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Supplemental Table S1. Comparison of the variables used to estimate the requirements of macrominerals for Holstein × Gyr and Holstein calves

Item	Holstein × Gyr	Holstein	P-value
iEBW (kg)	35.649	34.619	0.395
fEBW (kg)	59.095	61.358	0.501
ADG (kg/d)	0.432	0.474	0.467
EBG (kg/d)	0.422	0.446	0.529
	Mineral intake (mg/kg EBW/d)		
Calcium	147.490	164.240	0.206
Phosphorus	97.843	104.807	0.279
Potassium	251.770	276.164	0.278
Magnesium	34.657	32.762	0.765
Sodium	104.840	121.073	0.131
	Mineral retention (mg/kg EBW/d)		
Calcium	108.684	97.727	0.443
Phosphorus	42.429	49.690	0.393
Potassium	12.953	15.735	0.670
Magnesium	7.711	6.521	0.284
Sodium	15.702	16.324	0.908
	Final mineral content (g)		
Calcium	606.790	594.974	0.814
Phosphorus	365.750	328.251	0.260
Potassium	77.373	76.427	0.919
Magnesium	41.619	40.483	0.732
Sodium	118.440	113.205	0.576

iEBW = initial empty body weight; fEBW = final empty body weight; ADG = average daily gain; EBW = empty body weight.

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Supplemental Table S2. Summary of treatments and sources of minerals used in the evaluated studies

Study	Treatments	Source mineral used in studies
Jolomba, 2015	6 Liters of whole milk with increasing levels of DM up to: 13.5; 16.1; 18.2 and 20.4 %.). Started feed *ad libitum* throughout the experiment except the maintenance group which received only 3 L litters.	Source of Ca: limestone and dicalcium phosphate. Source of P: dicalcium phosphate. Source of K: potassium chloride. Source of Mg: magnesium Cl. Source of Na: common salt (NaCl).
Silva et al., 2015	The treatments used were: factorial arrangement 3 × 2 consisting of 3 levels of whole milk (2, 4, or 8 L/day) and 2 levels of starter feed (presence *ad libitum* or absence in diet)	Source of Ca: limestone and dicalcium phosphate. Source of P: dicalcium phosphate. Source of K: potassium chloride. Source of Mg: magnesium Cl. Source of Na: Common salt (NaCl).
Chagas et al., 2018	The treatments used were: 4 Metionine (MET) + Cysteine (Cys) inclusion levels (Met + Cys: 8.0, 8.7, 9.4, and 10.2 g/d), provided by an AA supplement added to 1.0 kg (as fed) of commercial milk replacer containing soy protein concentrate and wheat protein isolate reconstituted at 13.8% (DM basis).	no starter feed was used in this study
Rodrigues et al., 2016	The treatments used were: 4 levels of whole milk being 2, 4, 6, and 8 L/day. In all treatments, starter feed was offered ad libitum. In each whole milk level, four calves were slaughtered at 59 d of	Source of Ca: limestone and dicalcium phosphate. Source of P: dicalcium phosphate. Source of P: potassium chloride. Source of Mg: magnesium chloride. Source of Na: Common salt (NaCl).

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	age, and the other 4 were weaned on the 60th day, having their milk replaced by Coast-cross (Cynodon spp.) hay and the same initial starter *ad libitum*.	
Dias et al., 2017	Whole milk to 10% of BW or whole milk to 10% of body weight plus starter feed *ad libitum*.	Source of Ca: limestone and dicalcium phosphate. Source of P: dicalcium phosphate. Source of K: potassium chloride. Source of Mg: magnesium chloride. Source of Na: Common salt (NaCl).

DM = day matter; Ca= calcium, P = phosphorus, Mg = magnesium; K = potassium and Na = sodium.

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Supplemental Table S3. Initial and final age of the calves used in the studies

Study	Initial age	Final age
Jolomba, 2015	5 days after birth	60 days after birth
Silva et al., 2015	4 days after birth	64 days after birth
Chagas et al., 2018	8 days after birth	30 and 60 days after birth
Rodrigues et al., 2016	4 days after birth	59 and 87 days after birth
Dias et al., 2017	4 days after birth	7, 28, 49 and 63 days after birth

The final age is the age at which the animals were slaughtered

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Supplemental Table S4. Mineral content of feedstuffs used in the diet of the studies

Study	Food	g/ kg DM					
		DM	Ca	P	K	Mg	Na
Jolomba, 2015	Whole milk	124.3	8.1	7.50	5.7	0.9	3.3
	Starter feed	893.3	15.20	10.00	5.70	3.00	3.30
Silva et al., 2015	Whole milk	0.115	9.75	7.00	13.18	0.93	3.72
	Starter feed	890.0	5.42	3.77	7.70	1.62	0.85
Rodrigues et al., 2016	Whole milk	0.115	9.75	7.00	13.18	0.93	3.72
	Starter feed	890.0	5.42	3.77	7.70	1.62	0.85
Dias et al., 2017	Whole milk	124.3	8.1	7.50	5.7	0.9	3.3
	Starter feed	893.3	15.20	10.00	5.70	3.00	3.30
Chagas et al., 2018	Milk replacer	138.0	10.80	5.85	18.22	1.28	8.75

DM= dry matter, Ca = calcium, P = phosphorus, K = potassium, Mg = magnesium and Na = sodium.