

# REFERENCE RANGES

## Farm Animals

### CLINICAL CHEMISTRY

	Unit	Cattle	Sheep	Goat	Pig	Alpaca	Llama
<b>Enzymes 37°C</b>							
ALT (GPT)	U/l	< 93	< 33	< 32	< 126	< 93	< 93
α-Amylase	U/l	< 161	< 120	< 120	< 3500	< 161	< 161
AP	U/l	< 484	< 359	< 1942	< 274	< 269	< 192
AST (GOT)	U/l	< 182	< 126	< 135	< 80	< 370	< 330
Cholinesterase	U/l	78 – 156	78 – 156	78 – 156	317 – 788	78 – 156	78 – 156
CK	U/l	< 595	< 208	< 268	< 4769	< 238	< 238
GLDH	U/l	< 48	< 76	< 20	< 6	< 50	< 50
γ-GT	U/l	< 88	< 63	< 63	< 79	< 75	< 45
GPx	U/g Hb	> 130	60 – 180	-	-	-	-
α-HBDH	U/l	< 909	< 909	< 909	< 390	< 700	< 700
LDH	U/l	< 1364	< 1325	< 972	< 545	< 900	< 700
Lipase	U/l	2 – 8	-	2 – 8	-	2 – 8	2 – 8
<b>Substrates</b>							
Albumin	g/l	30 – 40	24 – 30	30 – 40	18 – 31	29 – 43	29 – 50
Bilirubin, total (l)	μmol/l	< 5.0	< 8.5	< 8.5	< 4.3	< 6.8	< 8.6
Cholesterol	mmol/l	2.07 – 3.88	1.2 – 1.9	2.07 – 3.88	2.0 – 3.3	0.4 – 2.3	0.34 – 2.3
Total Protein	g/l	60 – 80	50 – 70	60 – 80	55 – 86	57 – 72	47 – 73
Bile Acids	μmol/l	15 – 80	< 10	-	-	-	-
Globulins	g/l	< 48	< 48	< 48	18 – 31 (age dependent)	< 31	< 32
Glucose	mmol/l	1.94 – 3.05	2.2 – 5.2	2.2 – 5.2	3.9 – 6.4	5.7 – 8.3	5.7 – 7.0
Urea	mmol/l	< 8	4.5 – 10.7	4.5 – 10.7	3.3 – 8.3	3.6 – 10.1	3.2 – 12.8
β-HBS	mmol/l	0.2 – 1.0	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Creatinine	μmol/l	88 – 177	50 – 120	50 – 120	40 – 130	88 – 212	80 – 248
Lactate	mmol/l	0.5 – 3.0	1 – 1.4	1 – 1.4	-	0.5 – 3.0	0.5 – 3.0
NEFA	mmol/l	0.4 – 0.8	0.1 – 0.5	0.1 – 0.5	0.1 – 0.5	0.1 – 0.5	0.1 – 0.5
Triglyceride	mmol/l	0.17 – 0.51	0.06 – 0.34	0.17 – 0.51	< 0.5	< 0.6	< 0.27
<b>Electrolytes</b>							
Calcium	mmol/l	2.3 – 2.8	2.1 – 2.7	2.2 – 2.8	2.4 – 3.5	2.1 – 2.5	1.9 – 2.7
Chlorid	mmol/l	90 – 110	75 – 114	97 – 110	102 – 106	109 – 141	105 – 130
Iron	μmol/l	20 – 40	20 – 30	16 – 35	16.7 – 35.5	18.8 – 37.4	18.6 – 30.8
Potassium (K)	mmol/l	3.5 – 4.5	3.5 – 4.5	4.5 – 6.5	4.0 – 5.0	4.0 – 5.7	3.6 – 6.2
Cobalt	μg/l	1.0 – 3.5	-	-	-	-	-
Copper	μmol/l	8 – 24	7 – 24	16 – 32	16 – 39	2.1 – 12.5	6.1 – 7.9
Magnesium	mmol/l	0.8 – 1.3	0.8 – 1.0	0.8 – 1.0	1.1 – 1.5	0.7 – 1.0	0.8 – 1.1
Sodium (Na)	mmol/l	135 – 145	145 – 155	135 – 157	140 – 160	146 – 155	148 – 158
Phosphate	mmol/l	1.1 – 2.4	1.1 – 2.5	1.61 – 2.26	2.1 – 3.3	1.1 – 2.5	1.5 – 3.6
Selenium	μg/l	40 – 85	55 – 170	62 – 158	100 – 200	> 99	> 99
Zinc	μmol/l	8 – 24	11.0 – 20.5	10.7 – 19.9	10 – 20	3.0 – 14.6	4.1 – 12.4