Haematology and Biochemistry Reference Ranges for Alpaca

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Introduction

The alpaca is a relatively recent introduced species in New Zealand. As a consequence, information on haematology and biochemistry reference ranges in healthy alpaca grazing NZ pastures is limited. The NZ Alpaca Association, with funding contributions from the MAF Sustainable Farming Fund and Gribbles Veterinary Pathology recently undertook a project to determine mineral levels for NZ alpaca. These samples were also used for haematology and biochemistry testing

METHODS

The samples were derived from clinically normal, adult alpaca between the ages of 1 and 10 years. Five alpaca were bled from each farm during the spring months of 2004 and samples were received at Gribbles-Alpha within 24 hours of sampling.

Haematology tests were performed using the Advia from Bayer. The biochemical tests were analysed at 30˚C using an Hitachi 717 autoanalyser. Results were recorded in Microsoft Excel and a frequency of analyte level graph plotted for each analyte. If the results appeared normally distributed, then the 2.5 and 97.5 percentiles were calculated from the arithmetic mean and SD. If the data was not normally distributed, the data was log transformed and geometric mean and geometric SD calculated. The 2.5 and 97.5 percentile points were calculated from the formulas Geomean/(GeoSD^2) for the 2.5 percentile and Geomeanx(GeoSD^2) for the 97.5 percentile. .

RESULTS

A total of 10 alpaca farms participated in this study and these were in both the North and South Islands. The samples were received between 15th October and 3rd November 2004 with a total of 48 alpaca being tested (five per farm for 8 farms and 4 per farm for 2 farms).

Haematology

Haematocrit, haemoglobin, red cell count, MCV, monocyte, basophil and fibrinogen levels were normally distributed.
MCHC, WBC count, segmented neutrophil count, lymphocyte count, and eosinophil counts were skewed so were log transformed.

The 2.5 and 97.5 percentile values for all haematology analytes are presented in table 1.

Table 1: Haematology reference ranges for alpaca

Test	Units	2.5%	97.5%
Haematocrit	L/l	0.21	0.41
Haemoglobin	G/l	97	165
Red cell count	10^{12}/l	9.25	15.45
MCV	Fl	21	29
MCH		9	15
MCHC		314	480
WBC	10^9/l	7.5	24
Band Neutrophils	10^9/l	0	0
Seg Neutrophils	10^9/l	3.1	14.4
Lymphocytes	10^9/l	1.3	9.0
Monocytes	10^9/l	0	0.9
Eosinophils	10^9/l	0.5	7.9
Basophils	10^9/l	0	0.3
Fibrinogen	G/l	1.1	3.9

Biochemistry

AST, GGT, total bilirubin, total protein, albumin, globulin, A/G ratio, creatinine, phosphate, calcium, magnesium, BOH, sodium, potassium were normally distributed.

CK, GDH, and urea were log transformed and 95% confidence range calculated from the geometric mean and standard deviation.

The 2.5 and 97.5 percentile values for the biochemical analytes are presented in table 2.

Table 2: Biochemistry reference ranges for alpaca

Test	Units	2.5%	97.5%
CK	U/l 30˚C	13	580
AST	U/l 30˚C	80	200
GDH	U/l 30˚C	2	36
GGT	U/l 30˚C	10	35
Total bilirubin	Mmol/l	0	1.6
Total protein	G/l	56	76
Albumin	G/l	30	44
Globulin	G/l	21	36
A/G ratio		0.8	1.8
Creatinine	Umol/l	82	171
Urea	Mmol/l	5	12
Phosphate	Mmol/l	1.2	4.6
Calcium	Mmol/l	2.13	2.65
Magnesium	Mmol/l	0.71	1.23
BOH	Mmol/l	0	0.2
Sodium	Mmol/l	143	154
Potassium	Mmol/l	3.5	8.6