7	539	540	13.3	13.6	17.8	17.9	6.53	6.53	158	157
0.86	0.81	2.43	2.46	39	38	10.6	10.4	7.16	7.06	4.07	3.98	157	156
1.52	1.44	2.64	2.68	28	31	14.2	14.3	6.61	6.91	3.4	3.41	149	148
1.19	1.11	2.86	2.91	80	81	13.5	13.9	8.58	8.68	3.41	3.51	146	145
1.36	1.27	3.08	3.13	120	118	13.3	13.9	19.2	19	6.49	6.48	155	155
0.69	0.66	2.23	2.25	213	216	5.9	5.6	28.2	28.5	6.91	6.85	149	148
0.78	0.86	2.51	2.56	18	17	5.6	5.7	8.79	8.69	5.2	5.25	149	150
1.35	1.28	2.21	2.24	58	60	9.5	9.9	9.27	9.77	3.89	3.85	146	145
0.58	0.59	3.03	3.01	130	132	10.6	10.5	5.99	6.49	3.8	3.73	149	151
1.18	1.1	2.41	2.46	25	26	3.2	4.8	34.9	35.3	4.17	4.17	139	140
1.25	1.26	1.47	1.49	30	32	4.7	5.9	9.16	9.36	5.68	5.72	142	141
1.23	1.21	2.43	2.42	28	30	7.4	7.9	8.84	9.34	5.97	5.89	152	154
1.45	1.43	1.82	1.8	30	28	5.8	5.6	15.3	15.1	4.19	4.23	131	133
0.76	0.75	2.67	2.64	232	233	15.6	15.5	8.02	8.12	4.7	4.71	139	141
1.22	1.14	2.49	2.52	27	28	7.9	8.2	7.14	7.24	6.5	6.32	142	140
0.75	0.72	2.85	2.87	109	111	10.9	11.2	7.25	7.75	3.41	3.31	146	147
1.64	1.54	2.96	2.93	76	75	14.6	14.2	17.4	17.3	5.17	5.25	138	140
1.26	1.19	2.48	2.51	18	20	1.9	2.2	28.1	28.3	4.42	4.33	150	149
0.83	0.71	2.58	2.56	21	20	15.5	15.3	9.37	9.07	3.94	3.89	147	145
0.93	0.87	2.51	2.56	52	51	10.6	10.9	4.76	4.66	6.9	7.03	137	135
0.56	0.51	0.97	1.02	24	26	10.6	10.4	10.2	10.7	4.1	4.02	149	149
1.53	1.46	2.97	3.01	26	28	4.4	4.6	10.5	11	5.24	5.27	142	144
0.83	0.79	2.58	2.61	73	74	5.9	6.3	1.95	2.35	3.84	3.76	124	123
0.96	0.92	1.73	1.78	18	20	5.8	6.6	29.3	29.5	5.89	5.95	168	167
0.73	0.69	2.3	2.27	74	76	9.5	9.8	6.38	6.88	3.37	3.33	140	138
0.76	0.71	2.59	2.6	118	116	13.4	13.2	4.05	3.85	5.49	5.34	149	150

V- CHEM Cl- mmol/L	Abaxis VS2 Cl- mmol/ L	V- CHEM LAC mmol/L	Abaxis VS2 LAC mmol/L	V- CHEM pH	i-STAT pH	V- CHEM LDH U/L	Abaxis VS2 LDH U/L	V- CHEM FRU μmol/L	IDEXX Catalyst FRU μmol/L
119	117	2.34	2.31	7.25	7.23	214	213	150	152
118	119	2.26	2.25	7.25	7.27	118	119	152	150
135	134	1.82	1.83	7.3	7.29	150	152	153	151
110	111	2.00	2.08	7.3	7.32	234	237	153	155
117	120	3.94	4.09	7.5	7.48	172	170	161	160
118	117	2.68	2.78	7.52	7.54	126	127	159	164
136	139	3.09	3.08	7.48	7.46	230	232	158	152
118	116	1.44	1.43	7.76	7.78	266	265	162	160
120	118	2.86	2.97	7.49	7.48	695	696	163	163
115	116	1.38	1.39	7.4	7.42	180	182	158	161
116	115	2.38	2.36	7.38	7.37	519	515	157	159
92	93	1.49	1.48	7.78	7.76	134	135	163	160
130	129	1.50	1.51	7.8	7.78	171	170	164	161
92	93	1.44	1.43	7.21	7.23	234	235	169	164
118	117	1.80	1.87	7.22	7.24	134	136	166	162
113	115	4.16	4.14	7.35	7.33	126	125	168	171
124	121	1.42	1.37	7.46	7.47	289	290	169	170
111	108	1.22	1.23	7.65	7.66	178	178	167	168
118	117	3.45	3.69	7.32	7.34	152	151	171	172
120	118	1.79	1.78	7.33	7.3	92	91	172	175
129	132	3.57	3.54	7.45	7.43	165	167	181	179
122	125	3.67	3.69	7.59	7.57	392	393	191	190
103	104	5.81	5.77	7.29	7.31	237	236	185	188
124	127	2.55	2.68	7.45	7.43	169	172	185	187
123	122	1.81	2.01	7.41	7.39	240	239	186	188
118	115	2.56	2.74	7.21	7.19	213	214	182	184
127	130	6.20	6.17	7.28	7.26	200	201	178	176
137	135	4.45	4.43	7.43	7.41	158	159	179	177
126	127	1.58	1.65	7.42	7.44	188	188	184	182
125	124	5.78	5.73	7.39	7.40	246	247	186	188
121	122	2.09	2.14	7.54	7.56	260	257	182	184
113	116	1.27	1.47	7.56	7.54	1290	1291	183	181
114	113	2.38	2.4	7.29	7.27	191	193	191	190
130	133	3.32	3.27	7.62	7.6	119	117	195	194
116	115	2.92	2.89	7.71	7.69	303	302	196	194
112	111	2.55	2.53	7.21	7.19	284	285	193	192
130	133	2.36	2.33	7.33	7.3	131	130	193	194
115	118	2.58	2.68	7.55	7.52	239	237	176	178

102	103	8.83	8.81	7.54	7.52	86	84	120	121	173	175	2.56	2.38
111	112	8.72	8.7	7.56	7.54	124	128	166	168	177	179	1.90	2.10
125	123	3.35	3.36	7.71	7.69	25	24	265	257	172	170	2.53	2.56
106	108	3.88	3.88	7.81	7.79	45	43	202	203	200	199	2.09	2.06
114	115	5.11	5.08	7.65	7.66	76	75	118	116	201	201	2.82	2.92
124	122	2.96	2.94	7.55	7.57	116	118	130	131	205	204	2.36	2.35
126	124	2.04	2.09	7.69	7.66	185	188	1213	1215	206	203	2.71	2.74
117	118	2.55	2.53	7.58	7.54	114	118	385	386	208	206	2.15	2.27
106	105	3.96	3.91	7.49	7.45	27	26	280	278	209	210	89.88	89.78
116	117	1.24	1.12	7.42	7.44	96	98	177	178	207	205	25.33	25.49
126	129	1.04	1.23	7.49	7.46	144	140	222	225	210	207	2.24	2.34
119	118	0.83	1.03	7.62	7.6	148	151	231	230	211	212	2.95	2.85
114	117	3.23	3.23	7.38	7.36	133	137	228	229	213	214	5.42	5.62
100	103	3.30	3.37	7.35	7.36	42	42	209	207	215	210	2.10	2.33
125	123	3.29	3.23	7.64	7.66	136	133	143	140	216	214	2.91	2.74
131	133	1.18	1.04	7.66	7.64	124	126	211	211	218	216	5.25	5.38
113	115	3.27	3.2	7.59	7.54	142	145	106	107	219	217	14.47	14.57
121	119	3.17	3.03	7.69	7.64	123	125	482	483	220	218	2.99	3.12
119	120	2.04	1.95	7.54	7.56	104	107	845	847	222	220	2.15	2.16
120	119	2.18	2.19	7.65	7.63	103	101	118	119	225	224	3.47	3.67
110	111	1.99	1.84	7.48	7.46	133	135	131	130	226	223	2.56	2.53
105	106	2.44	2.48	7.58	7.56	22	21	1235	1236	228	226	2.85	2.75
103	105	2.80	2.86	7.49	7.46	53	53	117	119	229	227	2.05	2.03
117	119	1.11	1.13	7.64	7.62	87	85	194	196	233	231	3.03	3.13
109	110	1.96	1.94	7.56	7.53	47	45	424	428	230	232	3.66	3.56
105	103	3.23	3.12	7.25	7.23	112	115	144	142	235	233	21.31	21.51
113	116	3.41	3.5	7.31	7.29	102	103	117	118	236	234	2.55	2.52
128	126	2.16	2.09	7.34	7.32	124	125	772	778	238	238	2.45	2.35
110	108	6.30	6.24	7.43	7.4	54	56	377	378	239	240	2.82	2.97
120	121	3.00	2.98	7.36	7.34	134	136	140	142	240	239	2.04	2.04
135	134	4.19	4	7.38	7.36	53	51	426	424	240	239	2.51	2.49
93	94	0.85	1.01	7.34	7.32	64	62	1410	1411	241	240	2.08	2.06
118	121	2.46	2.35	7.39	7.36	73	73	152	150	245	246	4.68	4.78
124	123	3.60	3.69	7.49	7.46	54	56	377	375	246	247	32.80	32.95
125	128	3.13	3.2	7.51	7.49	94	91	25	26	248	247	2.37	2.36
114	111	2.67	2.49	7.39	7.36	103	105	177	175	249	250	3.30	3.50
115	112	3.63	3.55	7.34	7.32	296	294	395	398	250	251	2.28	2.51
123	122	1.22	1.25	7.52	7.5	75	73	690	692	252	255	2.06	2.05
122	123	3.82	3.66	7.39	7.37	35	34	3128	3139	251	252	2.11	2.09
114	117	3.86	3.81	7.41	7.39	42	43	125	126	253	251	2.18	2.34
122	124	1.92	2.05	7.25	7.22	25	26	816	815	255	254	2.45	2.44
112	113	1.69	1.6	7.39	7.36	87	85	90	89	262	260	2.18	2.38

114	111	3.36	3.37	7.61	7.59	89	88	181	182	263	263	2.93	2.88
122	124	3.29	3.47	7.62	7.6	142	145	536	535	268	269	3.25	3.45
112	114	2.93	2.89	7.66	7.64	132	129	700	693	269	269	3.84	4.04
116	119	1.80	1.69	7.54	7.52	114	111	526	526	267	269	5.84	6.05
115	113	3.14	3.1	7.53	7.51	244	240	690	695	274	277	2.78	2.99
102	103	3.53	3.4	7.62	7.6	174	177	540	546	275	277	3.23	3.37
110	112	3.87	3.82	7.48	7.46	103	102	306	305	274	277	1.83	2.13
119	118	1.03	1.12	7.42	7.4	124	127	625	624	278	275	46.81	46.91
128	126	3.49	3.51	7.32	7.3	42	41	832	826	279	276	2.93	2.84
108	106	2.07	2.17	7.34	7.32	132	134	502	502	280	277	2.08	2.07
118	119	2.51	2.57	7.29	7.27	49	50	390	392	281	280	2.46	2.42
132	131	2.78	2.81	7.81	7.79	114	115	709	712	282	283	2.29	2.28
121	122	1.58	1.45	7.62	7.63	214	211	286	286	283	284	2.28	2.25
132	135	2.32	2.36	7.52	7.54	43	45	390	388	285	283	2.19	2.18
116	115	3.56	3.72	7.46	7.44	33	32	260	262	287	288	2.99	2.98
116	119	1.19	1.21	7.59	7.57	88	90	512	513	290	289	2.42	2.67
119	120	2.94	2.89	7.43	7.4	43	42	636	636	297	299	2.34	2.32
120	119	4.02	3.99	7.64	7.62	136	135	434	438	298	298	2.48	2.61
110	111	1.99	1.85	7.63	7.6	303	307	628	625	294	300	2.26	2.52
105	106	2.90	2.79	7.56	7.54	153	151	771	772	295	296	4.44	4.34

V-CHEM NH3 $\mu\text{mol/L}$	IDEXX Catalyst NH3 $\mu\text{mol/L}$	V-CHEM UA $\mu\text{mol/L}$	Abaxis VS2 UA $\mu\text{mol/L}$
124.1	121.1	29	28
82.6	83	137	139
19	18.8	74	75
74.3	73.2	32	35
38.9	38.5	64	68
69.7	70.7	272	270
64.3	64.1	28	27
57.2	55.8	68	72
46.5	45	26	30
29.7	29.2	110	108
136.4	133.2	54	62
74.4	72.8	80	82
66.1	68.6	58	52
64.8	63	57	54
64.1	64.4	59	61
58.3	55.8	32	35
19.1	19.3	342	343
81.3	79.3	20	18
69.4	70.3	55	56
48.3	47.2	152	146
47.5	49.5	68	68
103.2	106.7	575	569
101.1	99.7	132	130
85.4	81.7	87	88

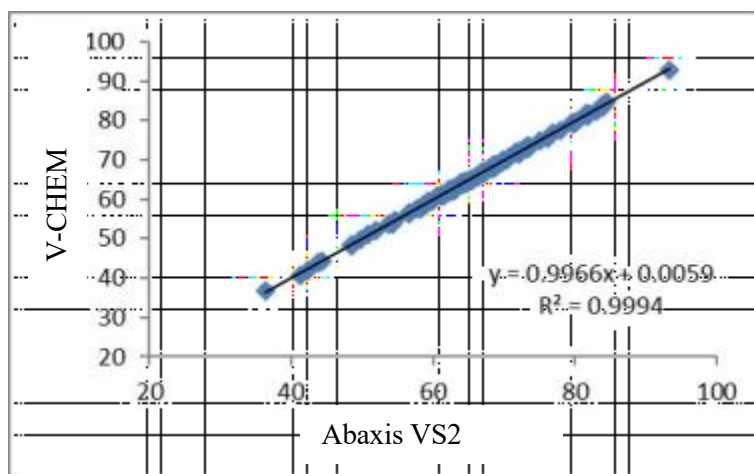
64.3	63	76	75
45.3	46.8	25	24
91.4	93.4	29	28
81.5	81.6	137	139
92.4	90.7	74	75
109.2	110.2	32	35
94.5	97.5	64	68
84.8	82.4	575	569
71.9	72.1	132	130
68.4	70	87	88
68.2	65.9	76	75
39.7	39.3	25	24
31.4	32.2	225	226
103.9	104.1	69	69
92.3	92.9	38	39
34.5	33.3	80	81
88.7	88.3	44	46
73.6	72.4	57	58
63.9	60.7	49	51
134.5	130.8	67	66
131.3	130.6	25	24
89.7	93.5	90	88
79.4	80.9	55	57
76.8	73.3	86	84
75.4	78.7	32	31
75.4	72.2	66	65
74.6	73.9	473	468
72.3	72.4	71	70
68.7	67.7	113	109
54.4	55.4	85	82
48.7	47.5	224	222
42.3	42.5	82	81
39.7	39.3	84	79
36.1	37.4	26	25
62.5	59.4	90	91
61.3	59.4	69	72
141.3	145.4	168	170
81.8	82.9	60	59
78.6	81.7	23	25
76.1	75.9	272	275
31.6	32.8	67	65
82.3	78.4	190	191
73.7	75.5	71	70
73.3	70.2	59	55
39.2	37.8	346	349
26.4	27.7	81	83
14.3	14.1	157	160
98.7	94.1	611	608
93.2	95.9	45	43
75.3	78.4	79	78
73.8	75.4	63	65
61.4	61.3	90	89
208.2	207.2	60	66
83.6	86	16	20

51.6	52.5	202	199
38.4	37.8	132	134
49.5	50.9	83	85
29.5	29.8	262	263
101.6	106.4	70	72
73.2	73.3	58	56
37.7	39.2	115	117
29.6	30.8	55	60
27.5	28.7	74	73
15.6	15.4	68	70
123.1	119	156	157
67.2	65.6	219	220
11.5	11.1	91	93
75.4	76.6	55	54
72.5	69.9	75	77
70.1	71.4	218	222
64.8	63.3	75	78
16.7	17	183	181
16.4	17	190	192
56.2	56.7	162	163
55.6	58.4	41	40
58.1	59.7	266	267

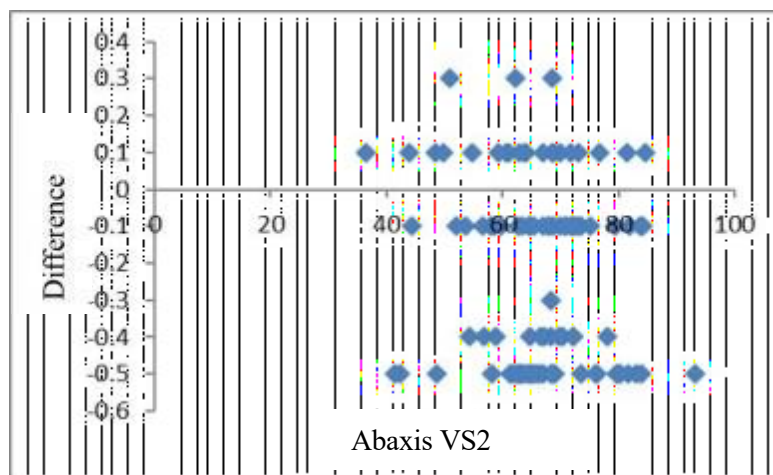
5.2. Results statistics and analysis (TP)

Data mapping: plot the difference between the measured value of the InSight V-CHEM and the Abaxis VS2 and the measured value of the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.2. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.

The correlation coefficient between the test system and the control system is calculated to be $r=0.9997$, which is greater than 0.975. The range of values is appropriate, and the correlation and consistency are good.

5.2.2. Linear regression analysis

Calculated regression equation $y = 0.9966x + 0.0059$

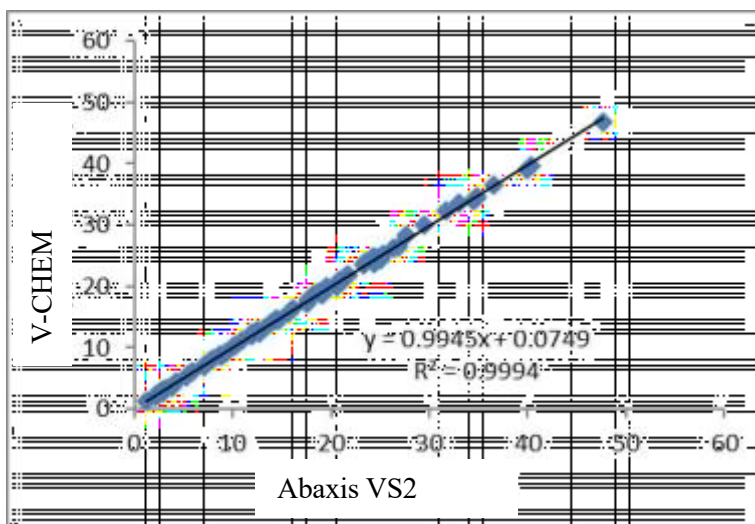
5.2.3. Statistical analysis

The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

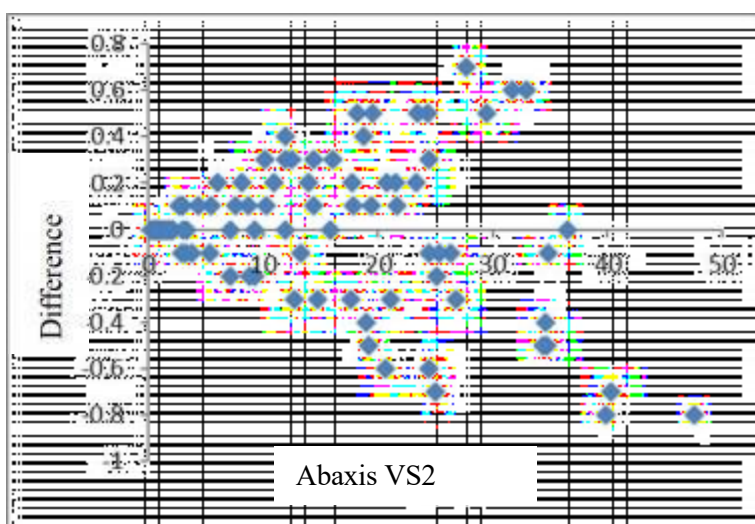
5.3. Results statistics and analysis (TBIL)

Data mapping: plot the difference between the measured value of the test system and the control system and the measured value of the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.3. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.

The correlation coefficient between the test system and the control system is calculated to be $r=0.9997$, which is greater than 0.975. The range of values is appropriate, and the correlation and consistency are good.

5.3.2. Linear regression analysis

Calculated regression equation $y = 0.9945x + 0.0749$

5.3.3. Statistical analysis

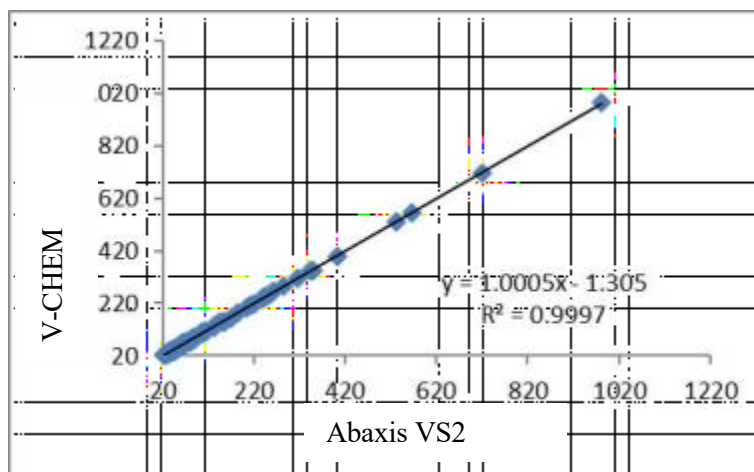
The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

5.4. Results statistics and analysis (ALT)

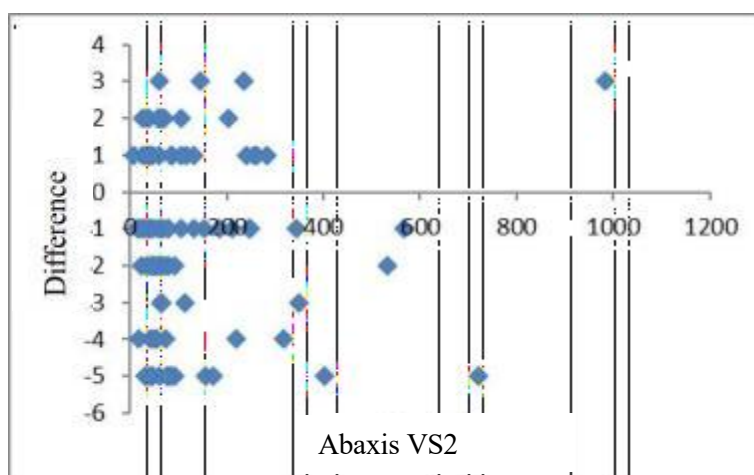
Data mapping: plot the difference between the measured value of the test system and the control system

and the measured value of the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.4. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers. The correlation coefficient of the test system and the control system is calculated to be $r=0.9999$, which is greater than 0.975. The range of values is appropriate, and the correlation and consistency are good.

5.4.2. Linear regression analysis

Calculated regression equation $y = 1.0005x - 1.0305$

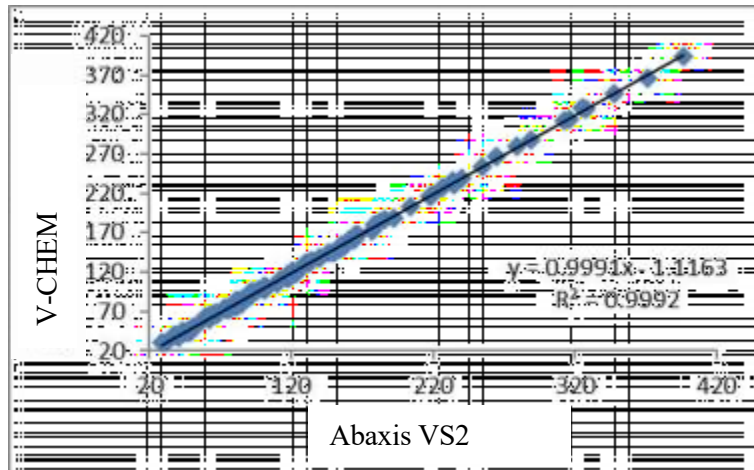
5.4.3. Statistical analysis

The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

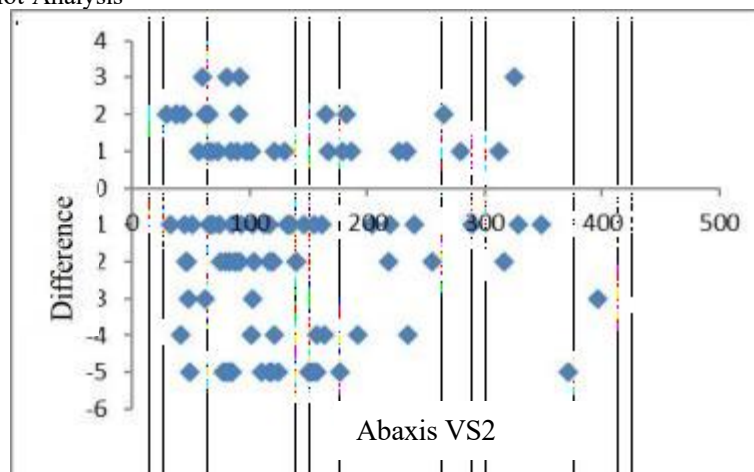
5.5. Results statistics and analysis (CRE)

Data mapping: plot the difference between the measured value of the test system and the control system (the center horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.5. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.

The correlation coefficient between the test system and the control system is calculated to be $r=0.9996$, which is greater than 0.975. The range of values is appropriate, and the correlation and consistency are good.

5.5.2. Linear regression analysis

Calculated regression equation $y = 0.9991x - 1.1163$

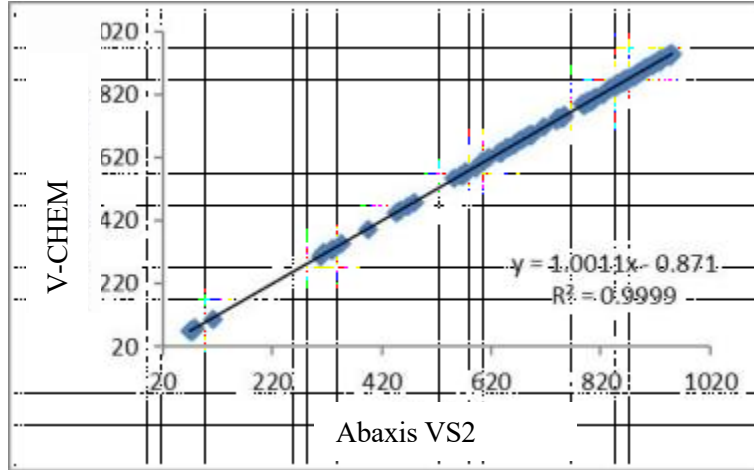
5.5.3. Statistical analysis

The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

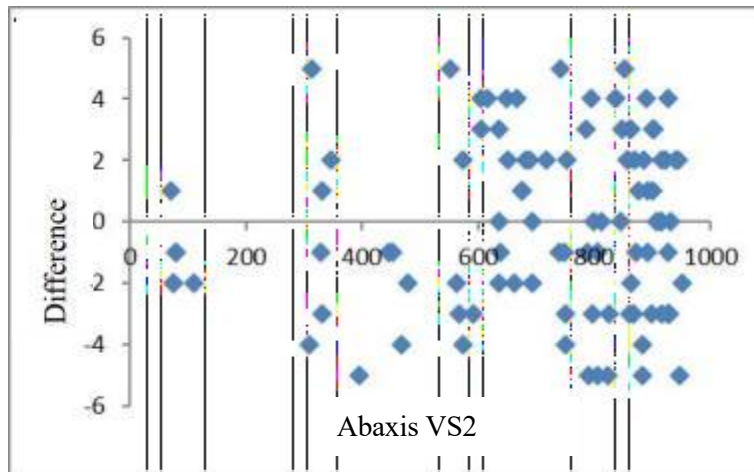
5.6. Results statistics and analysis (AMY)

Data mapping: plot the difference between the measured value of the test system and the control system and the measured value of the control system (the center horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.6. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers. The correlation coefficient between the test system and the control system is calculated to be $r=0.9999$, which is greater than 0.975. The range of values is appropriate, and the correlation and consistency are good.

5.6.2. Linear regression analysis

Calculated regression equation $y = 1.0011x - 0.871$

5.6.3. Statistical analysis

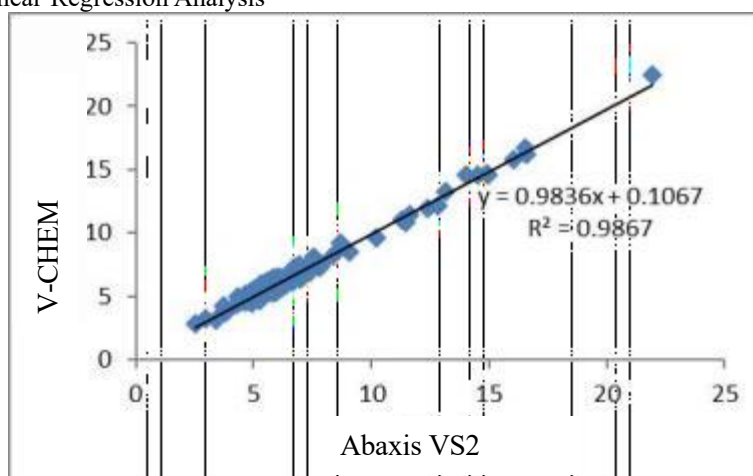
The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

5.7. Results statistics and analysis (GLU)

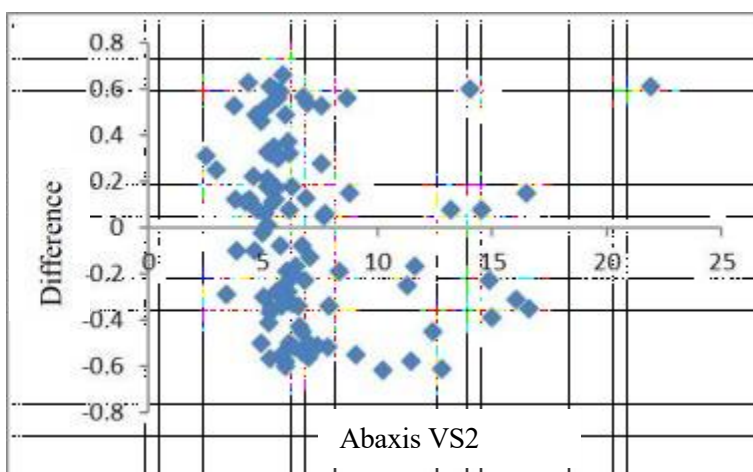
Data mapping: plot the difference between the measured value of the test system and the control system

and the measured value of the control system (the center horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.7. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.

The correlation coefficient between the test system and the control system is $r=0.9933$, which is greater than 0.975. The range of values is suitable, and the correlation and consistency are good.

5.7.2. Linear regression analysis

Calculated regression equation $y = 0.9836x + 0.1067$

5.7.3. Statistical analysis

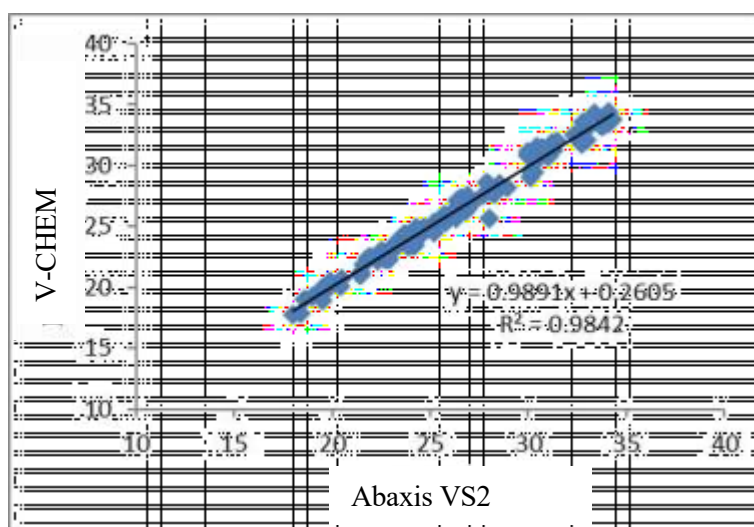
The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

5.8. Results statistics and analysis (tCO₂)

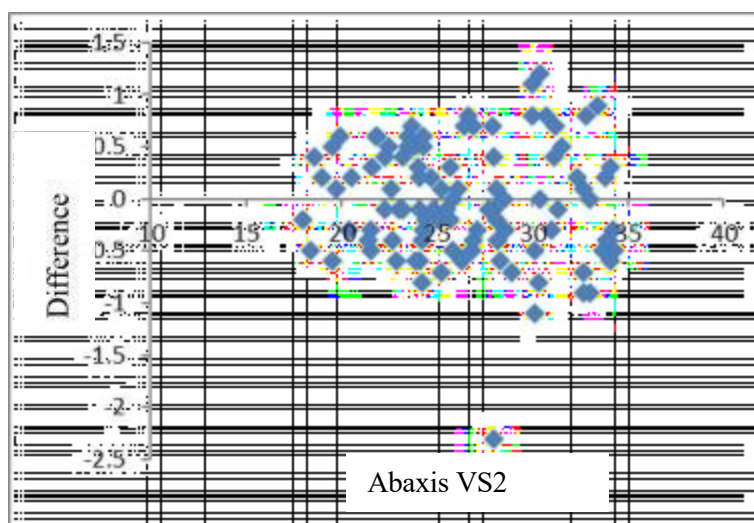
Data mapping: plot the difference between the measured value of the test system and the control system and the measured value of the control system (the centre horizontal line is zero) and the measured system

scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.8.1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.

The correlation coefficient of the test system and the control system is calculated to be $r=0.9921$, which is greater than 0.975. The range of values is appropriate, and the correlation and consistency are good.

5.8.2. Linear regression analysis

Calculated regression equation $y = 0.9891x + 0.2605$

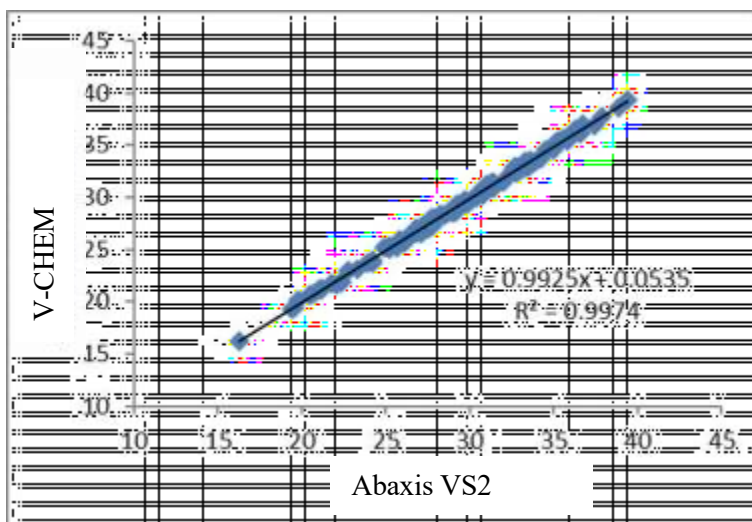
5.8.3. Statistical analysis

The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, and there was no significant difference.

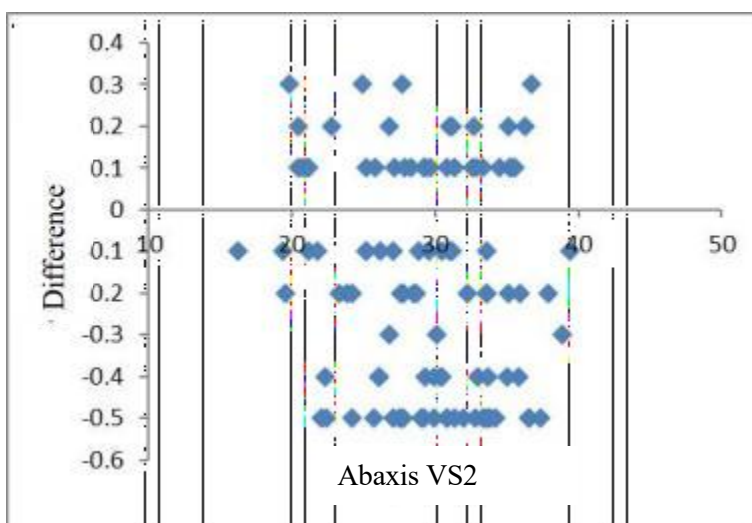
5.9. Results statistics and analysis (ALB)

Data mapping: plot the difference between the measured value of the test system and the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.9. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.

The correlation coefficient between the test system and the control system is $r=0.9987$, which is greater than 0.975. The range of values is suitable, and the correlation and consistency are good.

5.9.2. Linear regression analysis

Calculated regression equation $y = 0.9925x + 0.0535$

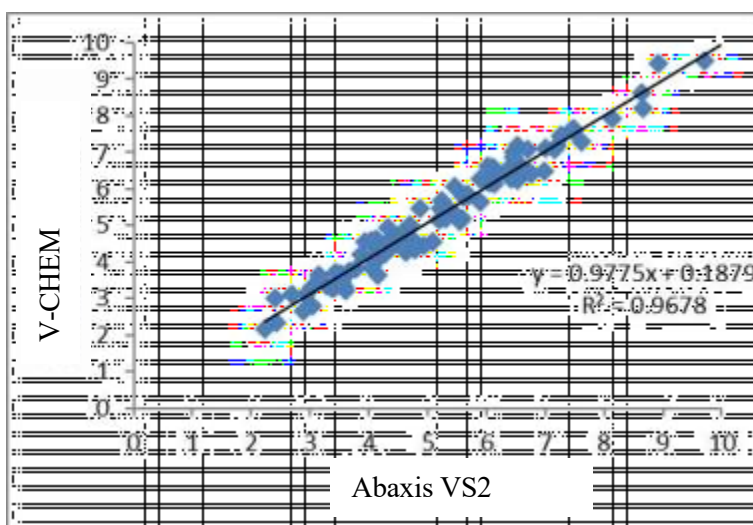
5.9.3. Statistical analysis

The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

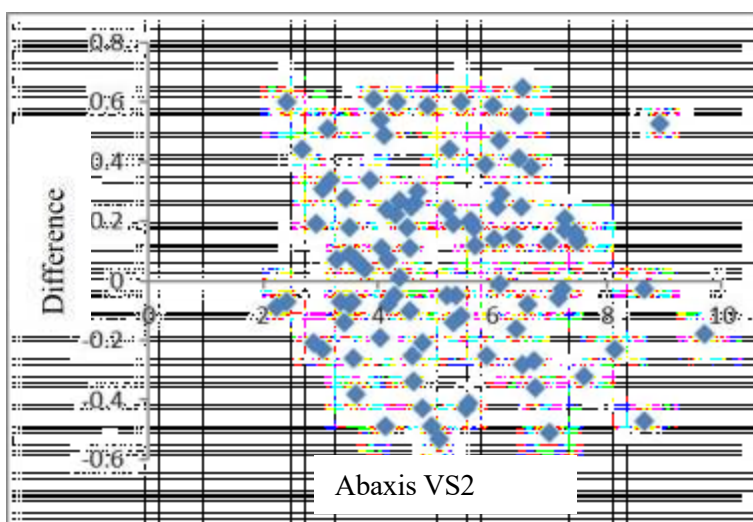
5.10. Results statistics and analysis (CHOL)

Data mapping: plot the difference between the measured value of the test system and the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.10. 1. measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers. The correlation coefficient between the test system and the control system is $r=0.9838$, which is greater than 0.975. The range of values is suitable, and the correlation and consistency are good.

5.10.2. Linear regression analysis

Calculated regression equation $y = 0.9775x + 0.1879$

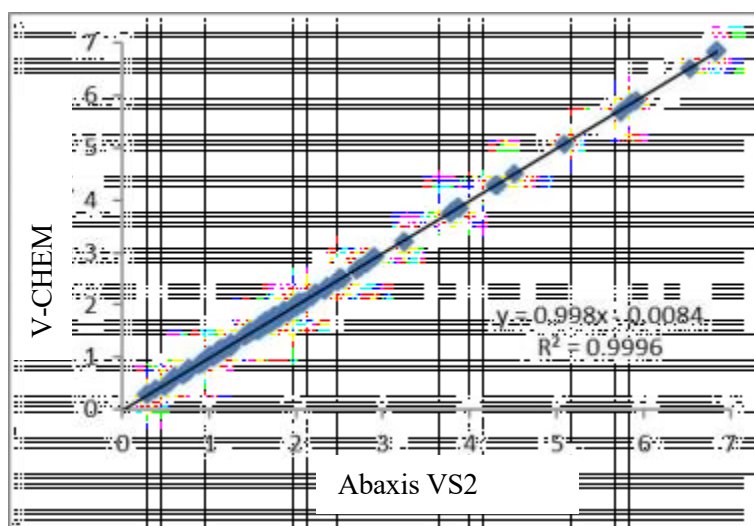
5.10.3. Statistical analysis

The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

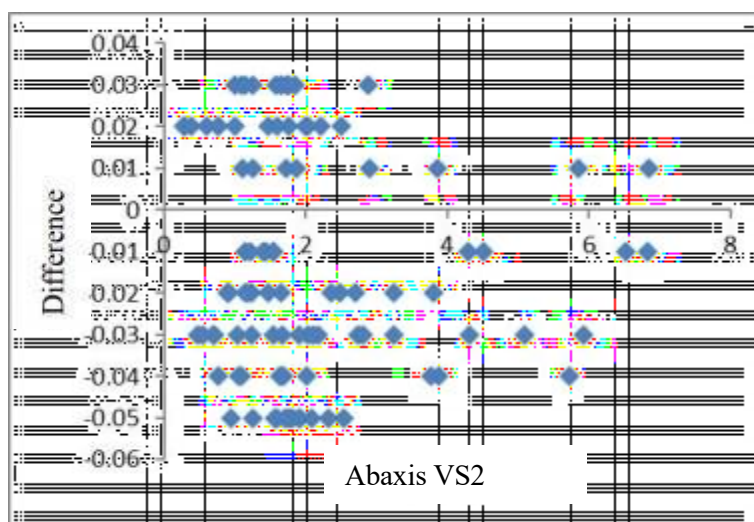
5.11. Results statistics and analysis (P)

Data mapping: plot the difference between the measured value of the test system and the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.11.1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers. The correlation coefficient between the test system and the control system is $r=0.9990$, which is greater than

0.975. The range of values is suitable, and the correlation and consistency are good.

5.11.2. Linear regression analysis

Calculated regression equation $y = 0.998x - 0.0084$

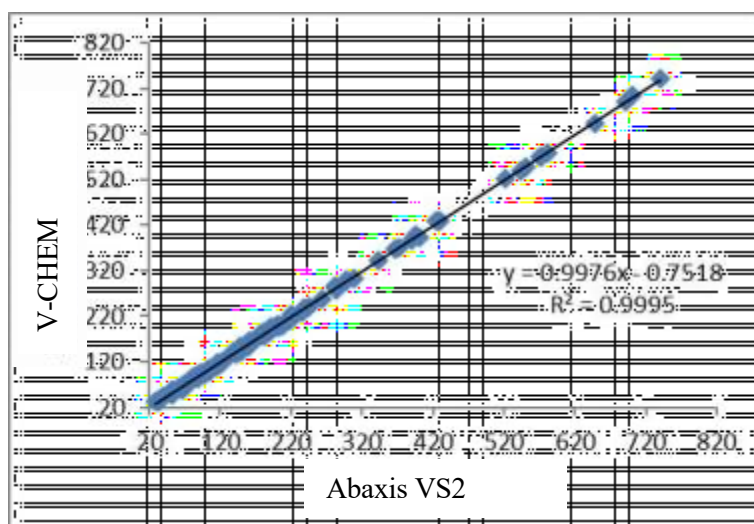
5.11.3. Statistical analysis

The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

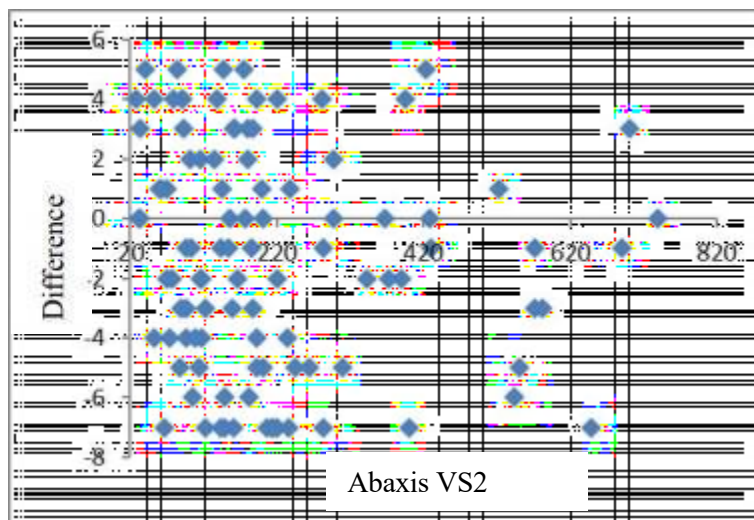
5.12. Results statistics and analysis (CK)

Data mapping: plot the difference between the measured value of the test system and the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.12.1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.

The correlation coefficient between the test system and the control system is $r=0.9998$, which is greater than 0.975. The range of values is suitable, and the correlation and consistency are good.

5.12.2. Linear regression analysis

Calculated regression equation $y = 0.9976x - 0.7518$

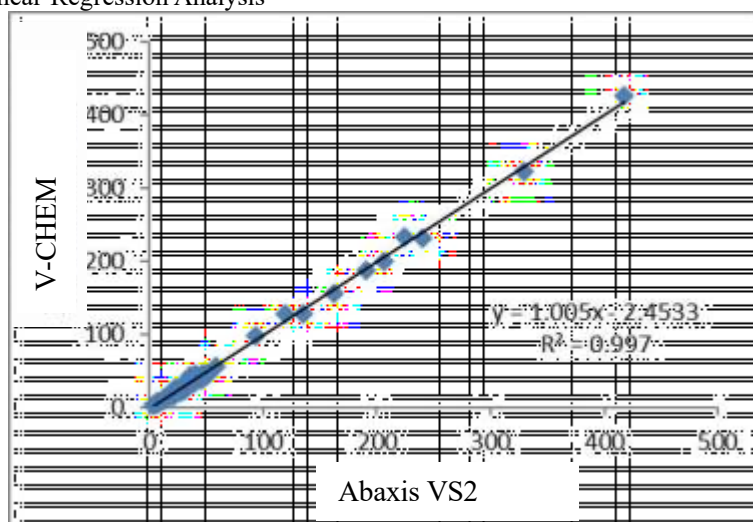
5.12.3. Statistical analysis

The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

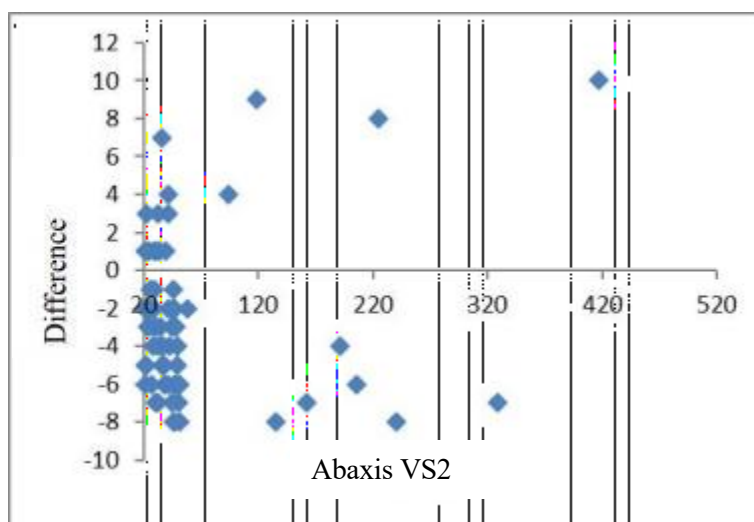
5.13. Results Statistics and Analysis (AST)

Data mapping: plot the difference between the measured value of the test system and the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.13. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.

The correlation coefficient between the test system and the control system is calculated to be $r = 0.9985$, which is greater than 0.975. The range of values is appropriate, and the correlation and consistency are good.

5.13.2. Linear regression analysis

Calculated regression equation $y = 1.005x - 2.4533$

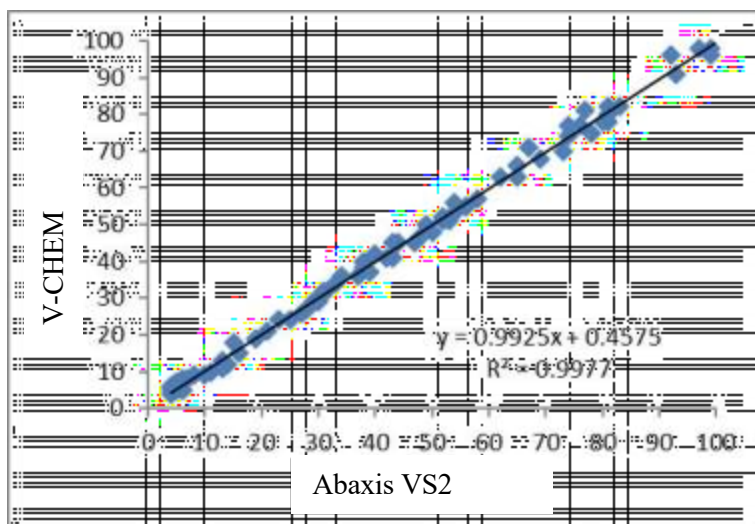
5.13.3. Statistical analysis

The t- test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, and there was no significant difference.

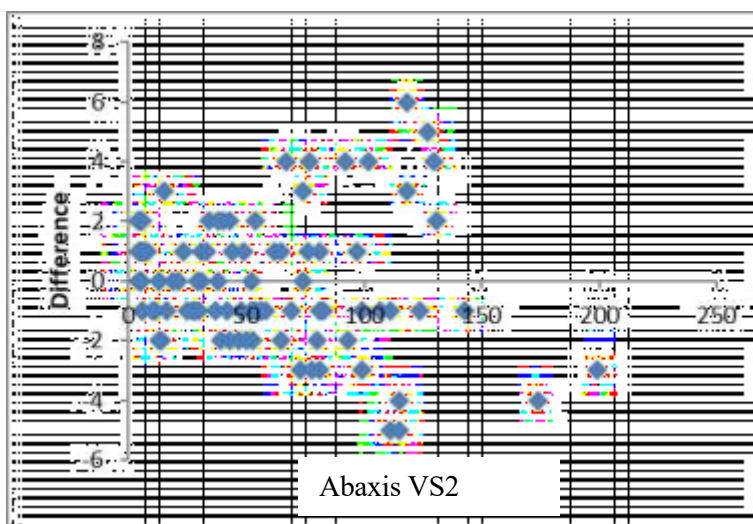
5.14. Results Statistics and Analysis (GGT)

Data mapping: plot the difference between the measured value of the test system and the control system and the measured value of the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.14.1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.

The correlation coefficient between the test system and the control system is $r = 0.9962$, which is greater than 0.975. The range of values is suitable, and the correlation and consistency are good.

5.14.2. Linear regression analysis

Calculated regression equation $y = 0.9925x + 0.4575$

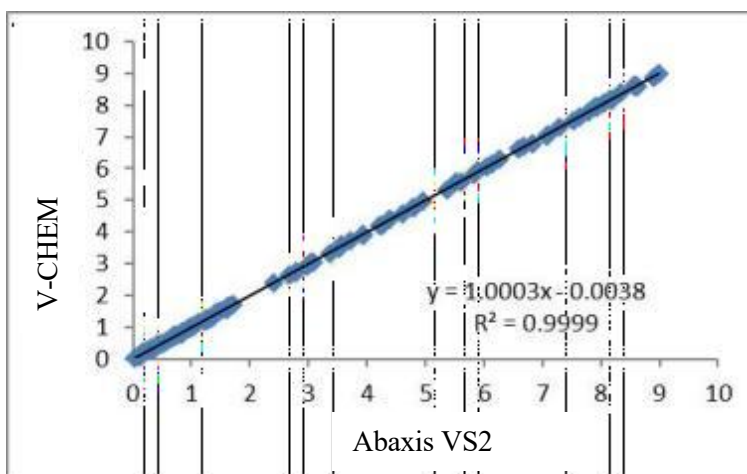
5.14.3. Statistical analysis

The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, and there was no significant difference.

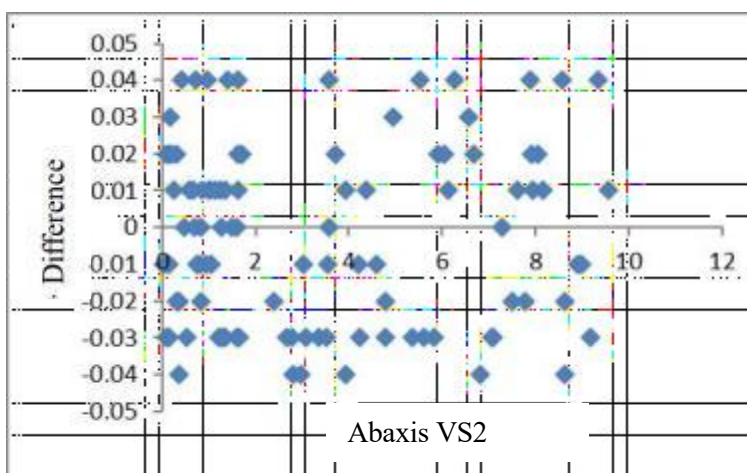
5.15. Results statistics and analysis (TG)

Data mapping: plot the difference between the measured value of the test system and the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.15. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.

The correlation coefficient between the test system and the control system is $r=0.9999$, which is greater than 0.975. The range of values is suitable, and the correlation and consistency are good.

5.15.2. Linear regression analysis

Calculated regression equation $y = 1.0003x - 0.0038$

5.15.3. Statistical analysis

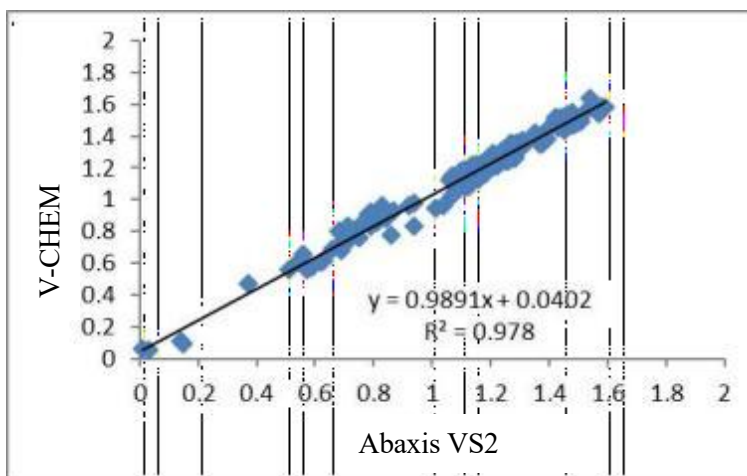
The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

5.16. Results Statistics and Analysis (Mg)

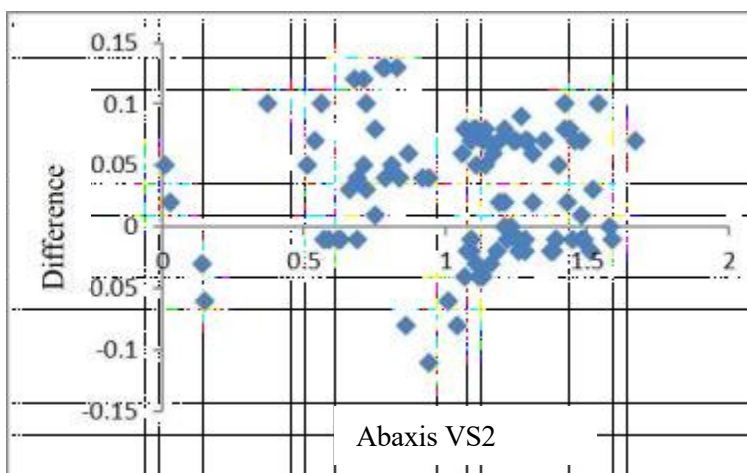
Data mapping: plot the difference between the measured value of the test system and the control system and the measured value of the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the

figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.16. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.

The correlation coefficient between the test system and the control system is calculated to be $r = 0.9889$, which is greater than 0.975. The range of values is appropriate, and the correlation and consistency are good.

5.16.2. Linear regression analysis

Calculated regression equation $y = 0.9891x + 0.0402$

5.16.3. Statistical analysis

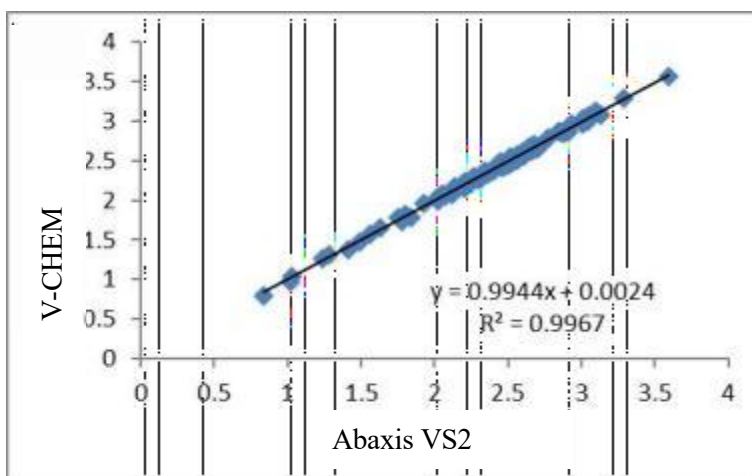
The t- test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, and there was no significant difference.

5.17. Results statistics and analysis (Ca)

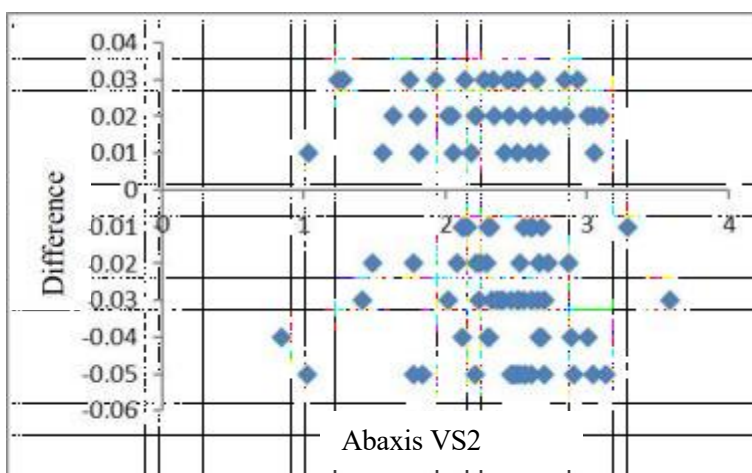
Data mapping: plot the difference between the measured value of the test system and the control system and the measured value of the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown

in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.17. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.

The correlation coefficient between the test system and the control system is $r=0.9983$, which is greater than 0.975. The range of values is suitable, and the correlation and consistency are good.

5.17.2. Linear regression analysis

Calculated regression equation $y = 0.9944x + 0.0024$

5.17.3. Statistical analysis

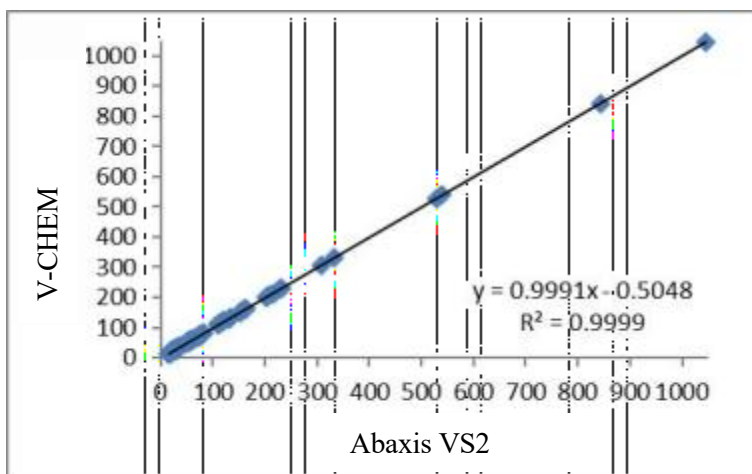
The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

5.18. Results statistics and analysis (ALP)

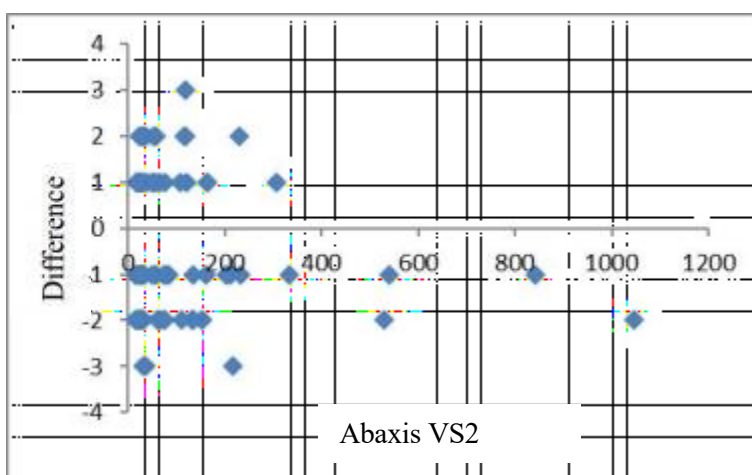
Data mapping: plot the difference between the measured value of the test system and the control system

and the measured value of the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.18. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.

The correlation coefficient between the test system and the control system is calculated to be $r=0.9999$, which is greater than 0.975. The range of values is appropriate, and the correlation and consistency are good.

5.18.2. Linear regression analysis

Calculated regression equation $y = 0.9991x - 0.5048$

5.18.3. Statistical analysis

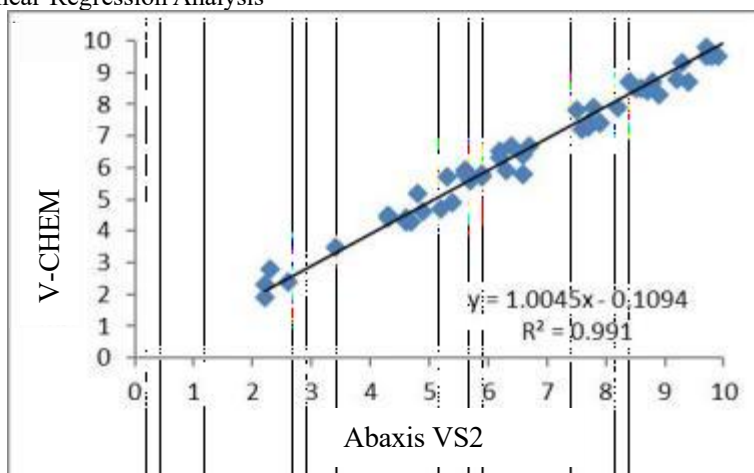
The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

5.19. Results statistics and analysis (TBA)

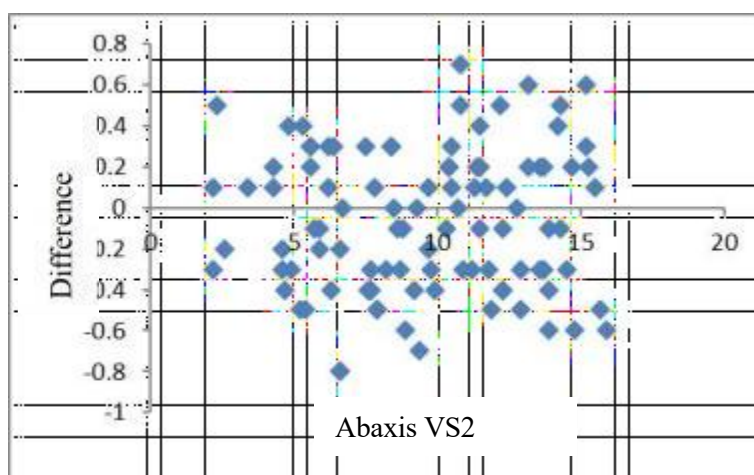
Data mapping: plot the difference between the measured value of the test system and the control system and the measured value of the control system (the centre horizontal line is zero) and the measured system

scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.19. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.

The correlation coefficient between the test system and the control system is calculated to be $r = 0.9955$, which is greater than 0.975. The range of values is appropriate, and the correlation and consistency are good.

5.19.2. Linear regression analysis

Calculated regression equation $y = 1.0045x - 0.1094$

5.19.3. Statistical analysis

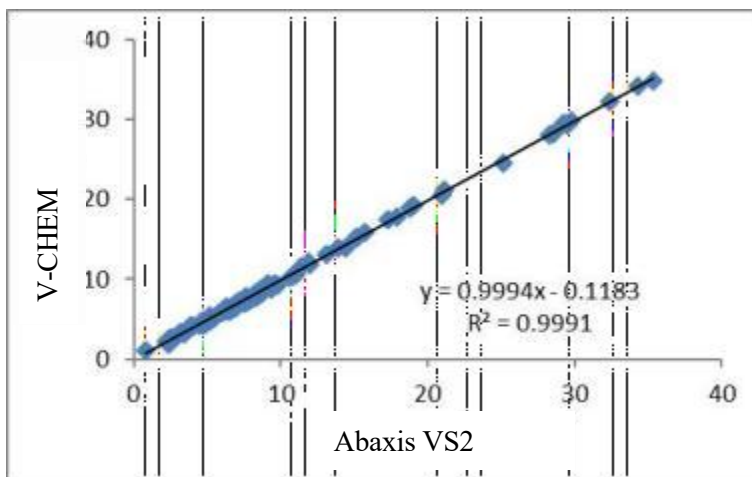
The t- test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, and there was no significant difference.

5.20. Results statistics and analysis (BUN)

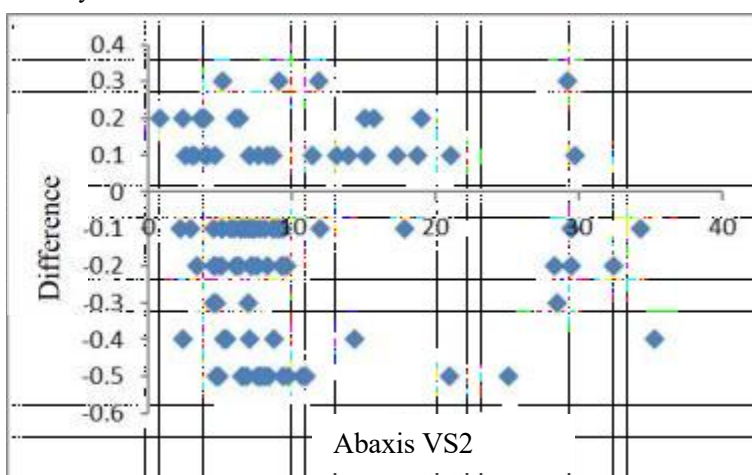
Data mapping: plot the difference between the measured value of the test system and the control system

and the measured value of the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.20. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.

The correlation coefficient between the test system and the control system is $r=0.9996$, which is greater than 0.975. The range of values is suitable, and the correlation and consistency are good.

5.20.2. Linear regression analysis

Calculated regression equation $y = 0.9994x - 0.1183$

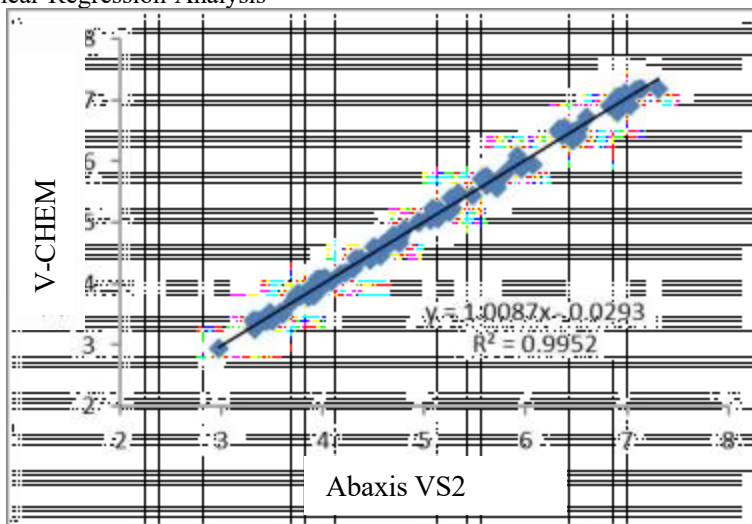
5.20.3. Statistical analysis

The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

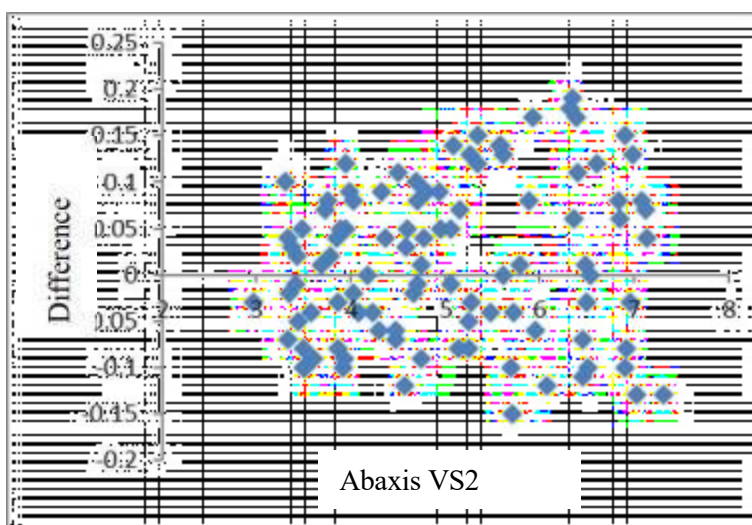
5.21. Results statistics and analysis (K⁺)

Data mapping: plot the difference between the measured value of the test system and the control system and the measured value of the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.21. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers. The correlation coefficient between the test system and the control system is $r=0.9976$, which is greater than 0.975. The range of values is suitable, and the correlation and consistency are good.

5.21.2. Linear regression analysis

Calculated regression equation $y = 1.0087x - 0.0293$

5.21.3. Statistical analysis

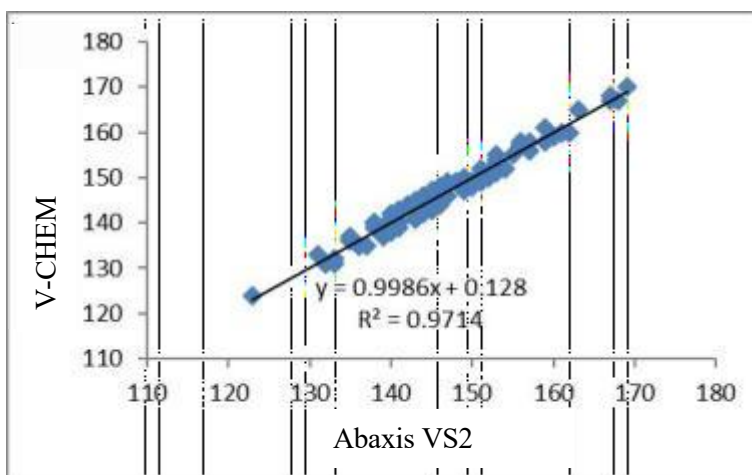
The t-test was performed on the linear regression equations of the test system and the control system, and

the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

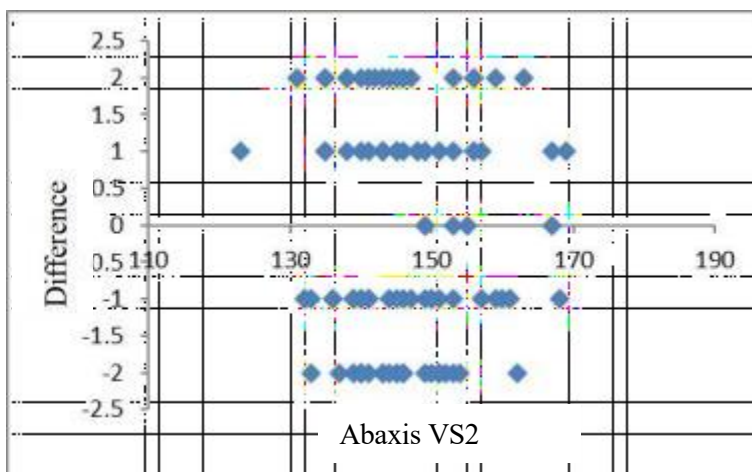
5.22. Results statistics and analysis (Na⁺)

Data mapping: plot the difference between the measured value of the test system and the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.22. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers. The correlation coefficient between the test system and the control system is $r=0.9856$, which is greater than 0.975. The range of values is suitable, and the correlation and consistency are good.

5.22.2. Linear regression analysis

Calculated regression equation $y = 0.9986x + 0.128$

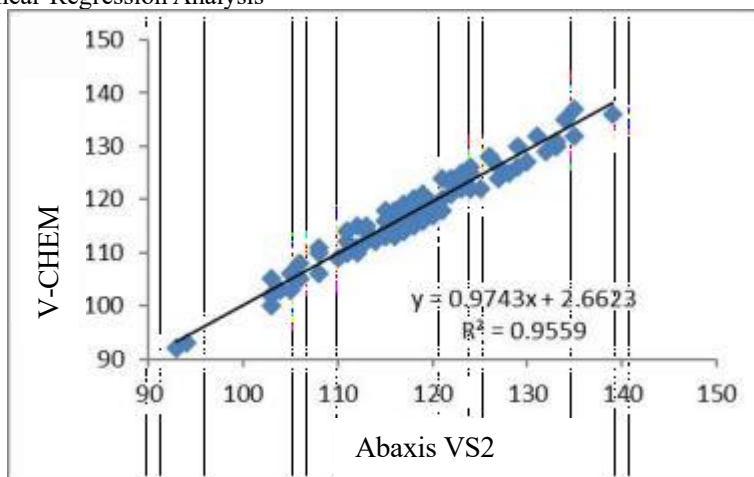
5.22.3. Statistical analysis

The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

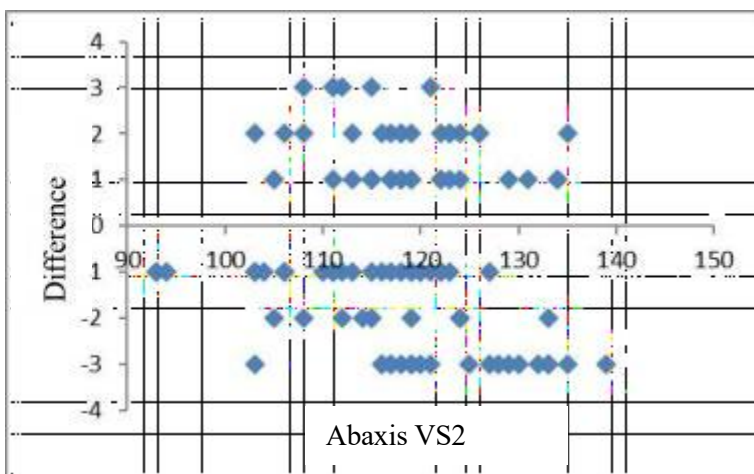
5.23. Results statistics and analysis (CI-)

Data mapping: plot the difference between the measured value of the test system and the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.23. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers. The correlation coefficient between the test system and the control system is $r=0.9777$, which is greater than 0.975. The range of values is suitable, and the correlation and consistency are good.

5.23.2. Linear regression analysis

Calculated regression equation $y = 0.9743x + 2.6623$

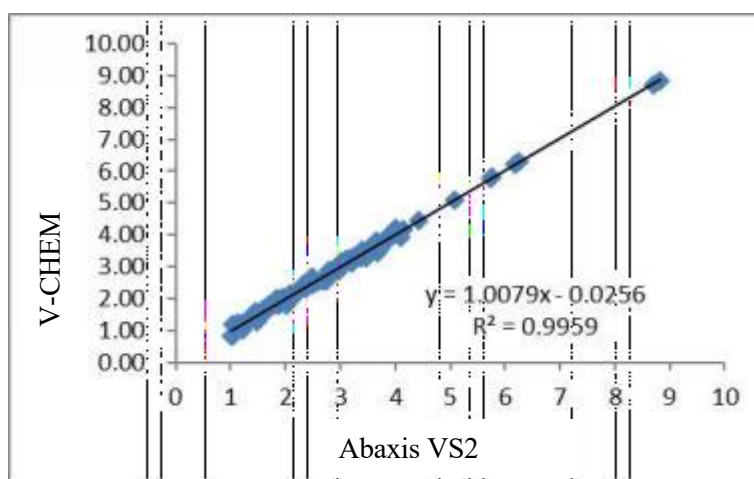
5.23.3. Statistical analysis

The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

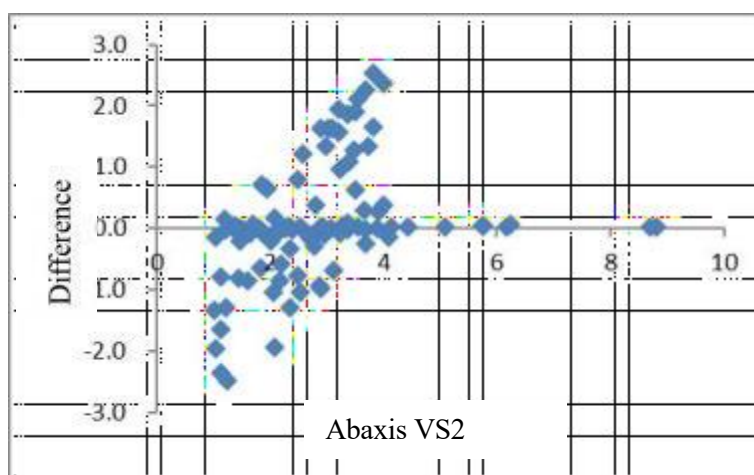
5.24. Results statistics and analysis (LAC)

Data mapping: plot the difference between the measured value of the test system and the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.24. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers. The correlation coefficient between the test system and the control system is $r=0.9972$, which is greater than 0.975. The range of values is suitable, and the correlation and consistency are good.

5.24.2. Linear regression analysis

Calculated regression equation $y = 1.0079x - 0.0256$

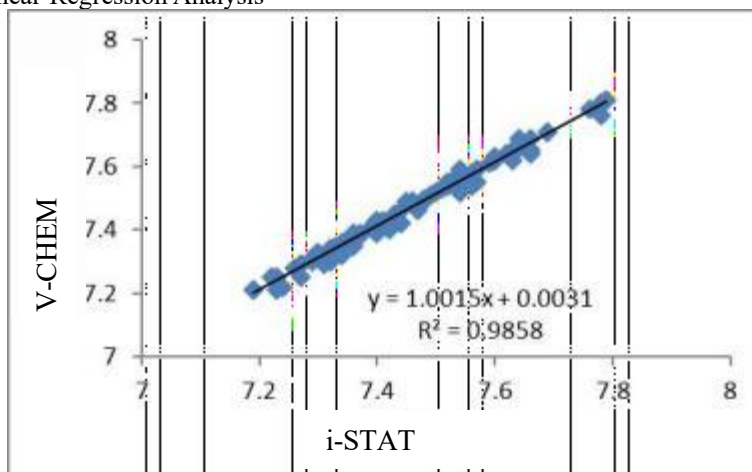
5.24.3. Statistical analysis

The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

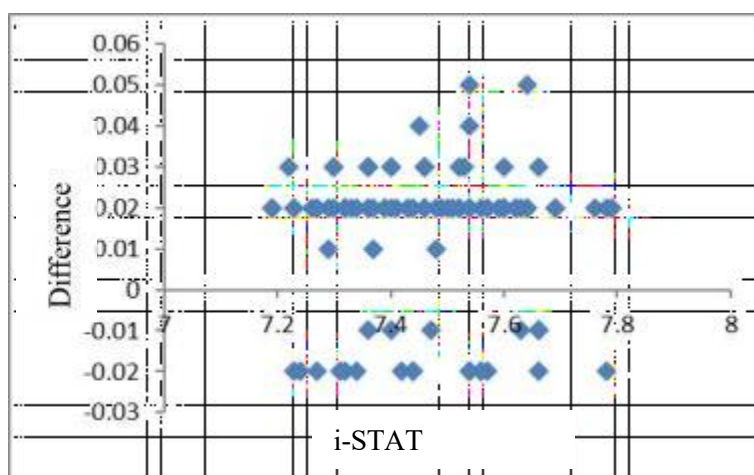
5.25. Results statistics and analysis (pH)

Data mapping: plot the difference between the measured value of the test system and the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.25. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.

The correlation coefficient between the test system and the control system is $r=0.9929$, which is greater than 0.975. The range of values is suitable, and the correlation and consistency are good.

5.25.2. Linear regression analysis

Calculated regression equation $y = 1.0015x + 0.0031$

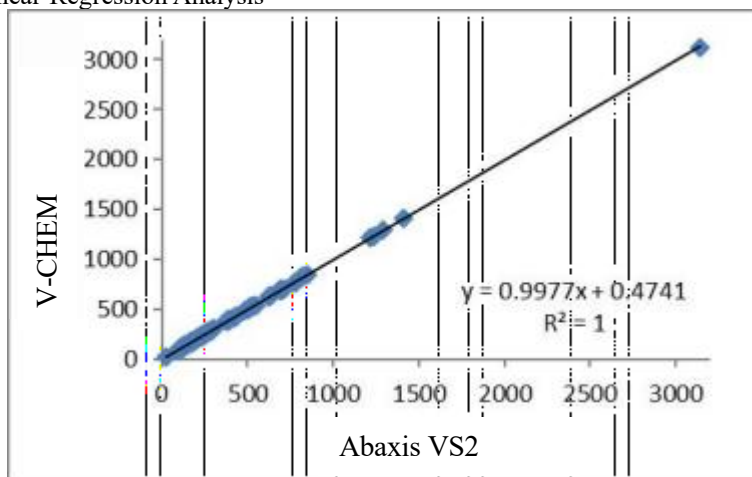
5.25.3. Statistical analysis

The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

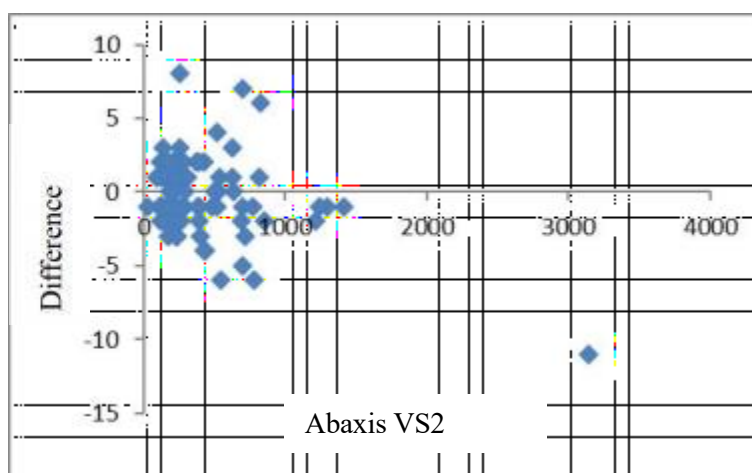
5.26. Results statistics and analysis (LDH)

Data mapping: plot the difference between the measured value of the test system and the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.26.1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.
The correlation coefficient between the test system and the control system is $r=1$, which is greater than 0.975.
The range of values is suitable, and the correlation and consistency are good.

5.26. .2. Linear regression analysis

Calculated regression equation $y = 0.9977x + 0.4741$

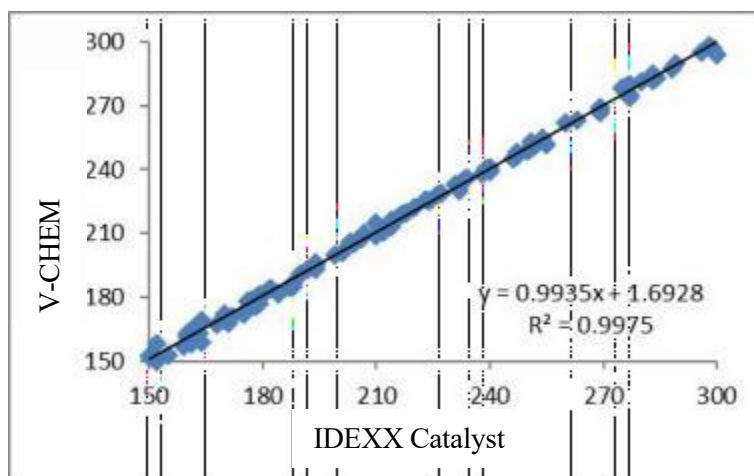
5.26.3. Statistical analysis

The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

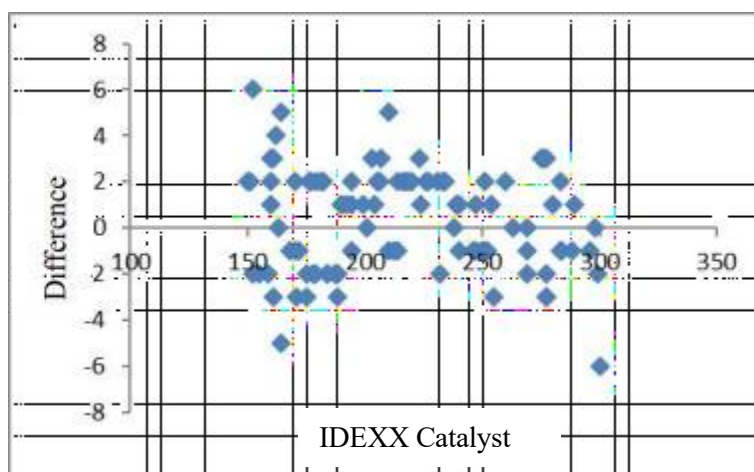
5.27. Results statistics and analysis (FRU)

Data mapping: plot the difference between the measured value of the test system and the control system and the measured value of the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.27.1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.
The correlation coefficient between the test system and the control system is $r=0.9987$, which is greater than 0.975. The range of values is suitable, and the correlation and consistency are good.

5.27.2. Linear regression analysis

Calculated regression equation $y = 0.9935x + 1.6928$

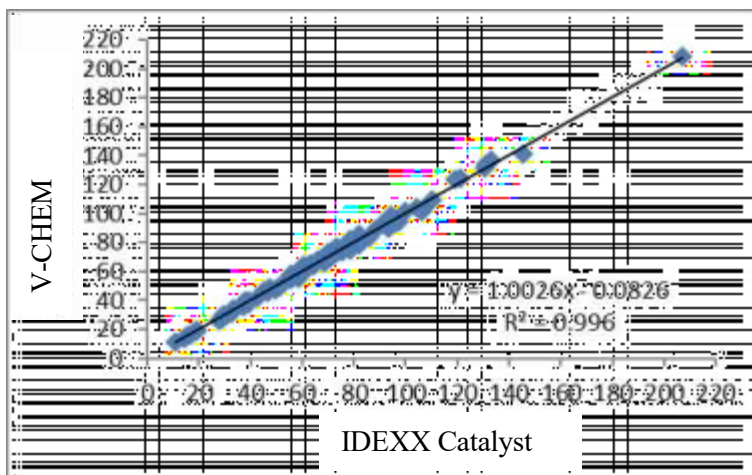
5.27.3. Statistical analysis

The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

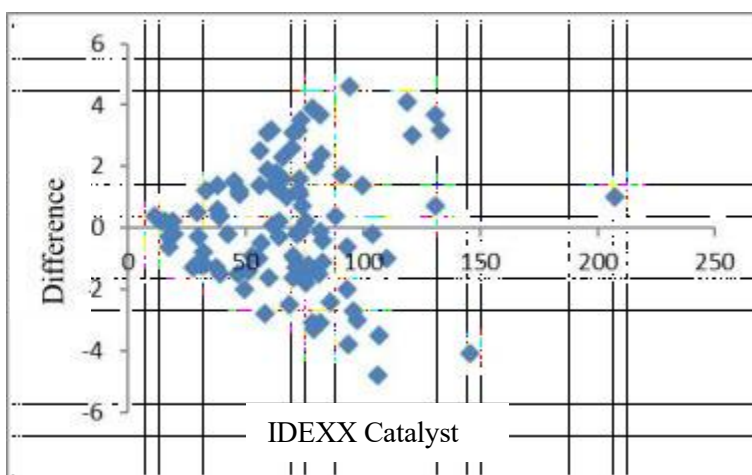
5.28. Results statistics and analysis (NH3)

Data mapping: plot the difference between the measured value of the test system and the control system and the measured value of the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.28. 1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.

The correlation coefficient between the test system and the control system is $r=0.9980$, which is greater than 0.975. The range of values is suitable, and the correlation and consistency are good.

5.28.2. Linear regression analysis

Calculated regression equation $y = 1.0026x - 0.0826$

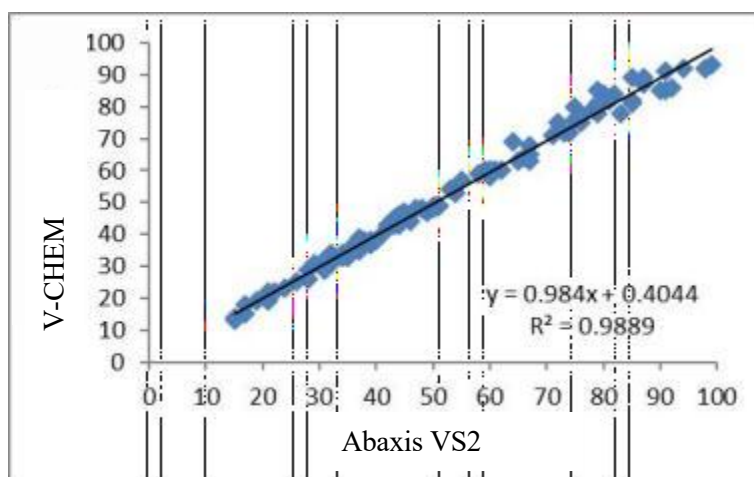
5.28.3. Statistical analysis

The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

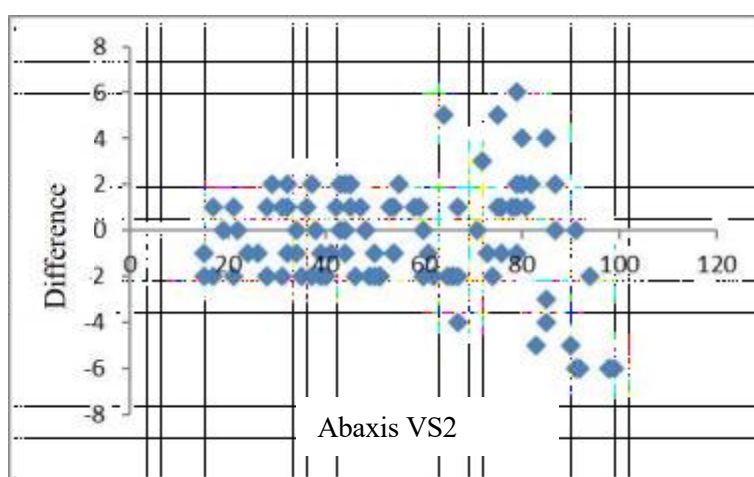
5.29. Results statistics and analysis (UA)

Data mapping: plot the difference between the measured value of the test system and the control system and the measured value of the control system (the centre horizontal line is zero) and the measured system scatter plot (Weighted linear regression graph) of the test system and the control system. The results are shown in the figure.

1) Weighted Linear Regression Analysis



2) Difference Plot Analysis



5.29.1. Measure linearity and calculate correlation coefficient

The test system and the control system showed no outliers.

The correlation coefficient between the test system and the control system is $r=0.9944$, which is greater than 0.975. The range of values is suitable, and the correlation and consistency are good.

5.29.2. Linear regression analysis

Calculated regression equation $y = 0.984x + 0.4044$

5.29.3. Statistical analysis

The t-test was performed on the linear regression equations of the test system and the control system, and the t value was $t > 0.05$, $P < 0.05$. There was a good linear relationship between the two groups of data, no significant difference.

6. Clinical evaluation conclusion

The test results show that the test system is equivalent to the control system, and the correlation is good. There is no significant difference between the two test results, and there is no significant deviation in clinical test.