

Manitoba Average Forage Mineral Concentrations



MINERALS

From 2000 to 2005, Manitoba Agriculture, Food and Rural Initiatives conducted an extension program designed to encourage feed testing and ration balancing with livestock producers in Manitoba. These reported results have been calculated from feed samples submitted by Manitoba producers. All samples were analyzed at Norwest/Bodycote Labs in Winnipeg.

		HAY																	
		Alfalfa				Alfalfa / Grass				Grass / Alfalfa	Clover/ Grass	Crested wheat grass	Meadow brome grass	Orchard grass	Perennial ryegrass	Tall fescue	Timothy	Native	Slough
		1 st cut	2 nd cut	3 rd cut	All cuts	1 st cut	2 nd cut	3 rd cut	All cuts	All cuts									
Calcium (%)	# Samples	76	84	7	391	87	54	1	634	79	13	6	5	3	5	4	28	22	48
	Average	1.57	1.63	1.59	1.59	1.17	1.46	1.53	1.19	0.81	1.01	0.29	0.51	0.47	0.33	0.37	0.33	0.47	0.54
	Minimum	0.63	0.60	1.22	0.41	0.42	0.80	1.53	0.20	0.25	0.41	0.24	0.25	0.29	0.30	0.22	0.15	0.27	0.26
	Maximum	2.58	2.30	2.13	2.89	1.92	2.33	1.53	2.62	1.58	1.52	0.41	1.14	0.69	0.36	0.46	0.60	0.86	1.08
Copper (ppm)	# Samples	4	10	1	28	14	10	0	97	8	1	0	1	1	0	0	6	5	1
	Average	4.98	9.27	8.20	7.55	5.04	6.73	n/a	6.11	4.86	6.40	n/a	2.40	5.10	n/a	n/a	2.05	2.60	3.50
	Minimum	2.30	3.60	8.20	2.00	1.10	0.60	n/a	0.60	3.20	6.40	n/a	2.40	5.10	n/a	n/a	0.80	0.60	3.50
	Maximum	7.50	16.70	8.20	16.90	13.60	8.20	n/a	13.70	8.70	6.40	n/a	2.40	5.10	n/a	n/a	2.50	6.50	3.50
Iron (ppm)	# Samples	4	9	1	25	n/a	n/a	n/a	98	8	1	0	1	1	0	0	7	5	2
	Average	174	228	209	164	n/a	n/a	n/a	116	107	106	n/a	54	64	n/a	n/a	53	136	199
	Minimum	65	80	209	48	n/a	n/a	n/a	23	48	106	n/a	54	64	n/a	n/a	35	72	70
	Maximum	299	334	209	334	n/a	n/a	n/a	772	299	106	n/a	54	64	n/a	n/a	71	269	327
Magnesium (%)	# Samples	76	84	7	391	87	54	1	634	79	13	6	5	3	5	4	28	22	48
	Average	0.34	0.36	0.34	0.35	0.30	0.37	0.30	0.30	0.24	0.35	0.14	0.19	0.28	0.21	0.26	0.14	0.25	0.27
	Minimum	0.15	0.17	0.23	0.15	0.12	0.20	0.30	0.07	0.08	0.23	0.09	0.10	0.25	0.20	0.21	0.09	0.12	0.12
	Maximum	0.61	0.58	0.40	0.67	0.51	0.61	0.30	0.66	0.60	0.53	0.21	0.28	0.31	0.23	0.37	0.25	0.42	0.51
Manganese (ppm)	# Samples	4	9	1	25	14	12	0	99	8	1	0	1	1	0	0	7	5	1
	Average	42.2	42.2	45.0	39.9	29.7	45.6	n/a	36.4	32.2	48.4	n/a	21.0	29.4	n/a	n/a	32.3	97.8	110.0
	Minimum	25.6	15.6	45.0	15.6	10.1	14.8	n/a	4.2	25.6	48.4	n/a	21.0	29.4	n/a	n/a	12.8	37.6	110.0
	Maximum	57.4	56.4	45.0	62.7	56.8	84.2	n/a	97.4	40.9	48.4	n/a	21.0	29.4	n/a	n/a	56.1	268.0	110.0
Molybdenum (ppm)	# Samples	4	10	1	28	14	11	0	98	6	1	0	1	1	0	0	7	5	1
	Average	2.10	4.44	8.60	3.26	2.36	3.20	n/a	2.91	2.67	5.20	n/a	5.10	1.00	n/a	n/a	2.46	0.72	1.40
	Minimum	0.60	1.30	8.60	0.60	0.60	0.60	n/a	0.60	0.60	5.20	n/a	5.10	1.00	n/a	n/a	1.40	0.50	1.40
	Maximum	4.40	6.80	8.60	8.60	5.70	7.80	n/a	14.30	5.70	5.20	n/a	5.10	1.00	n/a	n/a	5.30	1.30	1.40
Nitrate (%)	# Samples	4	9	0	13	2	2	0	12	1	0	0	0	0	0	0	2	1	0
	Average	0.05	0.04	n/a	0.04	0.03	0.01	n/a	0.07	0.16	n/a	n/a	n/a	n/a	n/a	n/a	0.06	0.02	n/a
	Minimum	0.01	0.01	n/a	0.01	0.01	0.01	n/a	0.01	0.16	n/a	n/a	n/a	n/a	n/a	n/a	0.06	0.02	n/a
	Maximum	0.09	0.08	n/a	0.09	0.04	0.01	n/a	0.22	0.16	n/a	n/a	n/a	n/a	n/a	n/a	0.06	0.02	n/a
Phosphorus (%)	# Samples	76	84	7	391	87	54	1	634	79	13	6	5	3	5	4	28	22	48
	Average	0.24	0.23	0.25	0.23	0.21	0.22	0.21	0.20	0.19	0.18	0.15	0.15	0.19	0.15	0.12	0.16	0.11	0.12
	Minimum	0.09	0.11	0.21	0.09	0.05	0.13	0.21	0.05	0.08	0.10	0.07	0.10	0.12	0.10	0.09	0.10	0.06	0.06
	Maximum	0.45	0.39	0.34	0.45	0.39	0.39	0.21	0.40	0.44	0.24	0.19	0.24	0.23	0.20	0.16	0.31	0.26	0.29
Potassium (%)	# Samples	76	84	7	391	87	54	1	634	79	13	6	5	3	5	4	28	22	48
	Average	2.32	2.21	2.33	2.24	2.09	2.13	2.16	1.99	1.93	1.99	1.48	1.93	1.96	1.42	1.97	1.47	1.11	1.30
	Minimum	0.95	0.59	2.05	0.59	0.54	0.87	2.16	0.54	0.75	1.38	0.97	1.40	1.19	0.21	1.48	0.53	0.53	0.41
	Maximum	3.50	3.27	2.50	4.05	3.25	2.87	2.16	3.33	3.72	2.96	2.07	2.41	2.66	2.05	2.73	2.74	2.02	3.14
Salt (%)	# Samples	44	41	2	182	35	17	0	280	43	6	5	1	2	4	2	8	11	35
	Average	0.10	0.17	0.18	0.13	0.10	0.11	n/a	0.08	0.06	0.06	0.05	0.14	0.31	0.08	0.11	0.04	0.08	0.21
	Minimum	0.03	0.03	0.13	0.03	0.03	0.06	n/a	0.03	0.03	0.03	0.03	0.14	0.04	0.06	0.03	0.03	0.03	0.03
	Maximum	0.34	0.51	0.23	0.83	0.36	0.38	n/a	0.72	0.16	0.15	0.11	0.14	0.57	0.10	0.19	0.08	0.28	1.04
Sodium (%)	# Samples	76	84	7	391	86	52	1	631	79	13	6	5	3	5	4	28	22	48
	Average	0.04	0.06	0.06	0.05	0.03	0.05	0.01	0.03	0.02	0.02	0.02	0.02	0.09	0.03	0.04	0.01	0.05	0.08
	Minimum	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01
	Maximum	0.13	0.32	0.09	0.42	0.14	0.21	0.01	0.28	0.08	0.06	0.04	0.05	0.23	0.05	0.08	0.03	0.20	0.41
Sulfur (%)	# Samples	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Average	n/a	n/a	n/a	0.30	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Minimum	n/a	n/a	n/a	0.30	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Maximum	n/a	n/a	n/a	0.30	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Zinc (ppm)	# Samples	4	10	1	28	14	12	0	99	8	1	0	1	1	0	0	7	5	1
	Average	17.8	20.4	14.4	19.9	12.7	17.7	n/a	18.3	16.5	4.8	n/a	13.6	14.9	n/a	n/a	13.5	22.8	15.9
	Minimum	6.0	9.6	14.4	0.6	5.0	9.1	n/a	1.7	13.0	4.8	n/a	13.6	14.9	n/a	n/a	2.7	19.9	15.9
	Maximum	25.0	28.7	14.4	34.8	20.2	24.3	n/a	37.7	21.3	4.8	n/a	13.6	14.9	n/a	n/a	27.3	29.2	15.9
As Fed pH	# Samples	2	0	0	5	0	0	0	1	2	0	0	0	0	0	0	0	0	1
	Average	5.30	n/a	n/a	4.62	n/a	n/a	n/a	4.60	5.25	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	6.30
	Minimum	4.50	n/a	n/a	4.10	n/a	n/a	n/a	4.60	5.20	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	6.30
	Maximum	6.10	n/a	n/a	6.10	n/a	n/a	n/a	4.60	5.30	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	6.30

- All analyte values are shown on a dry matter basis unless otherwise specified
- All mineral data was analyzed by wet chemistry
- Data collected from random feed samples submitted by Manitoba producers to Norwest/Bodycote Lab between 2000 and 2005.

		SILAGE																		
		Alfalfa				Alfalfa / Grass			Barley	Canola	Corn	Fall Rye	Millet	Oats	Sorghum Sudan grass	Wheat	Barley & oat	Barley & pea		
		1st cut	2nd cut	3rd cut	All cuts	1st cut	2nd cut	All cuts	All cuts											
Calcium (%)	# Samples	6	4	2	110	4	3	45	180	7	281	6	15	68	8	4	4	6		
	Average	1.47	1.52	1.32	1.54	1.24	2.20	1.41	0.43	1.64	0.28	0.43	0.43	0.36	0.69	0.23	0.42	0.68		
	Minimum	0.87	1.26	0.94	0.14	0.82	1.29	0.65	0.15	0.69	0.08	0.16	0.19	0.10	0.38	0.16	0.24	0.51		
	Maximum	1.88	1.87	1.69	2.70	1.50	2.81	2.81	1.71	2.09	2.09	1.38	0.72	0.64	1.24	0.31	0.73	0.95		
Copper (ppm)	# Samples	4	3	0	20	1	1	9	34	1	25	0	0	15	1	0	1	0		
	Average	7.85	6.17	n/a	6.50	8.90	3.90	8.02	4.93	4.60	3.92	n/a	n/a	4.25	1.90	n/a	6.30	n/a		
	Minimum	2.40	2.90	n/a	2.40	8.90	3.90	3.90	0.60	4.60	0.01	n/a	n/a	1.90	1.90	n/a	6.30	n/a		
	Maximum	12.60	8.90	n/a	12.60	8.90	3.90	19.40	11.20	4.60	7.70	n/a	n/a	8.70	1.90	n/a	6.30	n/a		
Iron (ppm)	# Samples	n/a	n/a	n/a	16	1	1	8	30	1	24	0	0	15	1	0	1	0		
	Average	n/a	n/a	n/a	206	82	137	118	224	119	192	n/a	n/a	196	140	n/a	107	n/a		
	Minimum	n/a	n/a	n/a	36	82	137	64	53	119	60	n/a	n/a	80	140	n/a	107	n/a		
	Maximum	n/a	n/a	n/a	738	82	137	178	1150	119	1230	n/a	n/a	709	140	n/a	107	n/a		
Magnesium (%)	# Samples	6	4	2	110	4	3	45	0	0	0	0	0	0	0	0	4	6		
	Average	0.38	0.43	0.48	0.38	0.31	0.38	0.35	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.35	0.35		
	Minimum	0.30	0.28	0.46	0.04	0.19	0.28	0.19	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.16	0.28		
	Maximum	0.45	0.55	0.49	0.64	0.48	0.50	0.87	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.50	0.42		
Manganese (ppm)	# Samples	2	3	0	16	1	1	8	29	1	24	0	0	15	1	0	1	0		
	Average	18.1	19.8	n/a	36.0	16.5	56.9	37.3	29.2	35.9	28.3	n/a	n/a	38.2	4.5	n/a	17.7	n/a		
	Minimum	13.8	13.4	n/a	13.4	16.5	56.9	16.5	1.4	35.9	11.7	n/a	n/a	10.5	4.5	n/a	17.7	n/a		
	Maximum	22.3	25.5	n/a	86.1	16.5	56.9	69.0	95.5	35.9	67.9	n/a	n/a	70.0	4.5	n/a	17.7	n/a		
Molybdenum (ppm)	# Samples	n/a	n/a	n/a	20	1	1	7	34	1	24	0	0	15	1	0	1	0		
	Average	n/a	n/a	n/a	3.19	2.20	0.60	1.96	1.65	1.00	1.19	n/a	n/a	2.67	1.40	n/a	1.60	n/a		
	Minimum	n/a	n/a	n/a	0.50	2.20	0.60	0.60	0.50	1.00	0.40	n/a	n/a	0.50	1.40	n/a	1.60	n/a		
	Maximum	n/a	n/a	n/a	22.80	2.20	0.60	3.80	4.50	1.00	6.10	n/a	n/a	10.00	1.40	n/a	1.60	n/a		
Nitrate (%)	# Samples	1	1	0	4	0	0	0	27	4	46	0	3	16	8	1	0	0		
	Average	0.07	0.04	n/a	0.07	n/a	n/a	n/a	0.16	0.20	0.13	n/a	0.08	0.17	0.35	0.03	n/a	n/a		
	Minimum	0.07	0.04	n/a	0.03	n/a	n/a	n/a	0.02	0.14	0.02	n/a	0.05	0.02	0.03	0.03	n/a	n/a		
	Maximum	0.07	0.04	n/a	0.13	n/a	n/a	n/a	0.44	0.35	0.72	n/a	0.15	0.76	1.69	0.03	n/a	n/a		
Phosphorus (%)	# Samples	6	4	2	110	4	3	45	180	7	281	6	15	68	8	4	4	6		
	Average	0.33	0.31	0.20	0.28	0.25	0.26	0.25	0.26	0.28	0.24	0.28	0.24	0.25	0.23	0.23	0.22	0.30		
	Minimum	0.28	0.27	0.17	0.08	0.16	0.17	0.14	0.11	0.20	0.06	0.14	0.14	0.08	0.12	0.18	0.16	0.23		
	Maximum	0.37	0.34	0.22	0.66	0.34	0.40	0.40	0.46	0.33	0.43	0.43	0.35	0.46	0.35	0.30	0.28	0.36		
Potassium (%)	# Samples	6	4	2	110	4	3	45	180	7	281	6	15	68	8	4	4	6		
	Average	2.16	2.35	1.71	2.44	2.28	2.01	2.36	1.71	1.71	1.19	1.74	2.52	2.02	2.42	1.74	1.85	1.55		
	Minimum	1.52	1.87	1.41	0.46	1.53	1.95	1.53	0.62	1.44	0.52	1.08	1.34	0.78	1.30	0.88	1.19	1.02		
	Maximum	3.46	3.28	2.01	4.09	3.02	2.07	4.14	2.97	2.69	3.02	2.33	4.73	4.42	3.06	2.57	2.86	2.32		
Salt (%)	# Samples	3	0	0	37	3	2	25	112	6	165	4	12	41	5	2	1	5		
	Average	0.23	n/a	n/a	0.11	0.15	0.22	0.22	0.52	0.20	0.05	0.04	0.09	0.67	0.11	0.17	1.12	0.44		
	Minimum	0.13	n/a	n/a	0.03	0.05	0.22	0.03	0.03	0.07	0.03	0.03	0.03	0.05	0.03	0.14	1.12	0.13		
	Maximum	0.29	n/a	n/a	0.39	0.28	0.22	2.66	3.04	0.50	1.30	0.06	0.27	1.58	0.26	0.19	1.12	0.93		
Sodium (%)	# Samples	6	4	2	109	4	3	45	180	7	273	6	15	68	8	4	4	6		
	Average	0.11	0.09	0.04	0.05	0.08	0.09	0.07	0.19	0.13	0.03	0.04	0.03	0.30	0.05	0.05	0.29	0.17		
	Minimum	0.05	0.04	0.04	0.01	0.02	0.09	0.01	0.01	0.03	0.01	0.01	0.01	0.02	0.01	0.03	0.09	0.05		
	Maximum	0.20	0.14	0.04	0.20	0.15	0.10	1.05	1.20	0.42	3.02	0.18	0.11	1.13	0.10	0.08	0.44	0.37		
Sulfur (%)	# Samples	0	0	0	1	0	8	31	0	3	0	0	0	0	1	0	0	0		
	Average	n/a	n/a	n/a	0.27	n/a	n/a	n/a	n/a	0.64	n/a	n/a	n/a	n/a	0.15	n/a	n/a	n/a		
	Minimum	n/a	n/a	n/a	0.27	n/a	n/a	n/a	n/a	0.62	n/a	n/a	n/a	n/a	0.15	n/a	n/a	n/a		
	Maximum	n/a	n/a	n/a	0.27	n/a	n/a	n/a	n/a	0.69	n/a	n/a	n/a	n/a	0.15	n/a	n/a	n/a		
Zinc (ppm)	# Samples	4	3	0	20	1	1	9	34	1	24	0	0	15	1	0	1	0		
	Average	30.6	18.6	n/a	24.1	19.6	28.8	22.6	25.2	21.7	24.8	n/a	n/a	21.8	10.2	n/a	20.6	n/a		
	Minimum	6.3	8.6	n/a	6.3	19.6	28.8	16.9	0.6	21.7	11.3	n/a	n/a	0.6	10.2	n/a	20.6	n/a		
	Maximum	48.6	26.9	n/a	48.6	19.6	28.8	29.0	97.0	21.7	132.0	n/a	n/a	40.2	10.2	n/a	20.6	n/a		
As Fed pH	# Samples	2	1	0	26	2	0	19	92	4	120	3	10	32	2	2	1	5		
	Average	5.85	5.70	n/a	5.66	5.20	n/a	5.04	5.00	4.93	4.31	4.60	6.31	5.39	5.65	5.30	4.50	5.44		
	Minimum	5.50	5.70	n/a	4.50	5.00	n/a	4.10	3.70	4.20	3.40	4.20	4.70	3.90	4.30	4.30	4.50	3.70		
	Maximum	6.20	5.70	n/a	8.90	5.40	n/a	6.50	8.80	5.60	9.00	5.30	8.60	8.30	7.00	6.30	4.50	7.80		

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- All mineral data was analyzed by wet chemistry
- Data collected from random feed samples submitted by Manitoba producers to Norwest/Bodycote Lab between 2000 and 2005.

		GREENFEED										GRAIN		MISC. FEEDS		
		Barley	Canola	Corn	Fall Rye	Millet	Oats	Sorghum Sudan grass	Soy bean	Turnips	Wheat	Barley	Oats	Wild oat green feed	Kochia hay	Quack grass hay
		All cuts														
Calcium (%)	# Samples	153	16	40	5	163	304	25	6	3	22	101	72	1	6	2
	Average	0.45	1.52	0.23	0.40	0.44	0.33	0.50	1.13	2.10	0.24	0.06	0.10	0.30	0.91	0.53
	Minimum	0.12	1.04	0.06	0.21	0.17	0.06	0.06	0.80	2.04	0.09	0.03	0.06	0.30	0.75	0.41
	Maximum	1.15	1.98	0.46	0.89	1.94	0.90	0.89	1.62	2.20	1.05	0.35	0.35	0.30	1.23	0.64
Copper (ppm)	# Samples	11	3	10	0	1	23	0	0	0	2	3	0	0	0	0
	Average	4.32	4.67	3.04	n/a	8.30	3.80	n/a	n/a	n/a	2.60	4.13	n/a	n/a	n/a	n/a
	Minimum	0.60	2.20	0.60	n/a	8.30	1.00	n/a	n/a	n/a	2.00	2.60	n/a	n/a	n/a	n/a
	Maximum	9.30	8.60	5.50	n/a	8.30	8.80	n/a	n/a	n/a	3.20	5.40	n/a	n/a	n/a	n/a
Iron (ppm)	# Samples	11	3	11	0	1	23	0	0	0	2	4	0	0	0	0
	Average	190	116	250	n/a	409	114	n/a	n/a	n/a	93	72	n/a	n/a	n/a	n/a
	Minimum	37	78	100	n/a	409	39	n/a	n/a	n/a	87	48	n/a	n/a	n/a	n/a
	Maximum	656	150	450	n/a	409	500	n/a	n/a	n/a	100	94	n/a	n/a	n/a	n/a
Magnesium (%)	# Samples	153	16	40	5	163	304	25	6	3	22	101	71	1	6	2
	Average	0.25	0.35	0.24	0.18	0.39	0.22	0.41	0.61	0.55	0.16	0.14	0.16	0.22	0.65	0.13
	Minimum	0.08	0.18	0.12	0.08	0.17	0.07	0.15	0.53	0.48	0.10	0.11	0.10	0.22	0.56	0.12
	Maximum	0.57	0.62	0.48	0.48	1.10	0.49	0.85	0.71	0.59	0.55	0.21	0.22	0.22	0.82	0.14
Manganese (ppm)	# Samples	11	3	11	0	1	23	0	0	0	1	4	0	0	0	0
	Average	25.4	30.9	20.7	n/a	29.7	32.4	n/a	n/a	n/a	57.2	19.7	n/a	n/a	n/a	n/a
	Minimum	11.1	23.7	5.9	n/a	29.7	7.1	n/a	n/a	n/a	57.2	16.6	n/a	n/a	n/a	n/a
	Maximum	40.1	38.6	43.3	n/a	29.7	117.0	n/a	n/a	n/a	57.2	26.4	n/a	n/a	n/a	n/a
Molybdenum (ppm)	# Samples	11	3	11	0	1	23	0	0	0	2	3	0	0	0	0
	Average	2.65	2.03	1.67	n/a	1.40	1.80	n/a	n/a	n/a	0.80	2.53	n/a	n/a	n/a	n/a
	Minimum	0.60	0.60	0.70	n/a	1.40	0.50	n/a	n/a	n/a	0.60	0.80	n/a	n/a	n/a	n/a
	Maximum	6.90	3.20	5.00	n/a	1.40	6.10	n/a	n/a	n/a	1.00	4.40	n/a	n/a	n/a	n/a
Nitrate (%)	# Samples	95	14	42	1	106	328	17	3	3	19	0	2	2	1	0
	Average	0.36	0.21	0.28	1.19	0.33	0.32	0.39	0.01	0.13	0.24	n/a	0.01	0.31	0.27	n/a
	Minimum	0.01	0.05	0.02	1.19	0.01	0.01	0.02	0.01	0.08	0.02	n/a	0.01	0.28	0.27	n/a
	Maximum	1.93	0.47	1.50	1.19	1.40	1.86	0.95	0.01	0.19	0.66	n/a	0.01	0.33	0.27	n/a
Phosphorus (%)	# Samples	153	16	40	5	163	304	25	6	3	22	101	72	1	6	2
	Average	0.25	0.27	0.27	0.25	0.22	0.23	0.21	0.23	0.57	0.23	0.37	0.37	0.27	0.20	0.17
	Minimum	0.08	0.18	0.04	0.07	0.06	0.04	0.09	0.16	0.53	0.13	0.23	0.22	0.27	0.15	0.14
	Maximum	0.46	0.36	0.40	0.32	0.48	0.55	0.37	0.35	0.59	0.35	0.51	0.60	0.27	0.25	0.19
Potassium (%)	# Samples	153	16	40	5	163	304	25	6	3	22	101	71	1	6	2
	Average	1.78	1.43	1.15	1.78	2.20	2.03	2.08	0.85	4.72	1.42	0.53	0.46	2.14	1.61	0.62
	Minimum	0.45	0.77	0.68	0.88	0.72	0.41	0.45	0.60	4.41	0.42	0.31	0.26	2.14	1.01	0.28
	Maximum	3.57	2.20	2.66	3.45	4.38	4.06	3.10	1.31	5.07	2.43	0.91	0.67	2.14	2.90	0.95
Salt (%)	# Samples	109	16	23	4	144	208	22	6	3	14	101	71	1	5	1
	Average	0.44	0.19	0.04	0.20	0.13	0.77	0.26	0.04	0.18	0.16	0.05	0.05	0.17	3.30	0.04
	Minimum	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.14	0.03	0.03	0.03	0.17	2.80	0.04
	Maximum	1.82	0.52	0.07	0.69	1.52	3.10	1.05	0.06	0.21	1.08	0.24	0.14	0.17	3.80	0.04
Sodium (%)	# Samples	152	16	40	5	163	304	25	6	3	22	101	71	1	6	2
	Average	0.17	0.07	0.01	0.07	0.05	0.30	0.09	0.01	0.07	0.05	0.02	0.02	0.07	1.32	0.02
	Minimum	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.06	0.01	0.01	0.01	0.07	1.10	0.02
	Maximum	0.95	0.20	0.04	0.27	0.60	1.22	0.41	0.02	0.08	0.43	0.09	0.06	0.07	1.49	0.02
Sulfur (%)	# Samples	0	7	0	0	0	1	0	0	0	0	2	0	0	0	0
	Average	n/a	0.59	n/a	n/a	n/a	0.26	n/a	n/a	n/a	n/a	0.14	n/a	n/a	n/a	n/a
	Minimum	n/a	0.17	n/a	n/a	n/a	0.26	n/a	n/a	n/a	n/a	0.14	n/a	n/a	n/a	n/a
	Maximum	n/a	1.07	n/a	n/a	n/a	0.26	n/a	n/a	n/a	n/a	0.14	n/a	n/a	n/a	n/a
Zinc (ppm)	# Samples	11	3	11	0	1	23	0	0	0	2	4	0	0	0	0
	Average	19.4	18.9	19.6	n/a	44.0	18.1	n/a	n/a	n/a	18.9	32.0	n/a	n/a	n/a	n/a
	Minimum	0.2	11.2	5.7	n/a	44.0	7.5	n/a	n/a	n/a	14.3	27.7	n/a	n/a	n/a	n/a
	Maximum	30.6	25.0	42.4	n/a	44.0	33.4	n/a	n/a	n/a	23.4	35.5	n/a	n/a	n/a	n/a
As Fed pH	# Samples	0	0	0	0	0	3	0	0	0	0	2	1	0	0	0
	Average	n/a	n/a	n/a	n/a	n/a	4.93	n/a	n/a	n/a	n/a	4.30	4.00	n/a	n/a	n/a
	Minimum	n/a	n/a	n/a	n/a	n/a	3.80	n/a	n/a	n/a	n/a	4.10	4.00	n/a	n/a	n/a
	Maximum	n/a	n/a	n/a	n/a	n/a	6.40	n/a	n/a	n/a	n/a	4.50	4.00	n/a	n/a	n/a

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		STRAW											
		Barley	Corn	Flax	Meadow fescue	Oats	Pea	Perennial ryegrass	Rye grass	Smooth brome grass	Tall fescue	Timothy	Wheat
Calcium (%)	# Samples	155	7	7	5	173	33	5	5	0	4	4	85
	Average	0.36	0.32	0.61	0.30	0.29	1.65	0.37	0.44	n/a	0.30	0.26	0.22
	Minimum	0.18	0.19	0.41	0.23	0.12	0.80	0.18	0.37	n/a	0.24	0.19	0.09
	Maximum	0.78	0.45	1.00	0.42	0.92	2.42	0.60	0.50	n/a	0.42	0.35	0.64
Copper (ppm)	# Samples	11	0	0	0	8	0	1	1	0	0	0	4
	Average	2.92	n/a	n/a	n/a	3.11	n/a	3.30	2.00	n/a	n/a	n/a	3.48
	Minimum	1.00	n/a	n/a	n/a	1.00	n/a	3.30	2.00	n/a	n/a	n/a	2.30
	Maximum	5.80	n/a	n/a	n/a	5.50	n/a	3.30	2.00	n/a	n/a	n/a	4.30
Iron (ppm)	# Samples	11	0	0	0	9	0	1	1	0	0	0	4
	Average	127	n/a	n/a	n/a	86	n/a	43	93	n/a	n/a	n/a	47
	Minimum	27	n/a	n/a	n/a	34	n/a	43	93	n/a	n/a	n/a	29
	Maximum	209	n/a	n/a	n/a	233	n/a	43	93	n/a	n/a	n/a	65
Magnesium (%)	# Samples	155	7	7	5	173	33	5	5	0	4	4	85
	Average	0.17	0.31	0.33	0.20	0.16	0.44	0.17	0.23	n/a	0.26	0.11	0.14
	Minimum	0.07	0.17	0.17	0.17	0.06	0.14	0.14	0.17	n/a	0.20	0.07	0.05
	Maximum	0.36	0.51	0.68	0.22	0.40	0.89	0.24	0.31	n/a	0.28	0.14	0.47
Manganese (ppm)	# Samples	10	0	0	0	9	0	1	1	0	0	0	3
	Average	22.4	n/a	n/a	n/a	19.5	n/a	26.4	5.0	n/a	n/a	n/a	23.9
	Minimum	11.8	n/a	n/a	n/a	4.6	n/a	26.4	5.0	n/a	n/a	n/a	12.7
	Maximum	35.8	n/a	n/a	n/a	34.0	n/a	26.4	5.0	n/a	n/a	n/a	44.4
Molybdenum (ppm)	# Samples	10	0	0	0	9	0	1	1	0	0	0	4
	Average	2.98	n/a	n/a	n/a	2.08	n/a	2.00	0.90	n/a	n/a	n/a	2.20
	Minimum	0.60	n/a	n/a	n/a	0.90	n/a	2.00	0.90	n/a	n/a	n/a	1.00
	Maximum	9.70	n/a	n/a	n/a	3.60	n/a	2.00	0.90	n/a	n/a	n/a	4.70
Nitrate (%)	# Samples	26	2	0	0	79	2	0	0	0	2	0	3
	Average	0.37	0.17	n/a	n/a	0.29	0.03	n/a	n/a	n/a	1.36	n/a	0.15
	Minimum	0.01	0.07	n/a	n/a	0.01	0.03	n/a	n/a	n/a	1.36	n/a	0.03
	Maximum	1.33	0.27	n/a	n/a	2.15	0.03	n/a	n/a	n/a	1.36	n/a	0.31
Phosphorus (%)	# Samples	155	7	7	5	173	33	5	5	0	4	4	85
	Average	0.09	0.17	0.11	0.22	0.10	0.09	0.17	0.13	n/a	0.14	0.09	0.08
	Minimum	0.03	0.06	0.03	0.18	0.02	0.04	0.05	0.07	n/a	0.09	0.05	0.02
	Maximum	0.30	0.42	0.27	0.26	0.30	0.16	0.30	0.20	n/a	0.22	0.12	0.28
Potassium (%)	# Samples	155	7	7	5	173	33	5	5	0	4	4	85
	Average	1.76	1.42	0.71	2.05	2.32	1.48	1.64	1.60	n/a	2.72	0.87	1.39
	Minimum	0.60	1.16	0.46	1.37	0.33	0.34	0.94	1.15	n/a	2.34	0.53	0.23
	Maximum	4.18	1.76	1.06	3.11	4.08	3.02	2.91	2.08	n/a	2.94	1.20	2.66
Salt (%)	# Samples	101	5	7	0	97	33	4	4	0	0	3	59
	Average	0.67	0.04	0.26	n/a	1.09	0.20	0.13	0.13	n/a	n/a	0.03	0.17
	Minimum	0.05	0.03	0.04	n/a	0.04	0.03	0.06	0.09	n/a	n/a	0.03	0.03
	Maximum	2.80	0.05	0.63	n/a	5.70	1.64	0.26	0.22	n/a	n/a	0.03	1.36
Sodium (%)	# Samples	155	7	7	5	162	33	5	5	0	4	4	85
	Average	0.24	0.02	0.10	0.01	0.31	0.08	0.06	0.11	n/a	0.08	0.01	0.06
	Minimum	0.01	0.01	0.02	0.01	0.02	0.01	0.02	0.04	n/a	0.02	0.01	0.01
	Maximum	1.10	0.02	0.25	0.02	0.95	0.65	0.10	0.32	n/a	0.12	0.01	0.54
Sulfur (%)	# Samples	0	0	0	0	1	0	0	0	0	0	0	0
	Average	n/a	n/a	n/a	n/a	0.16	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Minimum	n/a	n/a	n/a	n/a	0.16	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Maximum	n/a	n/a	n/a	n/a	0.16	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Zinc (ppm)	# Samples	11	0	0	0	9	0	1	1	0	0	0	4
	Average	12.7	n/a	n/a	n/a	11.4	n/a	14.7	13.8	n/a	n/a	n/a	11.6
	Minimum	0.2	n/a	n/a	n/a	0.5	n/a	14.7	13.8	n/a	n/a	n/a	0.6
	Maximum	40.0	n/a	n/a	n/a	26.1	n/a	14.7	13.8	n/a	n/a	n/a	19.8
As Fed pH	# Samples	4	0	0	0	1	1	0	1	0	0	0	0
	Average	5.30	n/a	n/a	n/a	5.50	5.30	n/a	4.50	n/a	n/a	n/a	n/a
	Minimum	4.80	n/a	n/a	n/a	5.50	5.30	n/a	4.50	n/a	n/a	n/a	n/a
	Maximum	6.40	n/a	n/a	n/a	5.50	5.30	n/a	4.50	n/a	n/a	n/a	n/a

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For more information, contact:

- your local Manitoba Agriculture, Food and Rural Initiatives GO Centre or Office
- the Manitoba Agriculture, Food and Rural Initiatives website www.manitoba.ca/agriculture
- the Manitoba Forage Council website www.mbforagecouncil.mb.ca

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