



STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

#### **ANNEX XIV – FPZSP NUTRITIONAL SCHEDULE**





STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

**NUTRITIONAL SCHEDULE**  
**August 2019**

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**CRMV-SP n° 2051-VP**

 **SERVIÇO PÚBLICO FEDERAL**  
**CONSELHO REGIONAL DE MEDICINA VETERINÁRIA**  
**DO ESTADO DE SÃO PAULO**  

**CERTIFICADO DE REGULARIDADE DE PESSOA JURÍDICA**

Razão / Nome: FUNDAÇÃO PARQUE ZOOLOGICO DE SÃO PAULO CRMV-SP: SP-42619-PJ  
Nome Fantasia: ZOOLOGICO DE SÃO PAULO - FÁBRICA DE RAÇÕES  
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CNPJ / CPF: 60.889.573/0001-40  
Responsável Técnico: IZABEL AMPARO MIRÓN LLAMAS MORENO CRMV-SP: SP-02051-VP

Descrição das Atividades Constantes do Objetivo Social:  
Fábrica de rações.

São Paulo, 01 de Março de 2019.

  
**MÁRIO EDUARDO PULGA**  
CRMV-SP Nº 02715  
Presidente

A VALIDADE DO PRESENTE CERTIFICADO ESTÁ CONDICIONADA À APRESENTAÇÃO DO COMPROVANTE DE PAGAMENTO DA ANUIDADE.  
OBRIGATORIA A FIXAÇÃO EM LUGAL VISÍVEL E DE FÁCIL ACESSO

22/08/2019

SEI/MAPA - 8253260 - Certificado de Registro de Estabelecimento



SERVIÇO PÚBLICO FEDERAL  
MINISTÉRIO DA AGRICULTURA, PECUÁRIA E ABASTECIMENTO

**CERTIFICADO DE REGISTRO DE ESTABELECIMENTO**

Área de atuação: ALIMENTAÇÃO ANIMAL

Certifico que está devidamente registrado neste Ministério, sob o nº SP-59192, nos termos do regulamento aprovado pelo Decreto nº 6.296, de 12 de dezembro de 2007, o estabelecimento Fundação Parque Zoológico de São Paulo, CNPJ nº 60.889.573/0001-40, situado à Av. Miguel Stéfano 4241 - Agua Funda - Sao Paulo, classificado como:

Atividade	Categoria
Fabricante	Racao

Data de Concessão: 04/05/2004  
Data de Renovação: 22/08/2019  
Data de Atualização: 20/02/2009

Este certificado tem validade por 5 (cinco) anos a partir da data de atualização ou de renovação do registro.

São Paulo, 22 de Agosto de 2019.



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Nº da Série do Certificado: 1672354

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## 1. INTRODUCTION

The strategic relevance of the Animal Nutrition Division – AND, of the *Fundação Parque Zoológico de São Paulo* is its interaction with the

- Veterinary Medicine Division – VM, to complement treatments with therapeutic diets, to ensure the animal's wellbeing;
- Biological Sciences Division – BSD, and the *Centro de Conservação da Fauna Silvestre* – CECFAU, to define the diets to be delivered daily and the volumes that meet the nutritional requirements of all the species kept at the *Fundação Parque Zoológico de São Paulo*;
- Applied Research Department, to impose legal and technical requirements to monitor the employment of good practices for lab exams and the study of contaminants, whether pathogens or otherwise;
- Rural Production Division, as the producer of the inputs needed to define the diets.

The social demand for animal well-being is on the rise, reinforcing the applicability and consolidating the expectation for the enforcement of the necessary practices, by veterinary doctors, as well as biologists and zoo technicians.

The determination of animal well-being depends on a number of indicators, generally distributed among the nutritional, environmental, health and behavior indicator groups (TONIN & DEL CARLO, 2017).

In regards to the nutritional indicators, its purpose is to ensure that the diet is suited to each species, as well as the proper storage and quality of the inputs; to plan, implement and monitor the animals' feeding habits, based on the existing knowledge of animal physiology, to ensure healthy growth, reproductive success, increased longevity and wellbeing, meeting their specific requirements; to adjust the formulation, production and quality control of the wild animals' diets and feeds, taking responsibility for the nutritional effectiveness of the formulas; to offer directions in view of the acquisition of good quality



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inputs, from well-regarded companies, and their appropriate, lawful use; and to periodically assess the quality of the water to be supplied to animals and the water for human consumption within the establishment, and the duties to be performed by the professional in charge at establishments dealing with exotic and wild animals (NARDI et al., 2019).

One of the greatest challenges in having animals at Zoos is properly adjusting nutrition. Captivity causes changes to animals' behaviors (ALMEIDA et al., 2008; MCPHEE & CARLSTEAD, 2010). In captivity, the barriers imposed by spatial limitations, the easy access to food and the lack of the dynamic experienced in the wild may cause massive behavioral shifts (ALMEIDA et al., 2008; NEWBERRY, 1993 apud NEWBERRY, 1995; PULZ, 2013). The challenge of adjusting the diet of species held in captivity requires the professional to have knowledge of each species's feeding habits, basic concepts of animal nutrition and survival strategies employed by animals in the wild, particularly interactions between animals and their living environment (FARIA, 2011).



## 2. NUTRITIONAL REQUIREMENTS

The nutritional requirements established by the National Research Council (NRC) for household and laboratory animals may be used as a guide to determine the minimum nutrient contents to be included in the diet, although they provide no information of the types of foods and diets consumed by wild animals. Extrapolation of the nutritional requirements of household production animals to wild animals should be based on specific criteria, thereby avoiding the occurrence of physiological disruptions (FARIA, 2011).

Therefore, a poorly formulated diet will, most often, cause extreme malnutrition issues, due either to the lack or to the excess of a given nutrient (FARIA, 2011).

The use of the metabolic weight allows for comparisons between animals of different weights and sizes, and even different species. This rate may vary according to the species. So, the basal metabolic rate (Table 1), for the majority of placental mammals is: **70 Kcal x (PV 0.75)**.

Table 1. Basal Metabolic Rate Multipliers

<i>BASAL METABOLIC RATE</i>
<b>Multipliers</b>
2x Animals in Captivity
3x or 4x Animals in Growing or Reproductive Stage
Up to 5x Animals on Feeding Tubes
<b>Source: Faria, 2011. Manejo Alimentar e Nutricional de Animais Silvestres para Centros de Triagem.</b>

The determination of species' Daily Energy Requirements (NEM) shall be based on the Body Mass, as well as the resulting Basal Metabolic Rate. A material factor is the number exponent that varies for each vertebrate group (Table 2).



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Table 2: General Estimates of Daily Energy Requirements based on Body Mass

<i>Group</i>	<i>NEM (Kcal/day)</i>	<i>Group</i>	<i>NEM (Kcal/day)</i>
<b>Passerine Birds</b>	<b>200 - 250 (PV) <math>\wedge 0.75</math></b>	<b>Reptiles</b>	<b>32 (PV) <math>\wedge 0.77</math></b>
<b>Non-passerine Birds</b>	<b>130- 160 (PV) <math>\wedge 0.75</math></b>	<b>Turtles</b>	<b>32 (PV) <math>\wedge 0.66</math></b>
<b>Placental Mammals</b>	<b>140 (PV) <math>\wedge 0.75</math></b>	<b>Household Dog</b>	<b>120 (PV) <math>\wedge 0.75</math></b>
<b>Marsupial Mammals</b>	<b>100 (PV) <math>\wedge 0.75</math></b>	<b>Household Feline</b>	<b>70 (PV)</b>

Source: Livro Tratado de Animais Silvestres – section 6.

A starting point for all studies in the field of wild animal nutrition would be a working knowledge of species' physiology and digestive anatomy due to the close relationship between the gastrointestinal tract (GIT) and the use of foods and nutrients (FARIA, 2011).

Although there may be considerable quantitative differences among species, there appear to be numerous similarities with the nutritional requirements at the cellular level. The nutritional requirements, deficiencies and toxicities tend to reveal similar patterns and trends in certain animal species (LI & ROBINSON, 1999).

So, the Nutritional Schedule of the Fundação Parque Zoológico de São Paulo – FPZSP shall proceed to show a number of tables of species, to serve as reference for the others, with similar digestive systems, feeding habits, nutritional requirements, deficiencies, as well as toxicity levels.

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2.1. Monogastric and Polygastric Herbivores

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SOURCE: ELEPHANTS: NUTRITION AND DIETARY HUSBANDRY - Duane E. Ullrey 1997-2002

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NUTRIENT	Elephant ( <i>Elephantidae</i> ) <b>Monogastric Fermenters</b>  (Maintenance)	Elephant ( <i>Elephantidae</i> ) <b>Monogastric Fermenters</b>  (Late Gestation)	Elephant ( <i>Elephantidae</i> ) <b>Monogastric Fermenters</b>  (Lactating)	Elephant ( <i>Elephantidae</i> ) <b>Monogastric Fermenters</b>  (Growing)
PB (%)	8 - 10	12	12 - 14	12 - 14
Lysine (%)	0.3	-	0.4 - 0.5	0.5 - 0.6
EE (%)	-	0.4	-	-
Starch (%)	-	-	-	-
FDN (%)	-	-	-	-
FDA (%)	-	-	-	-
Lig (%)	-	-	-	-
Ca (%)	0.3	0.5	0.5	0.5 - 0.7
P (%)	0.2	0.3	0.3	0.3 - 0.4
Mg (%)	0.1	0.1	0.1	0.1
K (%)	0.4	0.4	0.4	0.4
Na (%)	0.1	0.1	0.1	0.1
S (%)	0.15	0.15	0.15	0.15
Fe (mg/kg)	50	50	50	50
Cu (mg/kg)	10	10	10	10
Mn (mg/kg)	40	40	40	40
Zn (mg/kg)	40	40	40	40
Co (mg/kg)	0.1	0.1	0.1	0.1
I (mg/kg)	0.6	0.6	0.6	0.6
Se (mg/kg)	0.2	0.2	0.2	0.2
Vit A (UI/kg)	3000	3000	3000	3000
Vit D (UI/kg)	800	800	800	800
Vit E (UI/kg)	100	100	100	100
Thiamine (mg/kg)	3	3	3	3
Riboflavin (mg/kg)	3	3	3	3

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		SOURCE: Biaza
		Elephant Manual –
		2010 * Elephant ( <i>Elephantidae</i> )
		<b>Monogastric</b>
		<b>Fermenters</b>
NUTRIENT		
		(General)
PB (%)	-	
Lysine (%)	-	
EE (%)	1.2 – 1.8	
Starch (%)	-	
FDN (%)	62	
FDA (%)	48	
Lig (%)	15	
Ca (%)	-	
P (%)	-	
Mg (%)	-	
K (%)	-	
Na (%)	-	
S (%)	-	
Fe (mg/kg)	-	
Cu (mg/kg)	-	
Mn (mg/kg)	-	
Zn (mg/kg)	-	
Co (mg/kg)	-	
I (mg/kg)	-	
Se (mg/kg)	-	
Vit A (UI/kg)	-	
Vit D (UI/kg)	-	
Vit E (UI/kg)	130 - 167	
Thiamine (mg/kg)	-	
Riboflavin (mg/kg)	-	

\*Table Complementing Duane E. Ullrey 1997-2002

SOURCE: Dierenfeld, E.S. (1996) Nutrition. In: Rhinoceros SSP Husbandry Manual.

NUTRIENT	Rhinoceros ( <i>Rhinocerotidae</i> ) <b>Monogastric Fermenters</b>	Rhinoceros ( <i>Rhinocerotidae</i> ) <b>Monogastric Fermenters</b>	Rhinoceros ( <i>Rhinocerotidae</i> ) <b>Monogastric Fermenters</b>
	(Growing)	(Maintenance)	(Lactating)
	12 - 15	8	10 - 13
PB (%)	12 - 15	8	10 - 13
Lysine (%)	-	-	-
EE (%)	-	-	-
Starch (%)	-	-	-
FDN (%)	-	-	-
FDA (%)	-	-	-
Lig (%)	-	-	-
Ca (%)	0.6	0.3	0.4
P (%)	0.3	0.2	0.3
Mg (%)	0.1	0.1	0.1
K (%)	0.3	0.3	0.4
Na (%)	-	-	-
S (%)	-	-	-
Fe (mg/kg)	-	-	-
Cu (mg/kg)	-	-	-
Mn (mg/kg)	-	-	-
Zn (mg/kg)	-	-	-
Co (mg/kg)	-	-	-
I (mg/kg)	-	-	-
Se (mg/kg)	0.1	0.1	0.1
Vit A (UI/kg)	2000	2000	3000
Vit D (UI/kg)	800	800	600
Vit E (UI/kg)	80	50	80
Thiamine (mg/kg)	-	-	-
Riboflavin (mg/kg)	-	-	-

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SOURCE: Giraffe Nutrition Workshop Proceeding - 2005	
NUTRIENT	Giraffe ( <i>Giraffa camelopardalis</i> ) <b>Polygastric</b>
	(Maintenance)
PB (%)	10 -14
Lysine (%)	-
EE (%)	2 - 5
Starch (%)	<5
FDN (%)	-
FDA (%)	25 - 30
Lig (%)	-
Ca (%)	0.65 - 1
P (%)	0.35 – 0.5
Mg (%)	0.3
K (%)	-
Na (%)	-
S (%)	-
Fe (mg/kg)	-
Cu (mg/kg)	-
Mn (mg/kg)	-
Zn (mg/kg)	-
Co (mg/kg)	10 - 15
I (mg/kg)	-
Se (mg/kg)	-
Vit A (UI/kg)	3700
Vit D (UI/kg)	750
Vit E (UI/kg)	60
Thiamine (mg/kg)	-
Riboflavin (mg/kg)	-

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SOURCE: Hay And Pellet Ratios: Considerations In Feeding Ungulates - Barbara A. Lintzenich - 1997 - 2002	
NUTRIENT	Hippopotamus ( <i>Hippopotamus amphibius</i> ) <b>Monogastric Fermenters</b>
	(Maintenance)
PB (%)	9 - 14
Lysine (%)	-
EE (%)	-
Starch (%)	-
FDN (%)	38 - 44
FDA (%)	-
Lig (%)	-
Ca (%)	0.2 - 0.65
P (%)	0.15 - 0.34
Mg (%)	0.07 - 0.1
K (%)	0.27 - 0.38
Na (%)	0.09 - 0.27
S (%)	-
Fe (mg/kg)	36 - 45
Cu (mg/kg)	-
Mn (mg/kg)	36
Zn (mg/kg)	36
Co (mg/kg)	9
I (mg/kg)	-
Se (mg/kg)	0.09
Vit A (UI/kg)	1000 - 3500
Vit D (UI/kg)	200 - 500
Vit E (UI/kg)	120 - 350
Thiamine (mg/kg)	-
Riboflavin (mg/kg)	-

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NUTRIENT	SOURCE: Hay and Pellet Ratios: Considerations in Feeding Ungulates - Barbara A. Lintzenich - 1997 - 2002
	Tapir ( <i>Tapirus terrestris</i> ) <b>Monogastric Fermenters</b> (Maintenance)
PB (%)	14 - 18
Lysine (%)	-
EE (%)	-
Starch (%)	-
FDN (%)	31 - 37
FDA (%)	-
Lig (%)	-
Ca (%)	0.2 - 0.65
P (%)	0.15 - 0.34
Mg (%)	0.07 - 0.1
K (%)	0.27 - 0.38
Na (%)	0.09 - 0.27
S (%)	-
Fe (mg/kg)	36 - 45
Cu (mg/kg)	9
Mn (mg/kg)	36
Zn (mg/kg)	36
Co (mg/kg)	9
I (mg/kg)	0.9 - 0.54
Se (mg/kg)	0.09
Vit A (UI/kg)	1000 - 3500
Vit D (UI/kg)	200 - 500
Vit E (UI/kg)	120 - 350
Thiamine (mg/kg)	2 - 4.5
Riboflavin (mg/kg)	2



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2.1.2. Carnívoros

SOURCE: Jaguar Care Manual 2016	
NUTRIENT	
Household Carnivore (Maintenance)	
FB (%)	-
FDN (%)	-
FDA (%)	-
Starch (%)	-
PB (%)	20 - 30
Lysine (%)	-
Methionine (%)	-
Methionine + Cystine (%)	-
Arginine (%)	-
Isoleucine (%)	-
Leucine (%)	-
Aniline (%)	-
Tyrosine (%)	-
Tryptophan	-
Threonine (%)	-
Valine	-
Histidine (%)	-
Taurine (%)	0.1
EE(%)	9 - 15
Arachidonic acid (%)	0.02
Linoleic acid (%)	0.55
N-3 (%)	-
N-6 (%)	-
Vit A (UI/kg)	3.550 - 7.500
Vit D3 (UI/kg)	250
Vit E (UI/kg)	38
Vit K (mg/kg)	1
Thiamine (mg/kg)	5 - 5.6
Riboflavin (mg/kg)	4.25
Niacin (mg/kg)	45.5
Vit B6 (mg/kg)	2.5
Folic acid (mg/kg)	0.75
Biotin (mg/kg)	0.08
Vit B12 (mg/kg)	0.02
Pantothenic acid (mg/kg)	6.25
Choline (mg/kg)	2550
Calcium (%)	0.29 - 1.08
Phosphorus (%)	0.26 - 0.72
Magnesium (%)	0.04 - 0.06
Potassium (%)	0.4 - 0.52
Sodium (%)	0.7 - 0.14
Iron (mg/kg)	80
Zinc (mg/kg)	60 - 75



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Copper (mg/kg)	5 - 8.8
Manganese (mg/kg)	4.8 - 7.2
Iodine (mg/kg)	2.2
Selenium (mg/kg)	0.4

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SOURCE: Jaguar Care Manual 2016

NUTRIENT	Jaguar ( <i>Panthera onca</i> ) (Maintenance)
FB (%)	-
FDN (%)	-
FDA (%)	-
Starch (%)	-
PB (%)	50 - 64
Lysine (%)	-
Methionine (%)	-
Methionine + Cystine (%)	-
Arginine (%)	-
Isoleucine (%)	-
Leucine (%)	-
Aniline (%)	-
Tyrosine (%)	-
Tryptophan	-
Threonine (%)	-
Valine	-
Histidine (%)	-
Taurine (%)	-
EE (%)	25 - 41
Arachidonic acid (%)	-
Linoleic acid (%)	-
N-3 (%)	-
N-6 (%)	-
Vit A (UI/kg)	11,840 – 41,630
Vit D3 (UI/kg)	-
Vit E (UI/kg)	120.61 - 458.36
Vit K (mg/kg)	-
Thiamine (mg/kg)	-
Riboflavin (mg/kg)	-
Niacin (mg/kg)	-
Vit B6 (mg/kg)	-
Folic acid (mg/kg)	-
Biotin (mg/kg)	-
Vit B12 (mg/kg)	-
Pantothenic acid (mg/kg)	-
Choline (mg/kg)	-
Calcium (%)	1.33 - 2.14
Phosphorus (%)	1.08 - 1.5
Magnesium (%)	0.09 - 1.15
Potassium (%)	0.4 - 0.52
Sodium (%)	0.24 - 0.51
Iron (mg/kg)	142.89 - 353.35
Zinc (mg/kg)	125.20 - 133.52
Copper (mg/kg)	10.55 - 14.59
Manganese (mg/kg)	13.71 - 26.22
Iodine (mg/kg)	-



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<u>Selenium (mg/kg)</u>	<u>0.28 - 0.59</u>
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SOURCE: Lion Care Manual 2012

NUTRIENT	
	Lion ( <i>Panthera Leo</i> ) (Maintenance)
FB (%)	-
FDN (%)	-
FDA (%)	-
Starch (%)	-
PB (%)	48.53 - 60.56
Lysine (%)	-
Methionine (%)	-
Methionine + Cystine (%)	-
Arginine (%)	-
Isoleucine (%)	-
Leucine (%)	-
Aniline (%)	-
Tyrosine (%)	-
Tryptophan	-
Threonine (%)	-
Valine	-
Histidine (%)	-
Taurine (%)	-
EE (%)	19.44 - 39.50
Arachidonic acid (%)	-
Linoleic acid (%)	-
N-3 (%)	-
N-6 (%)	-
Vit A (UI/kg)	10.310 - 14.720
Vit D3 (UI/kg)	-
Vit E (UI/kg)	276.8 – 418.4
Vit K (mg/kg)	-
Thiamine (mg/kg)	9.16–12.28
Riboflavin (mg/kg)	11.11–16.09
Niacin (mg/kg)	128 –282.2
Vit B6 (mg/kg)	12.51–20.39
Folic acid (mg/kg)	0.26–
1.42 Biotin (mg/kg)	-
Vit B12 (mg/kg)	0.07–
0.16 Pantothenic acid (mg/kg)	-
Choline (mg/kg)	-
Calcium (%)	1.45–2.14
Phosphorus (%)	0.91–1.59
Magnesium (%)	0.10–0.12
Potassium (%)	0.40–1.06
Sodium (%)	0.40–0.96
Iron (mg/kg)	139.60–197.30
Zinc (mg/kg)	98.3–199.90
Copper (mg/kg)	8.61–21.16
Manganese (mg/kg)	10.99–
26.19 Iodine (mg/kg)	-



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<u>Selenium (mg/kg)</u>	<u>0.23–0.67</u>
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NUTRIENT	SOURCE: Mustelid Care Manual 2010	
	Mostly Omnivorous	Mostly Carnivorous
FB (%)	-	-
FDN (%)	-	-
FDA (%)	-	-
Starch (%)	-	-
PB (%)	17.5 - 26	19.7-32.5
Lysine (%)	-	-
Methionine (%)	-	-
Methionine + Cystine (%)	-	-
Arginine (%)	-	-
Isoleucine (%)	-	-
Leucine (%)	-	-
Aniline (%)	-	-
Tyrosine (%)	-	-
Tryptophan	-	-
Threonine (%)	-	-
Valine	-	-
Histidine (%)	-	-
Taurine (%)	-	-
EE (%)	5 - 8.5	9.0-30
Arachidonic acid (%)	-	-
Linoleic acid (%)	1 - 1.3	1 - 1.3
N-3 (%)	-	-
N-6 (%)	-	-
Vit A (UI/kg)	500 - 5.900	2.440 - 10.000
Vit D3 (UI/kg)	500 - 550	250 - 1.000
Vit E (UI/kg)	27 - 50	27-120
Vit K (mg/kg)	-	-
Thiamine (mg/kg)	1.0-2.25	1.0-5.6
Riboflavin (mg/kg)	1.6 -10.5	1.6-4.25
Niacin (mg/kg)	11.4-20.0	9.6-60
Vit B6 (mg/kg)	1.0-1.8	1.6-4.0
Folic acid (mg/kg)	0.18-0.5	0.2-1.3
Biotin (mg/kg)	0.1-0.12	0.07-0.12
Vit B12 (mg/kg)	0.022-0.035	0.02-0.035
Pantothenic acid (mg/kg)	7.4-15.0	5.0-8.0
Choline (mg/kg)	-	-
Calcium (%)	0.5-1.2	0.5-1.0
Phosphorus (%)	0.5-1.0	0.5-0.8
Magnesium (%)	0.04-0.06	0.03-0.08
Potassium (%)	0.4-0.6	0.4-0.6
Sodium (%)	0.04-0.3	0.05-0.4
Iron (mg/kg)	30-90	80-114
Zinc (mg/kg)	50-120	50-94
Copper (mg/kg)	6.0-12.4	5.0-8.8
Manganese (mg/kg)	-	-
Iodine (mg/kg)	0.9-1.54	0.35-2.2
Selenium (mg/kg)	0.1-0.35	0.1-0.4



STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

NUTRIENT	SOURCE: POLAR BEAR NUTRITION GUIDELINES 2006	
	Polar Bear ( <i>Ursus maritimus</i> ) (Maintenance)	
FB (%)	-	
FDN (%)	-	
FDA (%)	-	
Starch (%)	-	
PB (%)	25	
Lysine (%)	1	
Methionine (%)	0.55	
Methionine + Cystine (%)	1	
Arginine (%)	-	
Isoleucine (%)	-	
Leucine (%)	-	
Aniline (%)	-	
Tyrosine (%)	-	
Tryptophan	-	
Threonine (%)	-	
Valine	-	
Histidine (%)	-	
Taurine (%)	0.1	
EE (%)	5 - 20	
Arachidonic acid (%)	0.02	
Linoleic acid (%)	1	
N-3 (%)	-	
N-6 (%)	-	
Vit A (UI/kg)	5000	
Vit D3 (UI/kg)	1800	
Vit E (UI/kg)	100	
Vit K (mg/kg)	-	
Thiamine (mg/kg)	5	
Riboflavin (mg/kg)	4	
Niacin (mg/kg)	40	
Vit B6 (mg/kg)	4	
Folic acid (mg/kg)	0.5	
Biotin (mg/kg)	0.07	
Vit B12 (mg/kg)	0.02	
Pantothenic acid (mg/kg)	5	
Choline (mg/kg)	1200	
Calcium (%)	0.6	
Phosphorus (%)	0.5	
Magnesium (%)	0.04	
Potassium (%)	0.6	
Sodium (%)	0.2	
Iron (mg/kg)	80	
Zinc (mg/kg)	100	
Copper (mg/kg)	10	



STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

Manganese (mg/kg)	7.5
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Iodine (mg/kg)	1.5
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Selenium (mg/kg)	0.1
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STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

2.1.3. Birds

NUTRIENT	SOURCE: Penguin ( <i>Spheniscidae</i> ) Care Manual 2014
	Penguin ( <i>Spheniscidae</i> ) (Maintenance)
PB (%)	45 - 75
Gross Fiber (%)	-
FDN (%)	-
FDA (%)	-
Lysine (%)	-
Methionine (%)	-
Methionine + Cystine (%)	-
Arginine (%)	-
EE (%)	-
Arachidonic acid (%)	-
Linoleic acid (%)	-
Linolenic acid (%)	-
Vit A (UI/kg)	1100 - 7500
Vit D3 (UI/kg)	200 - 500
Vit E (UI/kg)	400
Vit K (mg/kg)	-
Thiamine (mg/kg)	100
Riboflavin (mg/kg)	-
Niacin (mg/kg)	-
Vit B6 (mg/kg)	-
Folic acid (mg/kg)	-
Biotin (mg/kg)	-
Vit B12 (mg/kg)	-
Pantothenic acid (mg/kg)	-
Choline (mg/kg)	-
Calcium (%)	0.78 - 2.5
Phosphorus (%)	0.26 - 0.76
Available Phosphorus (%)	-
Magnesium (%)	0.04 - 0.07
Potassium (%)	0.33 - 0.5
Sodium (%)	0.14 - 0.17
Iron (mg/kg)	60 - 80
Zinc (mg/kg)	35 - 75
Copper (mg/kg)	4 - 9
Manganese (mg/kg)	5 - 67
Iodine (mg/kg)	-
Selenium (mg/kg)	0.1 - 0.4

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

SOURCE: Andean Condor Care Manual 2010

NUTRIENT

Andean Condor ( <i>Vultur gryphus</i> ) (Maintenance)	
PB (%)	-
Gross Fiber (%)	>20
FDN (%)	-
FDA (%)	-
Lysine (%)	0.67 - 0.85
Methionine (%)	0.17 - 0.44
Methionine + Cystine (%)	0.34 - 0.88
Arginine (%)	0.67 - 0.96
EE (%)	>10
Arachidonic acid (%)	-
Linoleic acid (%)	-
Linolenic acid (%)	-
Vit A (UI/kg)	5000
Vit D3 (UI/kg)	224 - 1100
Vit E (UI/kg)	25 - 30
Vit K (mg/kg)	-
Thiamine (mg/kg)	>6
Riboflavin (mg/kg)	>5
Niacin (mg/kg)	-
Vit B6 (mg/kg)	-
Folic acid (mg/kg)	-
Biotin (mg/kg)	-
Vit B12 (mg/kg)	-
Pantothenic acid (mg/kg)	-
Choline (mg/kg)	-
Calcium (%)	0.8 - 2.5
Phosphorus (%)	0.39 - 0.72
Available Phosphorus (%)	-
Magnesium (%)	-
Potassium (%)	0.4 - 0.67
Sodium (%)	0.1 - 0.13
Iron (mg/kg)	>80
Zinc (mg/kg)	>75
Copper (mg/kg)	>9
Manganese (mg/kg)	>67
Iodine (mg/kg)	0.44
Selenium (mg/kg)	0.3

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

SOURCE: Red-legged Seriema (*Cariama cristata*) Care Manual  
2013

NUTRIENT	Seriema ( <i>Cariamidae</i> ) (Maintenance-Reproduction)	
PB (%)	16.5 - 30	
Gross Fiber (%)	-	
FDN (%)	-	
FDA (%)	-	
Lysine (%)	-	
Methionine (%)	-	
Methionine + Cystine (%)	-	
Arginine (%)	-	
EE (%)	10 - 30	
Arachidonic acid (%)	-	
Linoleic acid (%)	-	
Linolenic acid (%)	-	
Vit A (UI/kg)	170 - 7500	
Vit D3 (UI/kg)	22 - 550	
Vit E (UI/kg)	11 - 38	
Vit K (mg/kg)	-	
Thiamine (mg/kg)	2.2 - 5.6	
Riboflavin (mg/kg)	2.75 - 10.5	
Niacin (mg/kg)	15 - 42.5	
Vit B6 (mg/kg)	3.3 - 5	
Folic acid (mg/kg)	0.8 - 1.1	
Biotin (mg/kg)	0.11 - 0.25	
Vit B12 (mg/kg)	0.003 - 0.035	
Pantothenic acid (mg/kg)	10.5 - 17.6	
Choline (mg/kg)	990 - 2250	
Calcium (%)	0.66 - 2	
Phosphorus (%)	0.33 - 1	
Available Phosphorus (%)	-	
Magnesium (%)	0.04 - 0.06	
Potassium (%)	0.44 - 0.72	
Sodium (%)	0.13 - 0.18	
Iron (mg/kg)	55 - 80	
Zinc (mg/kg)	55 - 96	
Copper (mg/kg)	5.5 - 12.4	
Manganese (mg/kg)	66 - 72	
Iodine (mg/kg)	0.33 - 0.44	
Selenium (mg/kg)	0.2 - 0.4	

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

SOURCE: Sheila E. Scheideler Nutrition Guidelines  
for Ostriches and Emus 1997

NUTRIENT

Ostrich

(*Struthio camelus*) (Maintenance-Reproduction)

PB (%)	16 - 22
Gross Fiber (%)	6 - 17
FDN (%)	14 - 27
FDA (%)	-
Lysine (%)	0.75 - 1
Methionine (%)	0.35 - 0.38
Methionine + Cystine (%)	-
Arginine (%)	-
EE (%)	-
Arachidonic acid (%)	-
Linoleic acid (%)	-
Linolenic acid (%)	-
Vit A (UI/kg)	4000 - 5000
Vit D3 (UI/kg)	1000 - 1200
Vit E (UI/kg)	25 - 50
Vit K (mg/kg)	2.7 - 4.4*
Thiamine (mg/kg)	2 - 8*
Riboflavin (mg/kg)	7 - 10*
Niacin (mg/kg)	48 - 78*
Vit B6 (mg/kg)	3 - 5.6*
Folic acid (mg/kg)	-
Biotin (mg/kg)	0.1 - 0.8*
Vit B12 (mg/kg)	0.009 - 0.018
Pantothenic acid (mg/kg)	13 - 33*
Choline (mg/kg)	860 - 1000
Calcium (%)	1.2 - 3.5
Phosphorus (%)	
Available Phosphorus (%)	0.6 - 0.75
Magnesium (%)	-
Potassium (%)	-
Sodium (%)	0.2
Iron (mg/kg)	30 - 167*
Zinc (mg/kg)	40 - 55
Copper (mg/kg)	15 - 20
Manganese (mg/kg)	70
Iodine (mg/kg)	0.4 - 0.5
Selenium (mg/kg)	0.25 - 0.3*

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

SOURCE: Sheila E. Scheideler Nutrition Guidelines for Ostriches and Emus 1997

NUTRIENT

Emu

(*Dromaius novaehollandiae*) (Maintenance-Reproduction)

PB (%)	16 - 22
Gross Fiber (%)	6 - 8
FDN (%)	10 - 18
FDA (%)	-
Lysine (%)	0.75 - 1.1
Methionine (%)	0.36 - 0.48
Methionine + Cystine (%)	-
Arginine (%)	-
EE (%)	-
Arachidonic acid (%)	-
Linoleic acid (%)	-
Linolenic acid (%)	-
Vit A (UI/kg)	4000 - 7000
Vit D3 (UI/kg)	1500 - 2000
Vit E (UI/kg)	20 - 45
Vit K (mg/kg)	-
Thiamine (mg/kg)	-
Riboflavin (mg/kg)	-
Niacin (mg/kg)	-
Vit B6 (mg/kg)	-
Folic acid (mg/kg)	-
Biotin (mg/kg)	-
Vit B12 (mg/kg)	0.01 - 0.02
Pantothenic acid (mg/kg)	-
Choline (mg/kg)	900 - 1000
Calcium (%)	1.2 - 3.5
Phosphorus (%)	-
Available Phosphorus (%)	0.6 - 0.75
Magnesium (%)	-
Potassium (%)	-
Sodium (%)	0.2
Iron (mg/kg)	-
Zinc (mg/kg)	50
Copper (mg/kg)	15
Manganese (mg/kg)	70
Iodine (mg/kg)	0.5
Selenium (mg/kg)	-



STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

SOURCE: DEBRA McDONALD 2005

NUTRIENT		
	Psittacidae (Reproduction)	Psittacidae (Maintenance)
PB (%)	15-22	10 - 15
Gross Fiber (%)	-	-
FDN (%)	-	-
FDA (%)	-	-
Lysine (%)	-	0.8 - 1.5
Methionine (%)	-	0.30*
Methionine + Cystine (%)	-	0.50*
Arginine (%)	-	0.65*
EE (%)	10 - 15	5
Arachidonic acid (%)	-	-
Linoleic acid (%)	-	1
Linolenic acid (%)	-	-
Vit A (UI/kg)	-	4000
Vit D3 (UI/kg)	2000	200-1200
Vit E (UI/kg)	250-350	200-250
Vit K (mg/kg)	0.5	0.5
Thiamine (mg/kg)	-	4*
Riboflavin (mg/kg)	-	6*
Niacin (mg/kg)	-	50*
Vit B6 (mg/kg)	-	6*
Folic acid (mg/kg)	-	1.5*
Biotin (mg/kg)	-	0.25*
Vit B12 (mg/kg)	-	0.01*
Pantothenic acid (mg/kg)	-	20*
Choline (mg/kg)	-	1500*
Calcium (%)	0.7-1.2	0.3-0.7
Phosphorus (%)	0.5-0.8	0.3-0.7
Available Phosphorus (%)	-	-
Magnesium (%)	-	0.06
Potassium (%)	-	0.7
Sodium (%)	-	0.2
Iron (mg/kg)	100	100
Zinc (mg/kg)	50-80	40-50
Copper (mg/kg)	-	04 - 12
Manganese (mg/kg)	-	65
Iodine (mg/kg)	-	0.4
Selenium (mg/kg)	0.4-0.5	0.3

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

SOURCE: Feed Management 1998

NUTRIENT	Passerine (Maintenance)	
PB (%)	14	
Gross Fiber (%)	-	
FDN (%)	-	
FDA (%)	-	
Lysine (%)	0.75	
Methionine (%)	0.35	
Methionine + Cystine (%)	0.58	
Arginine (%)	0.75	
EE (%)	-	
Arachidonic acid (%)	-	
Linoleic acid (%)	1	
Linolenic acid (%)	-	
Vit A (UI/kg)	8000	
Vit D3 (UI/kg)	1000-2500	
Vit E (UI/kg)	-	
Vit K (mg/kg)	1	
Thiamine (mg/kg)	4	
Riboflavin (mg/kg)	6	
Niacin (mg/kg)	50	
Vit B6 (mg/kg)	6	
Folic acid (mg/kg)	1.5	
Biotin (mg/kg)	0.25	
Vit B12 (mg/kg)	0.01	
Pantothenic acid (mg/kg)	20	
Choline (mg/kg)	1500	
Calcium (%)	0.50-1.2	
Phosphorus (%)	0.5	
Available Phosphorus (%)	-	
Magnesium (%)	0.06	
Potassium (%)	0.4	
Sodium (%)	0.12	
Iron (mg/kg)	80	
Zinc (mg/kg)	50	
Copper (mg/kg)	8	
Manganese (mg/kg)	65	
Iodine (mg/kg)	0.4	
Selenium (mg/kg)	0.1	

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

SOURCE: Nutrient Requirements of Poultry 1994

NUTRIENT		Goose ( <i>Anserini</i> ) (Maintenance-Growing)	
PB (%)		1	
Gross Fiber (%) FDN (%)		5	
FDA (%)		-	
		2	
		0	
		-	
		-	
		-	
Lysine (%)	0.6-1		
Methionine (%)	-		
Methionine + Cystine (%)	0.5-0.6		
Arginine (%)	-		
EE (%)	-		
Arachidonic acid (%)	-		
Linoleic acid (%)	-		
Linolenic acid (%)	-		
Vit A (UI/kg)	1500-4000		
Vit D3 (UI/kg)	200		
Vit E (UI/kg)	-		
Vit K (mg/kg)	-		
Thiamine (mg/kg)	-		
Riboflavin (mg/kg)	2.5-4		
Niacin (mg/kg)	20 -65		
Vit B6 (mg/kg)	-		
Folic acid (mg/kg)	-		
Biotin (mg/kg)	-		
Vit B12 (mg/kg)	-		
Pantothenic acid (mg/kg)	10 – 15		
Choline (mg/kg)	1000-1500		
Calcium (%)	0.6-2.25		
Phosphorus (%)	0.3		
Available Phosphorus (%)	-		
Magnesium (%)	-		
Potassium (%)	-		
Sodium (%)	-		
Iron (mg/kg)	-		
Zinc (mg/kg)	-		



STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

Copper (mg/kg)	-
Manganese (mg/kg)	-
Iodine (mg/kg)	-
Selenium (mg/kg)	-

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

SOURCE: Nutrient Requirements of Poultry 1994

NUTRIENT		
		Duck ( <i>Anas platyrhynchos</i> ) (Growing-Reproduction)
PB (%)		15-22
Gross Fiber (%) FDN (%)		-
FDA (%)		-
Lysine (%) Methionine (%)		-
Methionine + Cystine (%)		0
		.
		6
		-
		0
		.
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		.
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		5
		-
		0
		.
		7
Arginine (%)	1-1.1	
EE (%)	-	
Arachidonic acid (%)	-	
Linoleic acid (%)	-	
Linolenic acid (%)	-	
Vit A (UI/kg)	2500-4000	
Vit D3 (UI/kg)	400-900	
Vit E (UI/kg)	10	
Vit K (mg/kg)	0.5	
Thiamine (mg/kg)	-	
Riboflavin (mg/kg)	4	
Niacin (mg/kg)	55	
Vit B6 (mg/kg)	2.5-3	

**STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT**

Folic acid (mg/kg)	-
Biotin (mg/kg)	-
Vit B12 (mg/kg)	-
Pantothenic acid (mg/kg)	11
Choline (mg/kg)	-
Calcium (%)	0.6-2.75
Phosphorus (%)	0.3-0.4
Available Phosphorus (%)	-
Magnesium (%)	50
Potassium (%)	-
Sodium (%)	0.15
Iron (mg/kg)	-
Zinc (mg/kg)	60
Copper (mg/kg)	-
Manganese (mg/kg)	50
Iodine (mg/kg)	-
Selenium (mg/kg)	0,2

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

SOURCE: Nutrient Requirements of Poultry 1994

NUTRIENT	Turkey ( <i>Meleagris</i> ) (Maintenance- Growing)
PB (%)	12 – 28
Gross Fiber (%)	-
FDN (%)	-
FDA (%)	-
Lysine (%)	0.5 - 1.6
Methionine (%)	0.2 -0.55
Methionine + Cystine (%)	0.4 - 1.05
Arginine (%)	0.5 - 1.6
EE (%)	-
Arachidonic acid (%)	-
Linoleic acid (%)	-
Linolenic acid (%)	-
Vit A (UI/kg)	5000
Vit D3 (UI/kg)	1100
Vit E (UI/kg)	10 – 12
Vit K (mg/kg)	0.5 - 1.75
Thiamine (mg/kg)	2
Riboflavin (mg/kg)	2.5 – 4
Niacin (mg/kg)	40 – 60
Vit B6 (mg/kg)	3.0 - 4.5
Folic acid (mg/kg)	-
Biotin (mg/kg)	0.1 - 0.25
Vit B12 (mg/kg)	-
Pantothenic acid (mg/kg)	9 – 10
Choline (mg/kg)	800 -1400
Calcium (%)	0.5 -1.2
Phosphorus (%)	0.25 - 0.6
Available Phosphorus (%)	-
Magnesium (%)	500
Potassium (%)	0.4 - 0.7
Sodium (%)	0.12 - 0.17
Iron (mg/kg)	50 – 80
Zinc (mg/kg)	40 – 70
Copper (mg/kg)	6 – 8





STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

Manganese (mg/kg)	60
Iodine (mg/kg)	0.4
Selenium (mg/kg)	0.2

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

2.1.4. Primates

SOURCE: NRC 2003.:. Colobus Monkey (Colobus) Care Manual

NUTRIENT	Cercopithecinae -		
	<i>Macaque</i>	Colobus sp.	Callitrichidae
PB (%)	8	15 - 22	15 - 22
n-3 (%)	0.5	0.5	0.5
n-6 (%)	2	2	2
FDN (%)	10	30	10
FDA (%)	5	15	5
Vit A (UI/kg)	5000	8000	8000
Vit D3 (UI/kg)	1000	2500	2500
Vit E (UI/kg)	68	50 - 100	100
Vit K (mg/kg)	3	-	0.5
Vit C (mg/kg)	110	200	-
Thiamine (mg/kg)	1.1	3	3
Riboflavin (mg/kg)	1.7	4	4
Niacin (mg/kg)	16	25	25
Vit B6 (mg/kg)	4.4	4	4
Folic acid (mg/kg)	1.5	4	4
Biotin (mg/kg)	0.11	0.1 - 0.2	0.2
Vit B12 (mg/kg)	0.011	0.01 - 0.03	0.03
Pantothenic acid (mg/kg)	20	12	12
Choline (mg/kg)	-	750	-
Calcium (%)	0.55	0.5 - 0.8	0.8
Phosphorus (%)	0.33	0.4 - 0.6	0.6
Magnesium (%)	0.04	0.08	0.08
Magnesium (%)	-	0.4	0.4
Potassium (%)	-	0.2	0.2
Sodium (%)	100	100	100
Iron (mg/kg)	20	20 - 100	100
Zinc (mg/kg)	15	12 - 20	20
Copper (mg/kg)	44	20	20
Manganese (mg/kg)	-	0.35	0.35
Iodine (mg/kg)	0.11	0.11 - 0.3	0.3
Selenium (mg/kg)	8	15 - 22	15 - 22

2012.:. EAZA Best Practice Guidelines for Callitrichidae 2017.

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

2.1.5. Reptiles

SOURCE: **Mader - Reptile medicine and surgery -1<sup>st</sup> Ed – pg. 81 Chapter 14, NUTRITION:**. Manual de nutrición y dietas para animales silvestres – 1996

NUTRIENT	<b>Carnivorous</b> (Maintenance)	<b>Omnivorous</b> (Maintenance)	<b>Herbivorous</b> (Maintenance)	Family; Chelidae, Emydidae, Boidae, Culubridae, Crotalidae, Crocodylida, Alligatoridae	Families: Testudinidae, Kinosturnidae, Chelydridae, Iguanidae, Pelomedusidae – Herbivores
FDN (%)	<10	20 -75	55 -75	-	-
Digestible Protein (%)	25 - 60	15 - 40	15 - 35	24	(Maintenance)
EE (%)	30-60	5 - 40	<10	-	0.5
Vit A (UI/kg)	-	-	-	10000	-
Vit D3 (UI/kg)	-	-	-	500	-
Vit E (UI/kg)	-	-	-	-	-
Calcium (%)	-	-	-	0.8	-
Phosphorous (%)	-	-	-	0.6	-

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

2.1.6. Live Edible Insects

SOURCE: Hidrocepe Laboratory – Belo Horizonte/MG (Nutrinsecta Products)

Giant

NUTRIENT	Common mealworm		Black cricket	Speckled cockroach	House fly ( <i>Musca domestica</i> )
		<i>morio</i> )			
Humidity (%)	59.14	62.26	68.06	68.42	75.26
Raw Protein (%)	18.72	17.24	16.47	20.17	13.92
EE (%)	20.08	15.23	9.65	10.60	5.12
Fibers (%)	7.61	7.42	10.59	15.58	8.61
Ashes (%)	1.03	1.04	1.42	1.40	1.08
Calcium (%)	0.05	0.07	0.15	0.14	0.09
Phosphorous (%)	0.28	0.21	0.23	0.25	0.24

Mealworm

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(*Zophobas*

(*Gryllus assimilis*)

(*Blattaria*)

### 3. FORMULATED FEEDS

The formulation of a feed that is appropriate to each animal must consider the delivery of energetic nutrients that provide the energy level needed by the species, considering that not all energy ingested will be used by the animal (MOREIRA, 2005).

Thus, a balanced feed should contain all nutrients required by the animal to satisfy a given physiological requirement and meet all nutritional requirements from the quantitative and qualitative standpoints (MOREIRA, 2005).

#### 3.1. Herbivores

Ração Herbívoros - Manutenção		Ração Herbívoro - Inicial/Crescimento	
EXIGÊNCIAS		EXIGÊNCIAS	
Energia Metabolizável	2500- 3200	Energia Metabolizável	2300- 2900
Umidade (Máx) (%)		Umidade (Máx) (%)	
PB (%)	13-16	PB (%)	15-19
EE (%)	2 a 4	EE (%)	2 a 4
MF (%)	2,5 a 10	MF (%)	2,5 a 10
MM (%)	2 a 7	MM (%)	2 a 7
Cálcio (%)	0,5 a 1	Cálcio (%)	0,5 a 1
Fósforo Disponível (%)	0,4 a 0,8	Fósforo Disponível (%)	0,4 a 0,8
		Lisina Total	0,6 a 1
		Metionina Total	0,3 a 0,5

RAÇÃO HERBÍVOROS - FPZSP		
Nutriente	Fase Inicial/Crescimento	Manutenção
Energia Metabolizável	2760	2500-3200
Umidade (Máx) (%)	12	11,76
PB (%)	18	15,31
EE (%)	3	2.66
MF (%)	3,6	3.65
MM (%)	2,7	2.36
Cálcio (%)	0,95	0,87
Fósforo Disponível (%)	0,4	0,48
Lisina (%)	0,93	-
Metionina Total (%)	0,4	-



## STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

### IN THE TABLE

Herbivorous Feed – FPZPSP

Nutrient      Initial Stage/Growth   Maintenance

Metabolizable Energy

Unit (Max)

Calcium

Available Phosphorous

Overall Lysine

Overall Methionine

### RIGHT

Herbivorous Feed – Maintenance

Herbivorous Feed – Initial/Growth

Metabolizable Energy

Unit (Max)

Calcium

Available Phosphorous

Overall Lysine

Overall Methionine

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

3.1.2. High Energy-Consuming Herbivores

Ração Herbívoro - Manutenção Alta Energia			Ração Herbívoro - FPZSP	
EXIGÊNCIAS			Manutenção Alta Energia	
Energia Metabolizável (Kcal)	2500-3200	EB 3500	Energia Metabolizável (Kcal)	-
Umidade (Máx) (%)	-	ED 3300	Umidade (Máx) (%)	11,43
PB (%)	13-16	EM 2900	PB (%)	16,51
EE (%)	2 a 4		EE (%)	4-5
MF (%)	2,5 - 10		MF (%)	3,72
MM (%)	2 a 7		MM (%)	2,54
Cálcio (%)	0,5 - 1		Cálcio (%)	1,12
Fósforo Disponível (%)	0,4 - 0,8		Fósforo Disponível (%)	0,6

IN THE TABLE:

Herbivorous Feed – High Energy Maintenance  
REQUIREMENTS

Metabolizable Energy  
Unit (Max)

Calcium  
Available Phosphorous

RIGHT  
High Energy Maintenance

3.1.3. Anatidae Feeds

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

Ração Anatídeos - FPZSP		Ração Anatídeos - FPZSP	
Manutenção - A partir de 56 dias de idade		Exigências	
Energia Metabolizavel	3000	Energia Metabolizavel	2800
Umidade (Máx) (%)	12	Umidade (Máx) (%)	-
PB (%)	16	PB (%)	15
EE (%)	3.36	EE (%)	3
MF (%)	2.44	MF (%)	2
MM (%)	2.58	MM (%)	2
Metionina Total (%)	0.30	Metionina Total (%)	0,27
Lisina Disponivel (%)	0.70	Lisina Disponivel (%)	0,65
Cálcio (%)	0.80	Cálcio (%)	0.60
Fósforo Disponivel (%)	0.30	Fósforo Disponivel (%)	0.30

**IN THE TABLE:**

Anatidae Feeds – FPZSP

Maintenance – Starting from 56 days old

**REQUIREMENTS**

Metabolizable Energy

Unit (Max)

Overall Methionine

Available Lysine

Calcium

Available Phosphorous

**RIGHT**

Anatidae Feeds – FPZSP

Requirements

3.1.4. Cracidae Feeds



STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

Ração Cracídeos – FPZSP			Ração Cracídeos - FPZSP	
Nutriente			Exigências - Ração Cracídeos Inicial/Crescimento até 56 dias	
Energia Metabolizável	2884	2830	Energia Metabolizável	2800
Umidade (Máx) (%)	12	12	Umidade (Máx) (%)	-
PB (%)	20	24	PB (%)	20
EE (%)	3.20	4.00	EE (%)	3
MF (%)	2.31	3.09	MF (%)	2
MM (%)	3.34	4.30	MM (%)	3
Metionina Total (%)	0.58	0.46	Metionina Total (%)	0.40
Lisina (%)	1.08	1.30	Lisina (%)	0.90
Cálcio (%)	1.05	1.30	Cálcio (%)	0.65
Fósforo Disponível (%)	0.51	0.50	Fósforo Disponível (%)	0.40

Ração Cracídeos - FPZSP	
Exigências - Ração Cracídeos - 0 a 6 semanas de Idade	
Energia Metabolizável	2800
Umidade (Máx) (%)	-
PB (%)	22-28
EE (%)	4
MF (%)	2.5 a 10
MM (%)	3.5 a 7
Metionina Total (%)	0.40
Lisina (%)	1.10
Cálcio (%)	1.00
Fósforo Disponível (%)	0.40

**IN THE TABLE:**

Cracidae Feeds – FPZSP

Nutrient

Metabolizable Energy

Unit (Max)

Overall Methionine

Lysine

Calcium

Available Phosphorous

RIGHT –

Cracidae Feeds – FPZSP

Requirements – Cracidae Feeds Initial/Grwoth until 56 days old

Overall Methionine

Lysine

Calcium

Available Phosphorous

ABOVE



STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

Cracidae Feeds – FPZSP

Requirements – Cracidae Feeds – 0 to 6 weeks old

Metabolizable Energy

Unit (Max)

Overall Methionine

Lysine

Calcium

Available Phosphorous

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

3.1.5. Ratite Feeds (Group 1)

Ração Ratitas - FPZSP		Ração Ratitas - FPZSP	
(Emas, Emus, Avestruzes) Inicial 1 a 8 semanas		Exigência	
Energia Metabolizavel Kcal/kg	2663.0	Energia Metabolizavel Kcal/kg	2300 - 2700
Umidade (Máx) (%)	11.0	Umidade (Máx) (%)	12
PB (%)	21.0	PB (%)	18 - 24
EE (%)	3.3	EE (%)	2 a 6
MF (%)	4.2	MF (%)	4 a 10
MM (%)	4.4	MM (%)	2 a 7
Metionina Total (%)	0.5	Metionina Total (%)	0.2 -0.3
Lisina (%)	1.2	Lisina (%)	1 -1.2
Cálcio (%)	2.0	Cálcio (%)	1.2 -2.0
Fósforo Total	1.1	Fósforo Total	0.9 - 1.2
Fósforo Disponível (mín)	0.9	Fósforo Disponível (mín)	0.6 - 1



## STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

### IN THE TABLE:

Ratite Feeds – FPZSP

(Greater rheas, emus, ostriches) Initial – 1 to 8 weeks old

Overall Methionine

Lysine

Calcium

Available Phosphorous

ABAIXO

Cracidae Feeds – FPZSP

Requirements – Cracidae Feeds – 0 to 6 weeks old

Metabolizable Energy

Unit (Max)

Overall Methionine

Lysine

Calcium

Available Phosphorous

Requirements

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

3.1.6. Ratite Feeds (Group 2)

Ração Ratitas - FPZSP		Ração Ratitas - FPZSP	
Crescimento 8 a 40 semanas		Crescimento 8 a 40 semanas	
Energia Metabolizavel Kcal/kg	2750.0	Energia Metabolizavel Kcal/kg	2300 - 2800
Umidade (Máx) (%)	12.0	Umidade (Máx) (%)	12
PB (%)	19.0	PB (%)	18-24
EE (%)	2.9	EE (%)	2 a 6
MF (%)	4.0	MF (%)	4 a 10
MM (%)	3.0	MM (%)	2 a 7
Metionina Disponível (%)	0.5	Metionina Disponível (%)	0,2 - 0,3
Lisina Disponível (%)	1.2	Lisina Disponível (%)	1 - 1,2
Cálcio (%)	1.8	Cálcio (%)	1,2 - 1,8
Fósforo Total	1.0	Fósforo Total	0,9 - 1,2
Fósforo Disponível (min)	0.9	Fósforo Disponível (min)	0,6 - 1

IN THE TABLE:

Ratite Feeds – FPZSP  
Growth – 8 to 40 weeks old

Metabolizable Energy  
Unit (max)  
Available Methionine  
Available Lysine  
Overall Phosphorous  
Available Phosphorous (min)

3.1.7. Ratite Feeds (Group 3)

Ração Ratitas - FPZSP		Ração Ratitas - FPZSP	
Manutenção - Acima de 40 semanas de Idade		Exigência	
Energia Metabolizavel Kcal/kg	2675.0	Energia Metabolizavel Kcal/kg	2300-2700
Umidade (Máx) (%)	12.0	Umidade (Máx) (%)	12
PB (%)	16.1	PB (%)	14-17
EE (%)	2.6	EE (%)	2 a 4
MF (%)	5.4	MF (%)	4 a 10
MM (%)	3.1	MM (%)	2 a 7
Metionina Disponível (%)	0.5	Metionina Disponível (%)	0,2 - 0,3
Lisina Disponível (%)	0.9	Lisina Disponível (%)	0,75 - 1
Cálcio (%)	1.4	Cálcio (%)	1,2 - 1,8
Fósforo Total	0.8	Fósforo Total	0,6 - 1
Fósforo Disponível (min)	0.6	Fósforo Disponível (min)	0,6 - 1

**IN THE TABLE:**

Ratite Feeds – FPZSP

Maintenance – Over 40 weeks old

Metabolizable Energy

Unit (max)

Available Methionine

Available Lysine

Overall Phosphorous

Available Phosphorous (min)

Requirements

3.1.8. Rodent Feeds

Ração Roedores - FPZSP		Ração Roedores - FPZSP	
Manutenção		Exigência	
EB (%)	4030	EB (%)	-
Energia Metabolizavel Kcal/kg	3435	Energia Metabolizavel Kcal/kg	-
Umidade (Máx) (%)	11	Umidade (Máx) (%)	-
PB (%)	23	PB (%)	-
EE (%)	5.00	EE (%)	-
MF (%)	3.00	MF (%)	-
MM (%)	6.00	MM (%)	-
Metionina Disponível (%)	0.40	Metionina Disponível (%)	-
Lisina Disponível (%)	1.37	Lisina Disponível (%)	-
Cálcio (%)	1.32	Cálcio (%)	-
Fósforo Total	0.88	Fósforo Total	-
Fósforo Disponível (min)	0.60	Fósforo Disponível (min)	-

**IN THE TABLE:**

Rodent Feeds – FPZSP  
Maintenance

Maintenance  
Metabolizable Energy  
Unit (max)  
Available Methionine  
Available Lysine  
Overall Phosphorous  
Available Phosphorous (min)

À DIREITA - Requirements

3.1.9. Mealworm Substrate Feeds

Ração Substrato Tenébrios - FPZSP	
Manutenção	
Energia Metabolizavel Kcal/kg	2877
Umidade (Máx) (%)	13
PB (%)	16
EE (%)	1,9
MF (%)	3,4
MM (%)	2,5
Cálcio (%)	0,5
Fósforo Disponível (min)	0,3

**IN THE TABLE:**

Mealworm Substrate Feeds – FPZSP

Maintenance

Metabolizable Energy

Unit (max)

Calcium

Available phosphorous (min)



3.1.10. Household Feline Feeds Test

Ração Felinos Domésticos	
Manutenção - TESTE	
Energia Metabolizavel Kcal/kg	3433.3
PB (%)	30.99
EE (%)	9.53
FB(%)	6.66
MM (%)	8.76
Cálcio (%)	1.68
Fósforo Total	1.24

**IN THE TABLE:**

Household Feline Feeds  
Maintenance – TRIAL  
Metabolizable Energy

Calcium  
Overall Phosphorous

3.1.11. Swine Feeds

Ração Suínos - FPZSP	
Manutenção	
EB (%)	3400
Energia Digestível	3225
Umidade (Máx) (%)	11
PB (%)	16,33
EE (%)	4,79
MF (%)	3,27
MM (%)	3,84
Metionina Disponível (%)	0,33
Lisina Disponível (%)	0,78
Cálcio (%)	1,1
Fósforo Total	0,7
Fósforo Disponível (min)	0,48

**IN THE TABLE:**

Swine Feeds – FPZSP

Maintenance

Digestible Energy

Unit

Available Methionine

Available Lysine

Calcium

Overall Phosphorous

Available Phosphorous (min)

#### **4. RENEWABLE LIVE FEEDING DEVELOPMENT CENTER**

Birds, reptiles, amphibians and mammals need to have in their diets the presence of animals more closely resembling life *in situ*, as sources of sufficient nutrients, thus avoiding the possibilities of deficiencies or excesses.

Thus, the Renewable Live Feeding Development Center – NUDAVR breeds, nourishes, feeds, maintains and reproduces rats, mice, gerbils, guinea pigs, chicks, rabbits, cockroaches, crickets and mealworms.

Primarily, the responsible professional shall, while exercising his or her duties, ensure proper management, to produce good quality animals, which satisfy the nutritional requirements of the species consuming them in their diets.

However, to provide basic care and assistance to the animals, ensuring their health and wellbeing and the ethical treatment of all species, is crucial to animal breeding. This center bases its work on the Technical Guides for Research Animal Facilities.

Therefore, it has developed Standard Operating Procedures – SOP, to address any and all management forms. Euthanasia, for instance, which consists of putting down a living being who is experiencing physical suffering, is a necessary procedure that has led the NUDAVR to develop the SOP - 020 for animal euthanasia.

The NUDAVR of the *Fundação Parque Zoológico de São Paulo* – FPZSP maintains an inventory of approximately one thousand mice, five to seven thousand rats, one hundred and fifty to two hundred gerbils, three hundred guinea pigs, one thousand chicks every fifteen days, eight rabbits every fifteen days, and a high level of production, reproduction and maintenance of insects.

To meet the requirements, the FPZSP produced in the year of 2018

- 90803 annual quantity of rats, mice, guinea pigs, cockroaches, gerbils
- and 44.5 kilograms of mealworms and crickets.

Below are detailed tables itemizing the production of the Renewable Live Feeding Development Center – NUDAVR, in 2018.

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

PRODUCTION OF THE NUDAVR – JANUARY 2018

ANIMAL	QUANTITY	UNIT
RATS	1350	# animals
MICE	850	# animals
GERBILS	25	# animals
GUINEA PIGS	144	# animals
COCKROACHES	1000	# animals
TOTAL	3369	# animals
MEALWORMS	2	kg
CRICKETS	2	kg
TOTAL	4	kg

PRODUCTION OF THE NUDAVR - FEBRUARY 2018

ANIMAL	QUANTITY	UNIT
RATS	1572	# animals
MICE	1450	# animals
GERBILS	10	# animals
GUINEA PIGS	185	# animals
COCKROACHES	5000	# animals
TOTAL	8217	# animals
MEALWORMS	5	kg
CRICKETS	2	kg
TOTAL	7	kg

PRODUCTION OF THE NUDAVR - MARCH 2018

ANIMAL	QUANTITY	UNIT
RATS	1798	# animals
MICE	1215	# animals
GERBILS	10	# animals
GUINEA PIGS	52	# animals
COCKROACHES	5000	# animals
TOTAL	8075	# animals
MEALWORMS	1	kg
CRICKETS	1	kg
TOTAL	2	kg

PRODUCTION OF THE NUDAVR - APRIL 2018

ANIMAL	QUANTITY	UNIT
RATS	1354	# animals
MICE	221	# animals
GERBILS	9	# animals
GUINEA PIGS	103	# animals
COCKROACHES	3000	# animals
TOTAL	4687	# animals
MEALWORMS	3	kg
CRICKETS	2	kg
TOTAL	5	kg

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

PRODUCTION OF THE NUDAVR – MAY 2018

ANIMAL	QUANTITY	UNIT
RATS	1508	# animals
MICE	1102	# animals
GERBILS	22	# animals
GUINEA PIGS	87	# animals
COCKROACHES	10000	# animals
TOTAL		# animals
		kg
2719		kg kg
MEALWORMS	1	
CRICKETS	2	
TOTAL	3	

PRODUCTION OF THE NUDAVR – JUNE 2018

ANIMAL	QUANTITY	UNIT
RATS	1773	# animals
MICE	111	# animals
GERBILS	5	# animals
GUINEA PIGS	73	# animals
COCKROACHES	1000	# animals
TOTAL	2962	# animals
MEALWORMS	1	kg
CRICKETS	2	kg
TOTAL	3	kg

PRODUCTION OF THE NUDAVR – JULY 2018

ANIMAL	QUANTITY	UNIT
RATS	1800	# animals
MICE	810	# animals
GERBILS	8	# animals
GUINEA PIGS	100	# animals
COCKROACHES	3000	# animals
TOTAL	2718	# animals
MEALWORMS	1	kg
CRICKETS	1.5	kg
TOTAL	2.5	kg

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

PRODUCTION OF THE NUDAVR – AUGUST 2018

ANIMAL	QUANTITY	UNIT
RATS	3300	# animals
MICE	676	# animals
GERBILS	25	# animals
GUINEA PIGS	124	# animals
COCKROACHES	25000	# animals
TOTAL	4125	# animals
MEAL WORMS	1	kg
CRICKETS	2	kg
TOTAL	3	kg

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

PRODUCTION OF THE NUDAVR – SEPTEMBER 2018

ANIMAL	QUANTITY	UNIT
RATS	3273	# animals
MICE	808	# animals
GERBILS	46	# animals
GUINEA	168	# animals
PIGS	500	# animals
COCKROA	4795	# animals
CHES	4	kg
TOTAL		
MEALWOR		
MS		
CRICKETS	1	kg
TOTAL	5	kg

PRODUCTION OF THE NUDAVR – OCTOBER 2018

ANIMAL	QUANTITY	UNIT
RATS	2822	# animals
MICE	827	# animals
GERBILS	37	# animals
GUINEA PIGS	227	# animals
COCKROACHES	0	# animals
TOTAL	3913	# animals
MEALWORMS	2	kg
CRICKETS	1	kg
TOTAL	3	kg

PRODUCTION OF THE NUDAVR – NOVEMBER 2018

ANIMAL	QUANTITY	UNIT
RATS	2822	# animals
MICE	827	# animals
GERBILS	37	# animals
GUINEA PIGS	227	# animals
COCKROACHES	0	# animals
TOTAL	3913	# animals
MEALWORMS	2	kg
CRICKETS	1	kg
TOTAL	3	kg

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

PRODUCTION OF THE NUDAVR – DECEMBER 2018

ANIMAL	QUANTITY	UNIT
RATS	2471	# animals
MICE	380	# animals
GERBILS	22	# animals
GUINEA PIGS	237	# animals
COCKROACHES	200	# animals
TOTAL	3310	# animals
MEALWORMS	3	kg
CRICKETS	1	kg
TOTAL	4	kg





STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

PRODUCTION OF THE NUDAVR – ANNUAL 2018

ANIMAL	QUANTITY	UNIT
RATS	25843	# animals
MICE	9277	# animals
GERBILS	256	# animals
GUINEA PIGS	1727	# animals
COCKROACHES	53700	# animals
TOTAL	90803	# animals
MEALWORMS	26	kg
CRICKETS	18.5	kg
TOTAL	44.5	kg



## STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

### 5. FRUITS, VEGETABLES, PRODUCE

All products must be top quality, with the highest applicable grading, that is to say, **A, AA, EXTRA**. Similarly, the packaging shall adhere to the determinations in SARC-ANVISA-INMETRO Joint Normative Instruction n. 009, of November 12, 2002, and labeled according to the current legislation: Ordinance n. 42, of January 14, 1998, by the Health Surveillance Department of the Brazilian Ministry of Health – revoked by resolution – RDC n. 259 – ANVISA, of September 22, 2002, published in the D.O.U. on September 23, 2002; Ordinance n. 371, of September 4, 1997, by the Brazilian Ministry of Agriculture and Food Supply; Normative Resolution n. 5, of December 31, 1998, by the Brazilian Ministry of Agriculture and Food Supply, and INMETRO Ordinance n. 157, of August 19, 2002 – by the National Institute of Metrology, Standardization and Industrial Quality – INMETRO.

- a) External measurements of packages shall be pallet-compatible, being submultiples of 1.00 x 1.20 m. The supplier may, subject to these requirements, use different types of packaging, as long as their measurements are submultiples and allow for proper piling.
- b) Packaging shall be standardized by the Companhia de Entrepósitos e Armazéns Gerais de São Paulo – CEAGESP, according to the weight or quantities described in the Report: box, carton, bags, and the supplier shall produce a list of the average or unit weights or quantities noted on the packaging.
- c) Packaging may also be recyclable or reusable. When disposable, it shall allow for clean incineration or recycling. When reusable, it shall be sanitized after each use.
- d) Packaging shall be labeled to show the product's net weight, the product identification, its variety and grading, as well as the identification of the person responsible for the product and the person's address, and its packing date.
- e) Empty boxes and cartons are always to be picked up on the date of the following delivery.

All products are to be transported inside closed vehicles, used solely for purposes of transporting produce: they are not to transport other foods or foreign substances or toxic products liable to contaminate the food, inside the same compartment. During their



## STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

transportation, products shall be stored on skids or shelves, so as to never be in direct contact with the floor.

Delivery vehicles shall preferably be provided with equipment to facilitate loading and unloading, such as a hydraulic platform and unloading carts. Thus, the subject of the bidding process shall be delivered to the locations established in this Term of Reference. All deliveries, loading and unloading shall be executed at the cost and at the risk of the **CONTRACTED PARTY**, with no additional delivery fee.

The delivered merchandise shall be reviewed by the head of the storeroom at the Animal Feeding Center, jointly with the supplier.

Any products not included in the lists of fruits, greens, vegetables and others, may be accepted, as long as they are currently in season and are included in the Report – CEAGESP. The annual quantities are approximated and variable, provided they may be changed, to more or less, based on seasonality requirements and the needs of the **CONTRACTING PARTY**.



## STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

### **TERM OF REFERENCE ANNEX I**

Subject: Hiring a specialized company to supply produce, making deliveries that are similar, in terms of quantities, specifications, packaging, to the detailing in this Term of Reference.

#### **PRECONDITIONS TO THE SUPPLY OF PRODUCTS**

All products referenced in this Term of Reference are identified according to registration codes in the Integrated Physical-Financial Information System – SIAFISICO, and offers shall fully adhere to the description registered.

Acceptance and supply of donated produce are strictly prohibited, as they are impossible to track.

The following is a list of fruits, vegetables, produce to be acquired, including a monthly/annual Estimate, according to the units, quantities, specifications and conditions:

STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

5.1. Products

Fruits

PRODUCT	Quantity month	Quantity year
	(Kg)	(Kg)
AVOCADO	60	720
PINEAPPLE	50	600
PLUM	15	180
PERSIMMON	20	240
DRY COCONUT	170	2040
GREEN COCONUT	4	48
DWARF BANANA	1500	18000
GUAVA	200	2400
KIWI	20	240
ORANGE	250	3000
APPLE	320	3840
PEAR	150	1800
MELON	150	1800
PAPAYA	1000	12000
MANGO	10	120
WATERMELON	320	3840
PASSION FRUIT	20	240
STRAWBERRY	10	120
PEACH	10	120
NECTARINE	10	120
GRAPE	10	120
		<b>51588</b>

Vegetables

PRODUCT	Quantity month	Quantity year
	(Kg)	(Kg)
EGGPLANT	20	240
SCARLETT EGGPLANT	2	24
CUCUMBER	100	1200
GREEN PEPPER	2	24
TOMATO	140	1680
GREEN BEANS	100	1200
OKRA	10	120
		<b>4488</b>

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Greens

PRODUCT	Quantity month	Quantity year
	(Kg)	(Kg)
SWISS CHARD	450	5400
BROCCOLIS	360	4320
CHICORY (**)	400	4800
SPINACH	300	3600
ENDIVE	1900	22800
KALE	220	2640
CAULIFLOWER	220	2640
CABBAGE (*)	500	6000
ESCAROLE	51	612
CORN	150	1800
		<b>54612</b>

(\*) Items produced by the Rural Production Division, based on seasonality, for its total or partial consumption.

(\*\*) May be used in the absence of endive

Roots and Tubers

PRODUCT	Quantity month	Quantity year
	(Kg)	(Kg)
SWEET POTATO	320	3840
CASSAVA	150	1800
PUMPKIN	2000	24000
BEET	150	1800
CARROT	400	4800
ONION	50	600
		<b>36840</b>

Others

PRODUCT	Quantity month	Quantity year
	(Kg)	(Kg)
EGGS	5400 (unit)	64800
PEANUTS	150	1800
MOYASHI	200	2400
		<b>69000</b>

5.1.2. The following conditions are to be met:

All products included in the attached list shall be assigned the best rating, with the following characteristics:



## STATE SECRETARIAT FOR INFRASTRUCTURE AND ENVIRONMENT

- a) Leafy greens: fresh, good quality, crisp, lush, with uniform coloring, typical of the respective variety, regular degree of evolution, perfect state of development, with aroma, color and flavor typical of the class, firm stalk, no discoloration.
- b) Other vegetables: smooth, firm surface, shiny, uniform skin, without discoloring, soft or bruised sections, or cracks.
- c) Fresh fruits; showing the highest quality in terms of size, aroma, color and flavor, which shall be typical of the type and variety: abnormal outside humidity, atypical flavor and aroma should be absent.
- d) Minor, negligible defects shall be tolerated, as long as they do not account for more than 5% (five percent) of the total weight of each product package delivered.
- e) At the discretion of the Animal Nutrition Division of the *Fundação Parque Zoológico de São Paulo*, quantities may be changed and products included or suppressed during certain times of the year.

### 5.1.3. Minimum Quality Standards

Serious defects not admissible in Fruits, Vegetables, Tubers and Greens: Rot, Damages extending deeply into the fruit, Immature, Overripe, Shriveled fruits, fruits showing Fungus, Mold, Mustiness, and other modified natural conditions.

Dirty Shell	Fermented	Overly Humid >12%
Broken Shell	Immature	Foreign Matter
Old	Rotten	Bruised
Rotten	Cracked	Fungus and Mold
Strong Odor	Strong Odor	-



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5.1.4. Serious defects not admitted in eggs, dry coconut and peanuts:

EGGS

DRY COCONUT

PEANUTS IN  
SHELL

Products may not present sediment or contamination levels above the lawful limits;

Oranges shall present at least 35% (thirty-five percent) juice and 10°Brix;

Lemons shall present at least 45% (forty-five percent) juice;

Eggs shall present a clean, whole, undistorted shell; fixed air chamber, measuring no more than 4 (four) millimeters in height; the egg white shall be clear, transparent, consistent, with the chalazas intact; the yoke shall be translucent, consistent, centralized, showing no germ development.

### 5.1.5. Delivery Location for Products

The *Fundação Parque Zoológico de São Paulo*, headquartered at Av. Miguel Stéfano nº 4241, Água Funda, São Paulo – SP, at the Animal Nutrition Division.

The following regulations shall govern the supply of products, and shall be complied with by the winning bidder;

#### **Egg:**

Animal Products Inspection Department (“Departamento de Inspeção de Produtos de Origem Animal”)

DECREE N. 56,585 of July 20, 1965

Approves new specifications for the classification and inspection of eggs.

Approves new specifications for the classification and inspection of eggs.

Published in the D.O.U. on July 22, 1965 Rec. July 30, 1965





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**Peanut (*Arachis hypogaea*):**

Ordinance n. 147 of July 14, 1987 MAPA

Aflatoxin in peanuts:

Resolution – RDC n. 274, of October 15, 2002.

Published in the D.O.U. on October 16, 2002 MERCOSUR TECHNICAL REGULATION  
ON THE MAXIMUM AFLATOXIN LEVELS ADMISSIBLE IN MILK, PEANUTS,  
CORN.



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### **Packaging:**

JOINT NORMATIVE INSTRUCTION SARC/ ANVISA/ INMETRO n. 009, of November 12, 2002.

### **Labeling:**

Specific rules applying to Foodstuffs.

Ordinance n. 42, of October 14, 1998, by the Health Surveillance Department of the Brazilian Ministry of Health – revoked by Resolution – RDC n. 259 – ANVISA, of September 20, 2002, Published in the D.O.U. on September 23, 2002.

Ordinance n. 371, of September 04, 1997, by the Brazilian Ministry of Agriculture and Food Supply.

Normative Resolution n. 05, of December 31, 1998, by the Brazilian Ministry of Agriculture and Food Supply.

### **General Regulations:**

Federal Decree n. 8210, of August 14, 1998 (articles 16,17,18 and 22).

State Decree n. 12,342, of September 27, 1978. Health Code (Title IV).

State Decree n. 12,486, of October 20, 1978. Technical Note.

Law n. 8,078, of September 11, 1990. Consumer Defense Code (Article 31).

CONMETRO Resolution n. 11/88, of October 12, 1988 – National Council of Metrology, Normalization and Industrial Quality (Articles 12, 14 and 15).

INMETRO Ordinance n. 88/96, of May 28, 1996 - National Institute of Metrology, Standardization and Industrial Quality.

INMETRO Ordinance n. 02/98, of February 11, 1998 - National Institute of Metrology, Standardization and Industrial Quality.

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### 6. FINAL CONSIDERATIONS

In light of the nutritional and dietary needs of wild animals held in captivity and the lack of studies focused on this field, even though studies on the nutritional requirements of wild animals have, since the 1980s, become more prevalent (SAAD, 2003), it is important to be aware of similar digestive systems, feeding habits, nutritional requirements, deficiencies, and specific toxicities. This is aimed at providing those species with the richest possible diet, which properly satisfies their requirements.

Finally, in order to prepare a balanced diet, the person in charge must not only be familiar with the nutritional, morphological and physiological aspects, as well as the psychological requirements of each species, but also be prepared to devise a diet plan adjusted to the current moment within the life cycle of each animal, the kind of living space made available to the animal (*ex-situ* or *in-situ*), its clinical condition, palatability, ensuring microorganism-free food, in the appropriate quantity and quality, digestibility, easy to secure and as cost-effective as possible.

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7. LIST OF ABBREVIATIONS AND ACRONYMS

ABBREVIATION	WORD
FB	Gross Fiber
FDN	Neutral Detergent Fiber
FDA	Acid Detergent Fiber
PB	Raw Protein
EE	Ether Extract
N-3	Omega 3
N-6	Omega 6
Vit A	Vitamin A
Vit D3	Vitamin D3
Vit E	Vitamin E
Vit K	Vitamin K
Vit B6	Vitamin B6
Ac. Fólico	Folic Acid
Vit B12	Vitamin B12
Ac. Pantatênico	Pantothenic Acid
PV	Live Weight
Lig	Lignin
Ca	Calcium
P	Phosphorus
Mg	Magnesium
K	Potassium
Na	Sodium
S	Sulfur
Fe	Iron
Cu	Copper
I	Iodine
Se	Selenium
Zn	Zinc (mg/kg)
Mn	Manganese
Co	Cobalt
mg/kg	Milligrams per Kilogram
MM	Mineral Matter
MF	Fibrous Matter
(Max)	Maximum
(Kcal)	Kilocalorie
(Min)	Minimum
N.	Number
UI	International Unit
10°Brix	Sugar Level
(%)	Percentage
Maintenance	Energy
NEM	Level

## 8. BIBLIOGRAPHIC REFERENCES

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