

A STUDY ON NUTRITIONAL STATUS OF TRACE MINERALS IN CATTLE IN INDONESIA

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Introduction

It has been considered that animal production in tropical regions is greatly disturbed by anomalies in mineral supply. Nevertheless, available informations are very limited concerning mineral status of cattle in tropical Asia. In the present study, trace mineral status of cattle in Java Island in Indonesia was examined by evaluating mineral concentrations in forages and blood.

Materials and Methods

Sample collection were made in Jonggol (West Java), Malang (East Java) and Mojokerto (East Java) in rainy and dry seasons (January and August in 1988 respectively). Blood samples from 19 grazing cattle and feed samples (native and im-

proved grass) in pasture were taken in Jonggol. Blood samples from 25 cattle were taken at slaughter houses in Malang and Mojokerto. Feed samples (native grass, rice straw, corn stover etc.) were taken in villages where the cattle used for investigation had been raised. The cattle breeds were Ongole, Bali, and crossbreeds of Ongole x Bali and of Ongole x Madura.

Results and Discussion

Analysis of Cu concentrations in forages showed a wide variety of values ranging from 3.8 ppm to 41.1 ppm. Although about 70% of forage samples in Malang and Mojokerto showed sufficient value for the requirement of NRC standard (> 8 ppm), forages in Jonggol showed lower Cu contents than others and half of them were below

TABLE 1. MINERAL CONCENTRATIONS OF FEEDS IN THREE PLACES IN INDONESIA (ppm DRY MATTER BASIS)

Places	Seasons	Jonggol(West Java)		Malang(East Java)		Mojokerto(East Java)	
		Rainy	Dry	Rainy	Dry	Rainy	Dry
No. of samples		9	4	7	8	7	6
Copper	mean	7.1	10.9	15.0	10.2	20.2	11.7
	range	3.8-10.3	6.8-17.0	6.3-32.4	4.6-15.4	10.2-41.1	6.0-19.1
Iron	mean	2960	1020	5640	2000	10760	3120
	range	230-11360	510-2100	410-11420	920-3890	980-29990	540-7220
Molybdenum	mean	0.82	1.35	1.14	1.24	2.07	0.70
	range	0.27-2.22	0.62-2.01	0.71-2.09	0.74-1.78	0.80-2.82	0.33-2.03
Zinc	mean	36.9	52.5	35.9	39.5	58.6	38.6
	range	20.1-57.8	45.8-57.0	17.3-58.8	23.9-59.4	31.4-77.9	10.9-68.7
Manganese	mean	147	295	142	214	192	144
	range	13-230	70-560	49-236	46-848	71-441	34-394
Selenium	mean	0.37	0.06	0.06	0.05	0.06	0.08
	range	0.02-1.06	0.05-0.07	0.03-0.11	0.03-0.12	0.03-0.09	0.01-0.16

TABLE 2. MINERAL CONCENTRATIONS IN BLOOD OF CATTLE IN THREE PLACES IN INDONESIA ($\mu\text{g/ml}$)

Places	Seasons	No. of samples	Jonggol(West Java)		Malang(East Java)		Mojokerto(East Java)	
			Rainy	Dry	Rainy	Dry	Rainy	Dry
			19	19	25	25	25	25
Copper (plasma)	mean		0.22	0.22	0.95	0.81	0.75	0.86
	range		0.09-0.62	0.09-0.47	0.65-1.19	0.17-1.21	0.30-0.99	0.59-1.22
Zinc (plasma)	mean		0.91	0.89	0.83	0.85	0.89	0.87
	range		0.74-1.19	0.67-1.10	0.60-1.17	0.60-1.14	0.70-1.45	0.57-1.35
Selenium (whole blood)	mean		0.34	0.21	0.11	0.13	0.17	0.15
	range		0.26-0.47	0.13-0.29	0.04-0.21	0.04-0.30	0.05-0.42	0.04-0.41

8 ppm. Cu contents in 85% of plasma samples in Malang and Mojokerto were in normal range giving mean values of 0.88 and 0.80 g/ml respectively. Plasma Cu in Jonggol was much lower than others and all plasma samples contained Cu concentrations lower than the critical level of deficiency (0.65 $\mu\text{g/ml}$)

Two thirds of feed samples were above the maximum tolerable level of Fe (1000 ppm). Fe levels of feeds in rainy season were 2 or 3 times as much as those in dry season in each place and half of samples in rainy season exceeded 4000 ppm.

Molybdenum concentrations in forages did not exceed the maximum tolerable level (6 ppm). Although some feed samples contained Zn concentrations lower than the requirement (30 ppm), no plasma samples of cattle showed the deficient level. Mn concentrations in most of forages were

between the requirement level and the toxic level.

Feed samples showed a wide variety of Se concentrations ranging from 0.01 to 1.06 ppm. Although 44% of samples were below the requirement (0.05 ppm), Selenium levels in whole blood were much higher than the critical level (0.01 $\mu\text{g/ml}$). In conclusion, cattle in Jonggol seemed to be in deficient Cu status and not only the marginal Cu levels but excess of Fe concentrations in forages might be included in the ethiology of this problem.

(Key Words: Indonesia, Trace Minerals, Cattle)

Literature Cited

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