FONTES DE ÓLEOS E GORDURAS E SUAS CARACTERÍSTICAS NUTRICIONAIS

Cristiana F.F. Pontieri

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Fontes de óleos e gorduras

Óleos e gorduras "puras"

- Gorduras de frango
- Banha suína
- Sebo bovino
- Óleo de peixe
- Óleos vegetais

Ingredientes com óleos e gorduras

- CMS
- Carnes & vísceras & subprodutos
- Farinhas de origem animal
  - Far. frango
  - Far. torresmo
  - Far. peixes
- Farinhas e farelos vegetais
  - Far. soja
  - Soja micronizada
- Sementes
- Algas, Krill
- Insetos


Nutrientes
Energia
Sustentabilidade
Óleos
Gorduras
Palatabilidade
Segurança
Alimentar



NUTRIENTES ESSENCIAIS

Energia (e digestibilidade)

Cães e gatos tem uma alta capacidade em digerir e absorver gorduras e óleos.

Poli-insaturadas > Saturadas

Cães e gatos saudáveis não tem limite máximo tolerável definido, desde que demais nutrientes estejam em equilíbrio.

Energia

Maior o teor de gordura maior a energia.

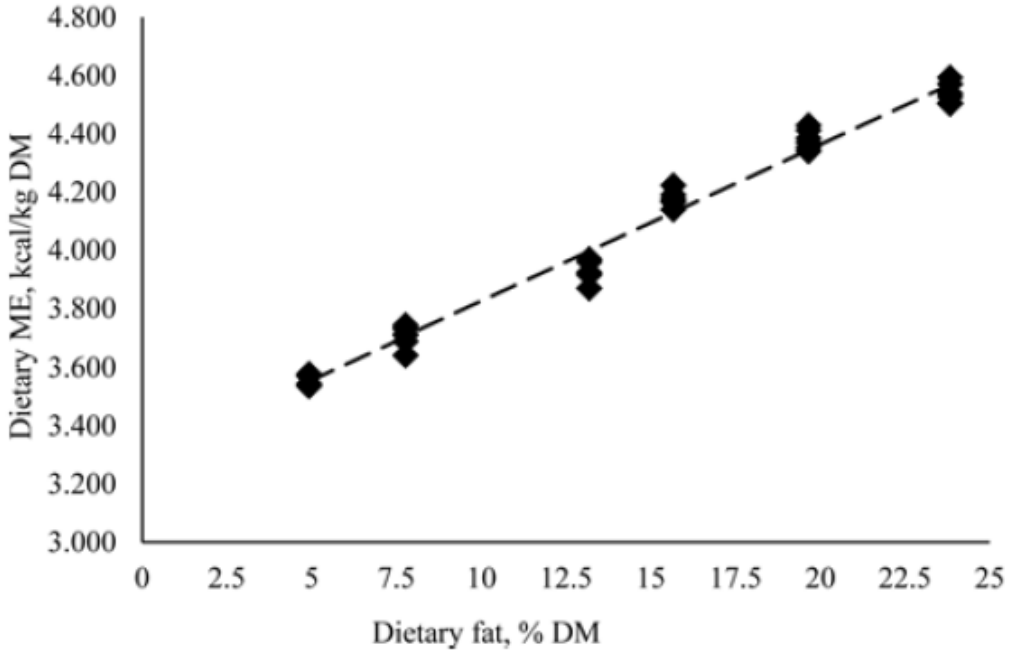


Figure 3. The relation between dietary ME content and dietary total fat level provided as a linear equation as follows: $y = 3{,}288 + 53.7x$ (r^2 = 0.98, SE 49.8).

J. Anim. Sci. 2017.95:2928–2935

Endogenous fat loss and true total tract digestibility of poultry fat in adult dogs[1]

F. R. Marx,*[2] L. Trevizan,* F. M. O. B. Saad,† K. G. Lisenko,† J. S. Reis,† and A. M. Kessler*

J. Anim. Sci. 2017.95:2928–2935

Table 4. Apparent total tract digestibility (ATTD) of macronutrients and energy, true total tract digestibility (TTTD) of fat, and endogenous fat losses (EFL) of adult Beagle dogs fed diets containing increasing levels of poultry fat

Item	Basal + 1% FAT[1]	Basal + 4% FAT	Basal + 10% FAT	Basal + 12% FAT	Basal + 16% FAT	Basal + 20% FAT	SEM	*P*-value
ATTD, %								
DM	83.8^{d}	84.4^{cd}	85.0^{cd}	85.7^{bc}	86.5^{ab}	87.2^{a}	0.14	<0.0001
OM	87.0^{d}	87.3^{d}	87.9^{cd}	88.5^{bc}	89.2^{ab}	89.7^{a}	0.11	<0.0001
CP	87.0	88.3	88.1	86.1	87.0	87.4	0.38	0.6783
Fat	83.5^{d}	89.9^{c}	92.6^{b}	93.6^{b}	95.6^{a}	96.2^{a}	0.16	<0.0001
Energy	86.1^{d}	86.7^{d}	88.1^{c}	88.8^{bc}	89.7^{ab}	90.4^{a}	0.11	<0.0001
TTTD of fat, %								
EFL corrected by mg·kg BW^{-1}·d^{-1}	100	101	99.8	100	101	101	0.15	0.4734
EFL corrected by g/kg DMI	99.4	100	99.0	98.6	99.6	99.4	0.16	0.2644
EFL								
Adult Beagle 15.5 kg BW, g/d	2.42	2.41	2.40	2.42	2.42	2.40	0.004	0.6687
Relative to fat intake, %	16.9^{a}	11.3^{b}	6.85^{c}	6.80^{c}	5.16^{d}	4.73^{d}	0.09	<0.0001

$^{a–d}$Means within a row with different superscripts differ ($P \leq 0.05$).

[1]FAT = Fat added to the Basal diet.

Pontieri, 2008

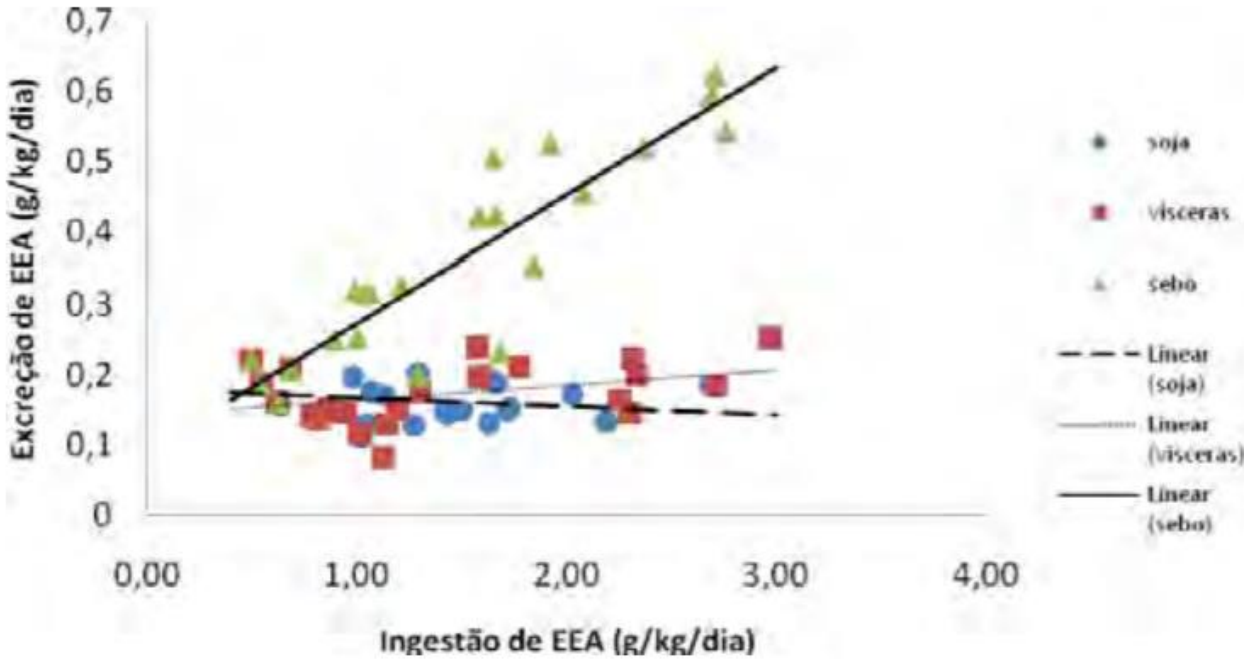


Fig. 2.1. Excreção fecal de extrato etéreo ácido (EEA) em função de sua ingest pelos gatos

Energia

Gorduras e óleos são altamente digestíveis por cães e gatos:

Poli-insaturadas > Saturadas

Tabela 2.13 Energia bruta (EB), energia metabolizável (EM) estimada e coeficiente de metabolização da energia bruta (CMEB) das fontes de gordura para gatos

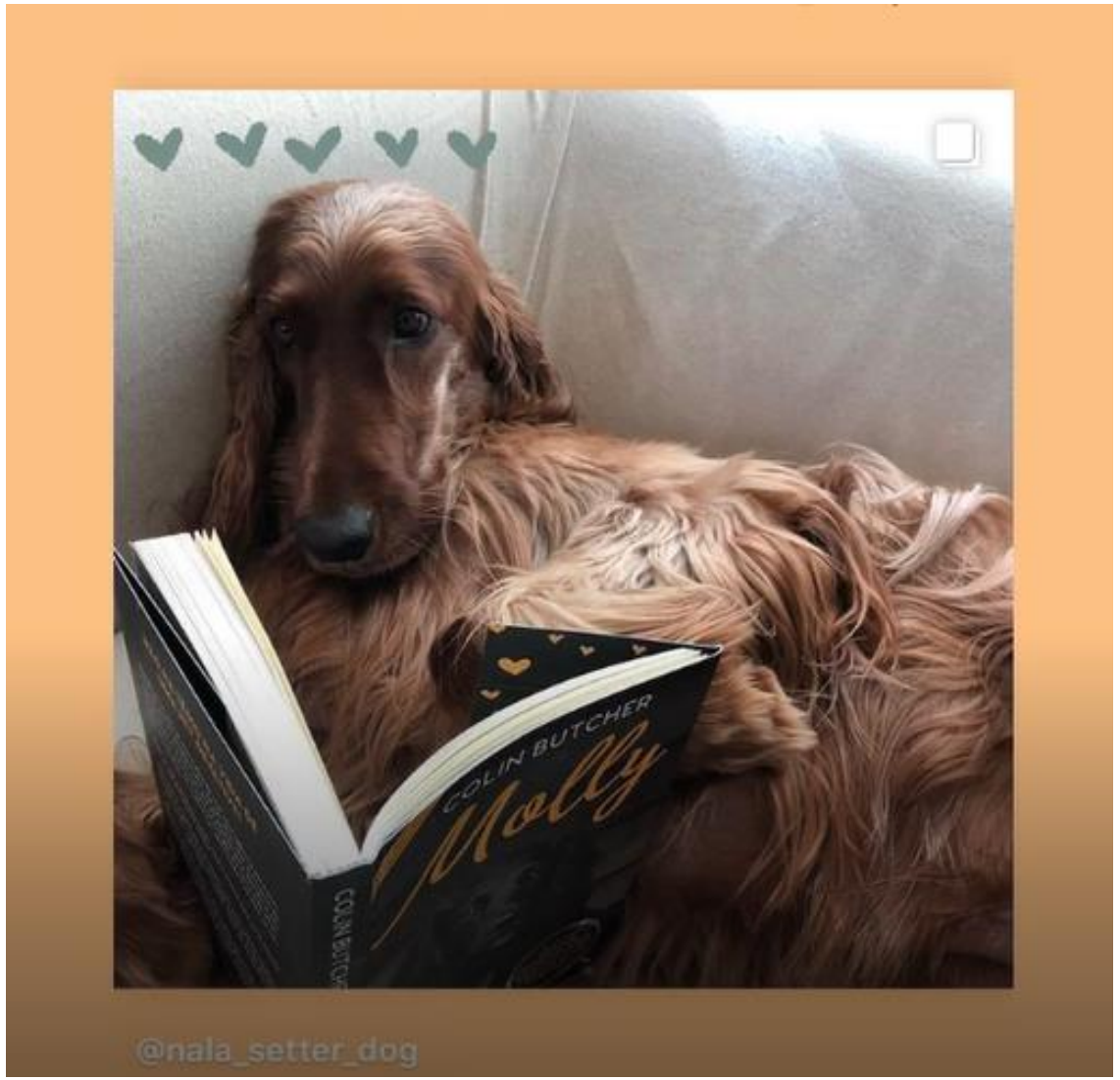
	EB (kcal/kg)	EM – Estimada (kcal/kg)	CMEB (%)
Óleo de soja	9590	8850	92,28
Óleo de vísceras	9604	9088	94,62
Sebo bovino	9544	8032	84,15

Pontieri, 2008

Quanta energia preciso?






COLIN BUTCHER
Wally
@nala_setter_dog

Quanta energia preciso?



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Prevalence of canine obesity in the city of São Paulo, Brazil

Mariana Yukari Hayasaki Porsani[1], Fabio Alves Teixeira[1], Vinicius Vasques Oliveira[1], Vivian Pedrinelli[1], Ricardo Augusto Dias[1], Alexander James German[2] & Marcio Antonio Brunetto[1]

Canine obesity is associated with comorbidities, a shortened lifespan, and a poorer quality of life, but epidemiological studies characterizing canine obesity in Latin America are scarce. Therefore, this study aimed to determine the prevalence of canine obesity in the city of Sao Paulo, Brazil, and the possible associated causal factors. Randomly-selected households from different city regions were visited. Dogs in each household were evaluated and owners completed a questionnaire whilst their anthropometric measures were taken. Total of 285 dogs from 221 owners were included, and the combined prevalence of overweight and obesity was 40.5%. The prevalence of overweight and obesity was greater in female dogs ($P = 0.003$) and in dogs that were neutered ($P = 0.001$). There was also a positive association between BCS and frequency of visits to a veterinarian ($P = 0.026$), feeding frequency ($P = 0.033$), and higher snack intake ($P = 0.011$). Further, the BCS of dogs was greater when their owners reported consuming more snacks themselves ($P = 0.005$) and whose had a presence of elderly people in the household ($P = 0.006$). In conclusion, the prevalence of obesity found in a Brazilian metropolitan region was similar to that if other countries, and neutering and snack intake were associated with the development of this disease.

Prevalência de sobrepeso e obesidade = 40,5%

Ácidos Graxos Essenciais - Cães



Ácido Linoleico ω6
Ácido Araquidônico ω6
Ácido α Linolênico ω3
EPA+DHA ω3



Ácido Linoleico ω6

Fonte: FEDIAF 2020

Ácidos Graxos Essenciais - Gatos





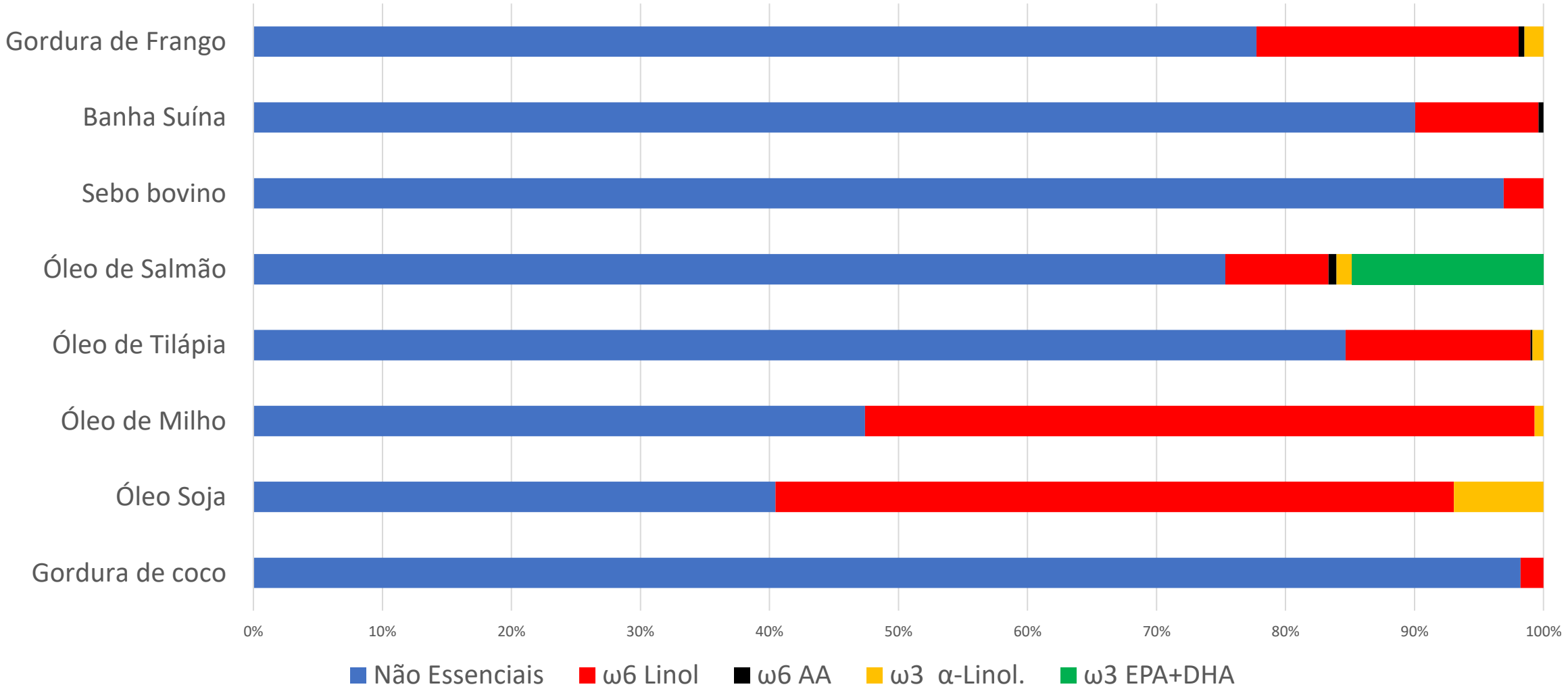
Ácido Linoleico ω6
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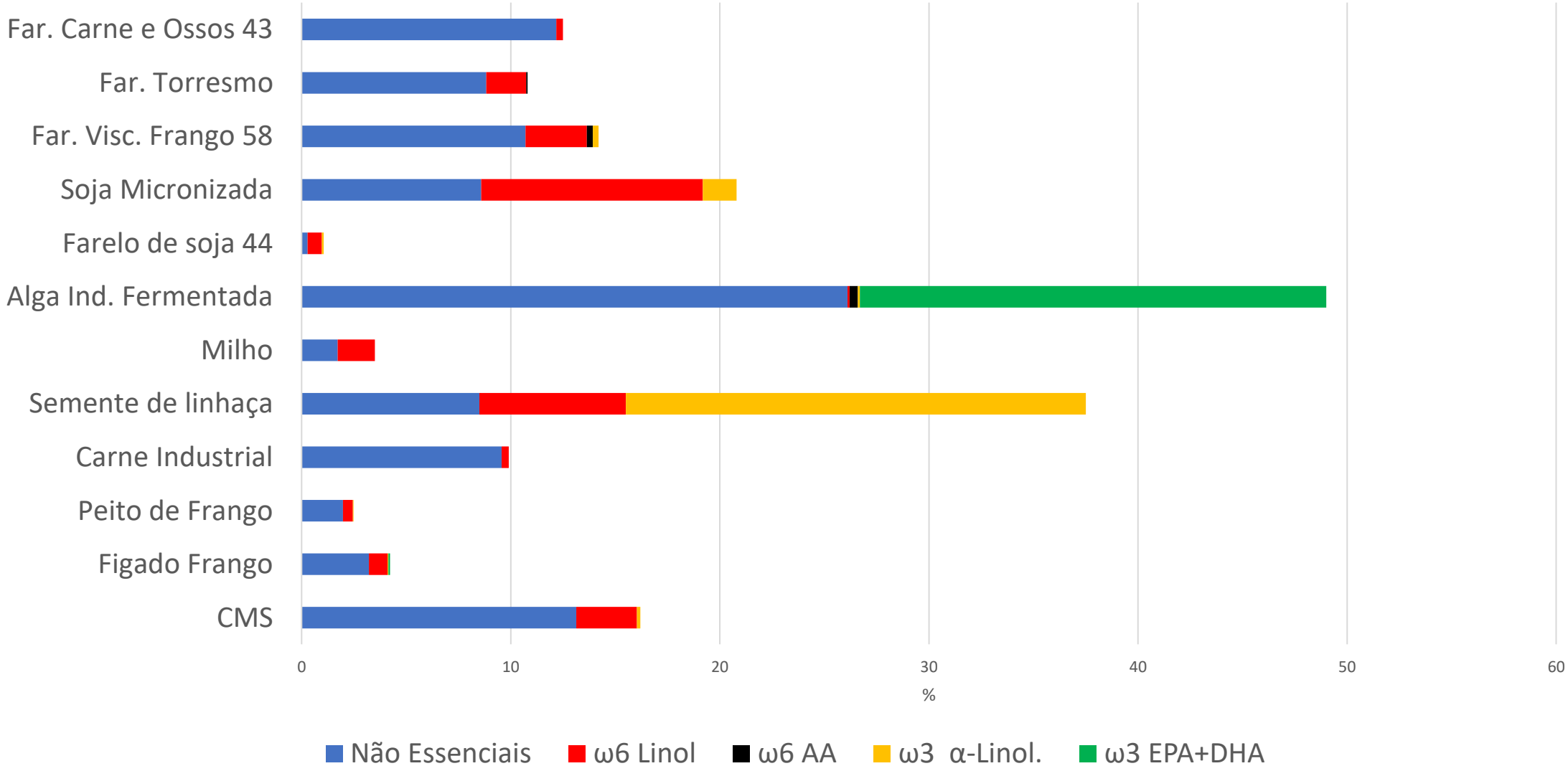
Ácido Linoleico ω6
Ácido Araquidônico ω6

Fonte: FEDIAF 2020

Ácidos Graxos em Gorduras e Óleos



Ácidos graxos em ingredientes



Insetos como fonte de gordura

Table 1. Proximate composition (percentage of DM), indispensable amino acid composition (percentage of CP) and amino acid (AA) score of insect and reference substrates

	Insect substrates										Reference substrates		
Parameter	HFp	BSFl	BSFp	HC	YMW	LMW	MW	SSR	DHCR	ACR*	PMM	FM	SBM
CP	62·5	56·1	52·1	70·6	52·0	64·8	47·0	66·3	65·0	64·4	69·1	71·0	51·6
Fat	19·2	12·8	19·7	17·7	33·9	22·2	39·6	25·1	22·0	24·5	12·8	9·2	2·5
Ash	5·6	12·6	13·9	5·3	3·9	4·1	3·0	3·6	3·9	4·4	15·4	19·9	6·8
AA													
Arg	4·2	3·7	4·2	5·7	4·6	4·8	4·6	3·6	3·9	3·5	5·8	4·5	6·3
His	4·8	4·4	4·7	3·4	5·1	4·9	4·8	4·3	4·6	4·5	3·7	3·4	3·1
Ile	4·0	4·0	4·2	4·0	4·6	4·6	5·0	3·4	3·7	3·2	3·8	4·8	5·0
Leu	6·1	6·1	6·5	6·6	7·3	6·7	7·2	5·4	5·9	5·3	6·4	7·1	7·8
Lys	6·2	5·4	5·4	5·8	5·5	6·5	5·3	4·3	4·7	4·0	5·6	7·4	6·2
Met	2·6	1·4	1·7	1·6	1·4	1·3	1·6	1·3	1·2	1·3	1·0	1·9	2·0
Phe	5·2	3·1	3·3	3·2	3·4	3·9	3·7	2·6	2·7	2·7	3·3	3·5	5·2
Thr	3·8	3·6	3·6	3·6	4·0	4·0	4·1	3·1	3·3	3·1	3·6	4·0	3·9
Val	5·0	5·5	5·7	5·7	6·3	5·9	6·5	5·6	6·1	5·4	4·6	5·0	5·0
tIAA	41·8	37·1	39·3	39·6	42·3	42·7	42·7	33·5	36·2	33·1	37·8	41·5	44·4
AA scores†													
Dog	94·0	63·4	74·4	69·3	68·4	60·4	73·8	53·0	55·5	59·7	44·6	73·1	89·1
Cat	106·1	79·2	93·0	86·6	85·5	75·5	92·2	66·2	69·4	74·6	55·8	91·6	107·5

CP, crude protein; HFp, housefly pupae; BSFl and BSFp, black soldier fly larvae and pupae; HC, house cricket; YMW, yellow mealworm; LMW, lesser mealworm; MW, Morio worm; SSR, six spot roach; DHC, death's head cockroach; ACR, Argentinean cockroach; PMM, poultry meat meal; FM, fish meal; SBM, soyabean meal; tIAA, total indispensable amino acids.

*Females.

†Calculated as described in Kerr *et al.*[13] using minimal requirements for growth of kittens and puppies[14] as reference values.

Insetos como fonte de gordura





omposition (percentage of DM), indispensable amino acid composition (perc

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Ile	4·0	4·0	4·2	4·0	4·6	4·6	5·0	3·4	3·7	3·2	3·8	4·8	5·0
Leu	6·1	6·1	6·5	6·6	7·3	6·7	7·2	5·4	5·9	5·3	6·4	7·1	7·8
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Met	2·6	1·4	1·7	1·6	1·4	1·3	1·6	1·3	1·2	1·3	1·0	1·9	2·0
Phe	5·2	3·1	3·3	3·2	3·4	3·9	3·7	2·6	2·7	2·7	3·3	3·5	5·2
Thr	3·8	3·6	3·6	3·6	4·0	4·0	4·1	3·1	3·3	3·1	3·6	4·0	3·9
Val	5·0	5·5	5·7	5·7	6·3	5·9	6·5	5·6	6·1	5·4	4·6	5·0	5·0
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Research Article

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(2020) 44: 481-486
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doi:10.3906/vet-1906-56

Determination of fat preferences of adult dogs

Fatma İNAL[1,*], **Mustafa Selçuk ALATAŞ**[1], **Oğuzhan KAHRAMAN**[1], **Şeref İNAL**[2], **Mustafa ULUDAĞ**[3]

[1]Department of Animal Nutrition and Nutritional Diseases, Faculty of Veterinary Medicine, Selçuk University, Konya, Turkey
[2]Department of Animal Science, Faculty of Veterinary Medicine, Selçuk University, Konya, Turkey
[3]Bil-Yem Food Industrial Limited Company, Ankara, Turkey

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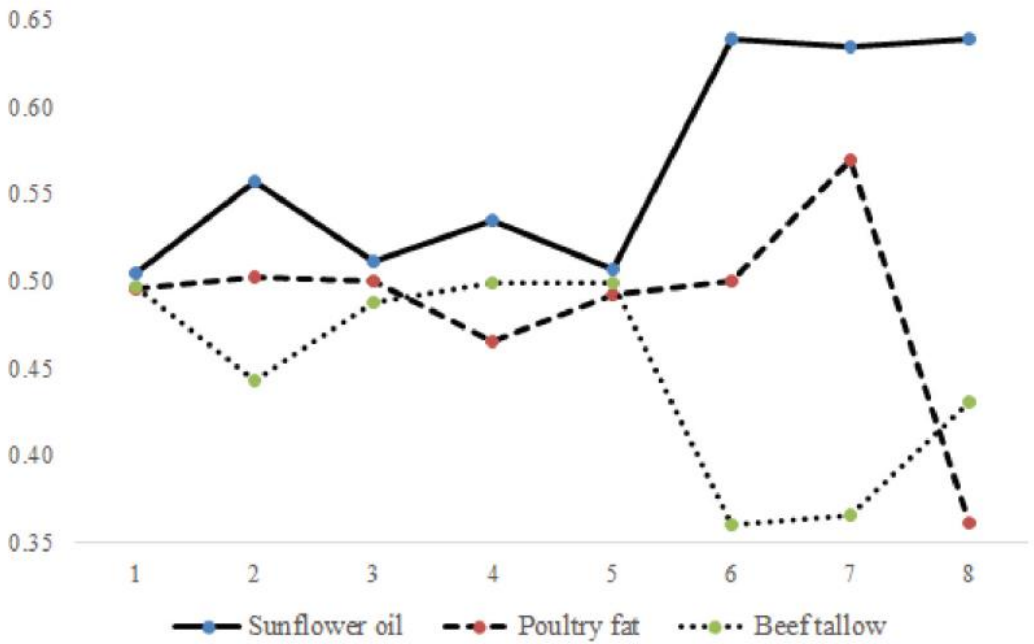


Figure 3. Preference ratios of fat sources that are given 8 times, n = 30.



SEGURANÇA ALIMENTAR

OXIDAÇÃO

ELSEVIER

Journal of Nutritional Biochemistry 14 (2003) 24–31

THE JOURNAL OF Nutritional Biochemistry

Oxidized lipid depresses canine growth, immune function, and bone formation

John J. Turek[a,*], Bruce A. Watkins[b], Ingrid A. Schoenlein[a], Kenneth G. D. Allen[c], Michael G. Hayek[d], C. Gregory Aldrich[d,†]

[a]*Department of Basic Medical Sciences, School of Veterinary Medicine, Purdue University, W. Lafayette, IN 47907*
[b]*Department of Food Science, Lipid Chemistry and Molecular Biology Laboratory, Purdue University, W. Lafayette, IN 47907*
[c]*Department of Food Science and Human Nutrition, Colorado State University, Fort Collins, CO 80523*
[d]*The Iams Company, Research and Development, Lewisburg, OH 45538*

Table 2
Fatty acid analysis of diet (mol/100 mol)

Fatty Acid	Oxidation level of diet		
	Control	100 ppm aldehydes	500 ppm aldehydes
14:0	0.636[a]	0.843[b]	0.90[c]
16:0	21.4	21.16	22.42
16:1n-7	6.67[a]	5.18[b]	5.17[b]
18:0	5.43[a]	6.92[b]	7.44[c]
18:1n-9	37.85	37.25	37.65
18:1n-7	2.23	2.36	2.41
18:1 total	40.08	39.61	40.06
18:2n-6	19.34[a]	17.81[b]	15.21[c]
18:3n-3	1.27[a]	1.21[b]	1.05[b]
20:1n-9	0.67[a]	0.80[b]	0.78[b]
20:4n-6	0.51	0.50	0.52
22:6n-3	0.496[a]	0.556[b]	0.67[c]

Mean values for diet fatty acid composition within a row having different superscripts ([a, b, c]) are significantly different by one-way ANOVA and Tukey's studentized range test ($p < 0.05$).

J.J. Turek et al. / Journal of Nutritional Biochemistry 14 (2003) 24–31

- ✓ Redução valor nutricional

J.J. Turek et al. / Journal of Nutritional Biochemistry 14 (2003) 24–31

- ✓ Menor aceitação por tutores

Animals **2016**, *6*, 44; doi:10.3390/ani6080044

- ✓ Redução crescimento
- ✓ Redução gordura corporal
- ✓ Redução da aposição óssea
- ✓ Alteração do *status* antioxidantes
- ✓ Alteração de alguns parâmetros imune

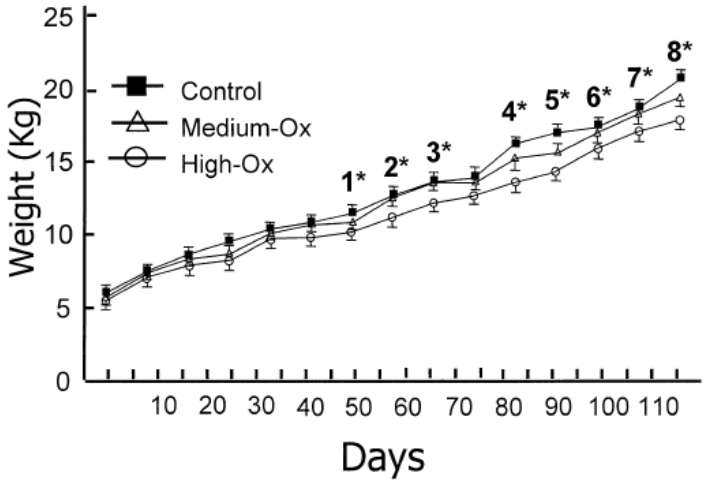


Fig. 1. Weight gain in dogs fed control (<50 ppm aldehydes), medium-oxidation (100 ppm aldehydes), and high-oxidation (500 ppm aldehydes) diets. Mean ± S.E.M. (n = 8).

Table 5
Serum chemistry

	8 wks			16 wks		
	Oxidation level			Oxidation level		
	Control	100 ppm aldehydes	500 ppm aldehydes	Control	100 ppm aldehydes	500 ppm aldehydes
Vitamin E (serum ppm)	0.96 ± 0.22^{a}	0.56 ± 0.1^{a}	0.12 ± 0.06^{b}	2.2 ± 0.26^{a}	1.3 ± 0.1^{b}	0.52 ± 0.05^{c}
Triglycerides (mg/dL)	100 ± 9^{a}	45.8 ± 4^{b}	$30 \pm 3^{b,c}$	62 ± 5^{a}	60 ± 10^{a}	30 ± 1.4^{b}

Mean values (± S.E.M.; n = 8) within a row for each time point (8 or 16 wks) having different superscripts ($^{a, b, c}$) are significantly different by one way ANOVA and Tukey's multiple comparison test.

Contaminação Microbiológica

Óleos e gorduras em extrusados: críticos por serem adicionados em etapa sem tratamento posterior.

EUA, até 28/09/20 → 9 Recalls de alimentos pet por *Salmonella sp**.

Brasil*: ??*

*https://www.fda.gov/animal-veterinary/safety-health/recalls-withdrawals, acesso em 29/09/2020

Segurança alimentar: *Salmonella*

O abrigo e crescimento da Salmonella em gordura de aves é influenciado por uma série de fatores:

- Grau de contaminação
- Umidade
- Impureza
- Temperatura

→ *Cada empresa tem que entender as condições da gordura que recebe*.

Effects of different moisture and temperature levels on *Salmonella* survival in poultry fat

Valentina Trinetta,[†,1,*] Austin McDaniel,[†] Gabriela Magossi,[†] Umut Yucel,[†] and Cassandra Jones[‡]

[†]Food Science Institute, Kansas State University, 1530 Mid-Campus Drive North, Manhattan, KS 66506; and
[‡]Department of Animal Sciences and Industry, Kansas State University, 1424 Claflin Road, Manhattan, KS 66506

ABSTRACT: Fat products have been historically thought to have too low water activity to harbor pathogens. However, it has been recently reported that high moisture levels in fats may lead to *Salmonella* presence and growth. Limited research on strategies to eliminate pathogens in these environments is available, and the mechanisms contributing to microbial presence and growth are not yet well understood. The purpose of this research was to evaluate the effects of moisture levels and storage temperatures on the growth and survival of *Salmonella* in poultry fat. Samples were stored for 7 d at 48°C or 76°C and remaining *Salmonella* was evaluated. When poultry fat was challenged with a wet high inoculum, more than a 4 log CFU/mL difference in *Salmonella* population was observed with 1% and 3% moisture levels at 48°C after 5 d ($P < 0.05$). No differences between moisture levels ($P > 0.05$) were observed when samples were tested with a wet low inoculum. Counts below detectable limits were observed after 24 h in samples challenged at 76°C, regardless of inoculum level. When poultry fat was stored at 48°C and inoculated with low levels of *Salmonella* spp., bacterial growth was influenced only by time ($P < 0.05$) and not affected ($P > 0.05$) by moisture level. However, when poultry fat was stored at 48°C and inoculated with high levels of *Salmonella* spp., bacterial decrease was easier ($P < 0.05$) in samples containing greater moisture. This research suggests that residual moisture in containers during transportation of poultry fat largely does not affect *Salmonella* spp. growth.

Key words: dry inoculum, moisture, poultry fat, *Salmonella*, temperature, wet inoculum

76^{O}C : mínima detecção após 24 horas

48^{O} C baixa contaminação: decréscimo influenciado apenas pelo tempo, sem influência do teor de umidade

48^{O} C alta contaminação: decréscimo facilitado em amostras com maior teor de umidade

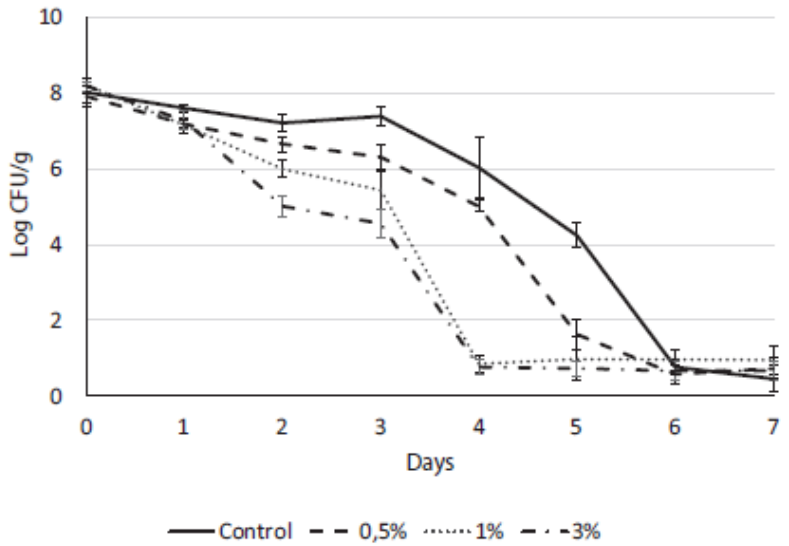


Figure 2. *Salmonella* cocktail remaining population in poultry fat samples challenged at 48°C with high dry inocula levels and different moisture levels (0%, 0.50%, 1%, and 3%) over time.

J. Food Prot., Vol. 81, No. 8

Influence of Storage Temperature, Moisture Content, and Physical Impurities on the Distribution and Survival of *Salmonella enterica* in Poultry Fat Intended for Pet Food Use

RINARA C. KIEL, JENNIFER N. MARTIN,* DALE R. WOERNER, RACHEL MURPHY, IFIGENIA GEORNARAS, JENNIFER R. LEVEY, HUA YANG, ROBERT J. DELMORE, AND KEITH E. BELK

Center for Meat Safety & Quality, Department of Animal Sciences, Colorado State University, Fort Collins, Colorado 80523-1171, USA (ORCID: http://orcid.org/0000-0002-0761-0720 [J.N.M.])

MS 17-344: Received 17 August 2017/Accepted 12 April 2018/Published Online 17 July 2018

TABLE 1. *Initial moisture content, final moisture content, and water activity (a_w) for poultry fat representing three impurity levels*[a]

		Low-moisture poultry fat		Medium-moisture poultry fat		High-moisture poultry fat	
Impurity level (%)	Initial moisture content (%)	Final moisture content (%)	a_w	Final moisture content (%)	a_w	Final moisture content (%)	a_w
0.2 ± 0.0	0.4 ± 0.1	0.5 ± 0.2	0.461 ± 0.010	2.2 ± 0.9	0.905 ± 0.003	4.5 ± 0.1	0.923 ± 0.003
0.5 ± 0.1	0.1 ± 0.1	0.5 ± 0.1	0.571 ± 0.012	2.1 ± 0.5	0.842 ± 0.010	3.9 ± 0.5	0.910 ± 0.005
1.0 ± 0.0	0.0 ± 0.1	0.7 ± 0.2	0.554 ± 0.005	3.0 ± 0.2	0.837 ± 0.025	4.8 ± 0.3	0.918 ± 0.023

[a] Values are means ± standard deviations.

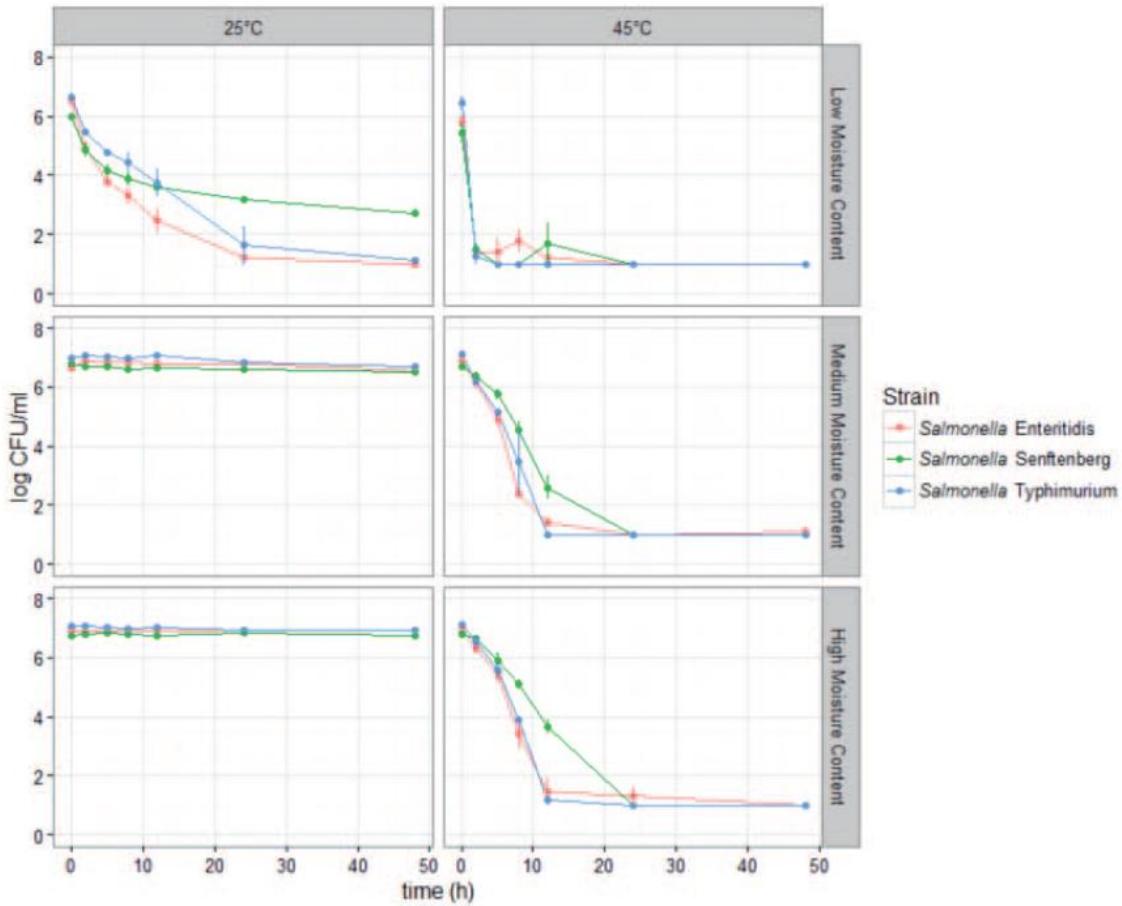


FIGURE 4. *Survival (log CFU per milliliter) of* Salmonella *Enteritidis,* Salmonella *Senftenberg, and* Salmonella *Typhimurium in 0.5% impurity level poultry fat incubated at 25°C for 48 h. Poultry fat samples were formulated to represent one of three targeted moisture contents (low, 0.5% ± 0.1%; medium, 2.1% ± 0.5%; and high, 3.9% ± 0.5%).*

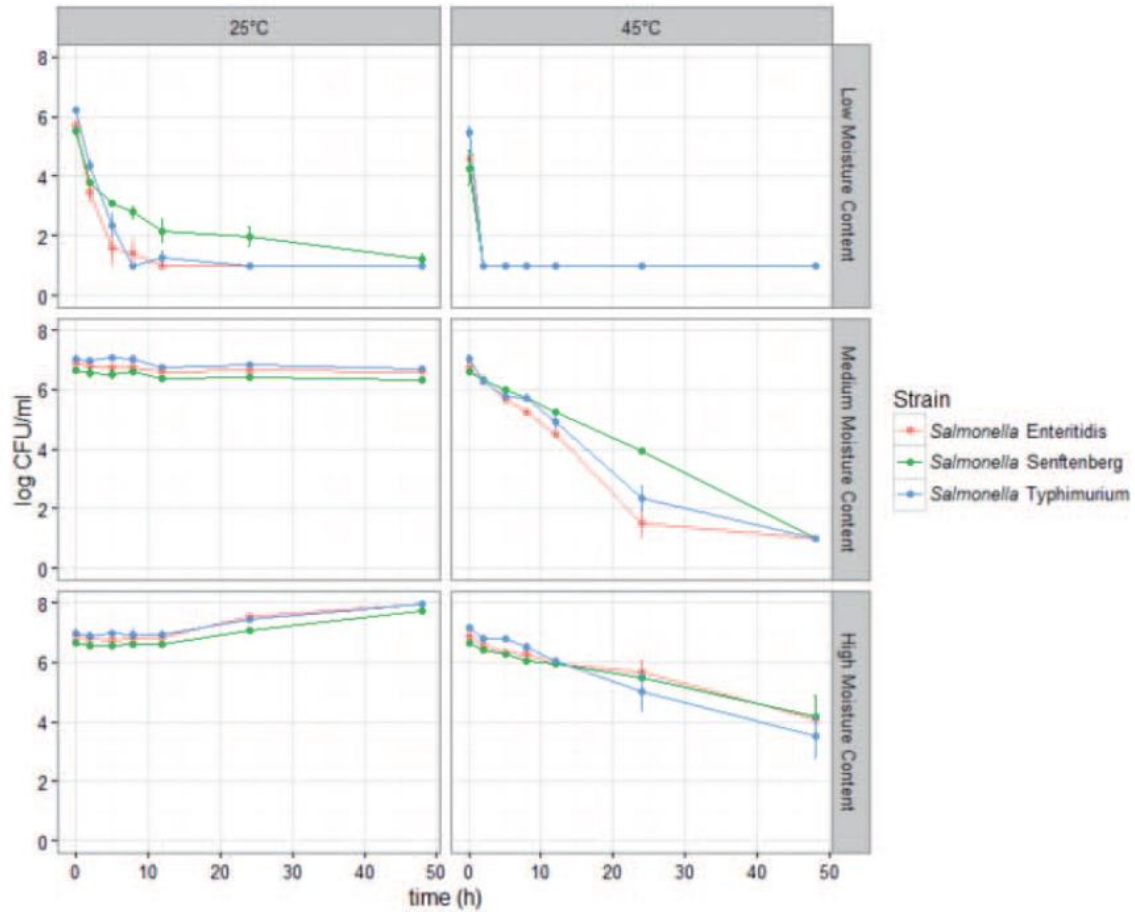


FIGURE 7. *Survival (log CFU per milliliter) of* Salmonella *Enteritidis,* Salmonella *Senftenberg, and* Salmonella *Typhimurium in 1.0% impurity level poultry fat incubated at 45°C for 48 h. Poultry fat samples were formulated to represent one of three targeted moisture contents (low, 0.7% ± 0.2%; medium, 3.0% ± 0.2%; and high, 4.8% ± 0.3%).*


SUSTENTABILIDADE

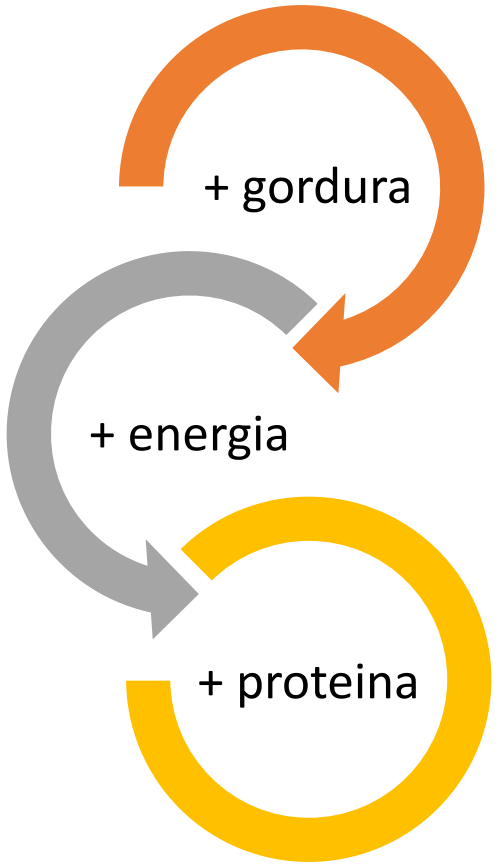
A48

Environmental impact of commercial diets for dogs in Brazil

Pedrinelli V[1], Brunetto M A[1]
[1]Pet Nutrology Research Center, School of Veterinary Medicine and Animal Science, University of São Paulo, São Paulo/Pirassununga, Brazil. E-mail: vivian.pedrinelli@gmail.com

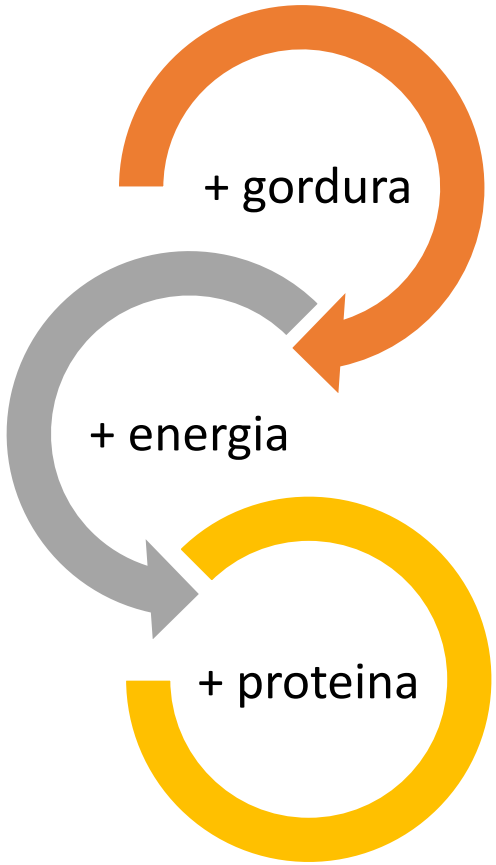
ESVCN Congress, 2020

Results and discussion. The mean land use was 0.78±1.81 hectares and the mean CO_2eq emission was 2.75±5.44 tonnes per dog per year. As for the environmental impact of the entire dog population in Brazil, a total of $40.49x10^6$±$94.80x10^6$ hectares/year and 0.14±0.28 gigatonnes CO_2eq/year were estimated, which is equivalent to 10.0% of the total emission of Brazil in 2016 or the emission of 20.9 million Brazilian citizens [4]. Wet diets were significantly more responsible for land use and emission ($p<0.0001$) (Figure 1). The results are similar to previous studies in Japan, China, and the Netherlands [5] and lower than estimates for the U.S. [6].



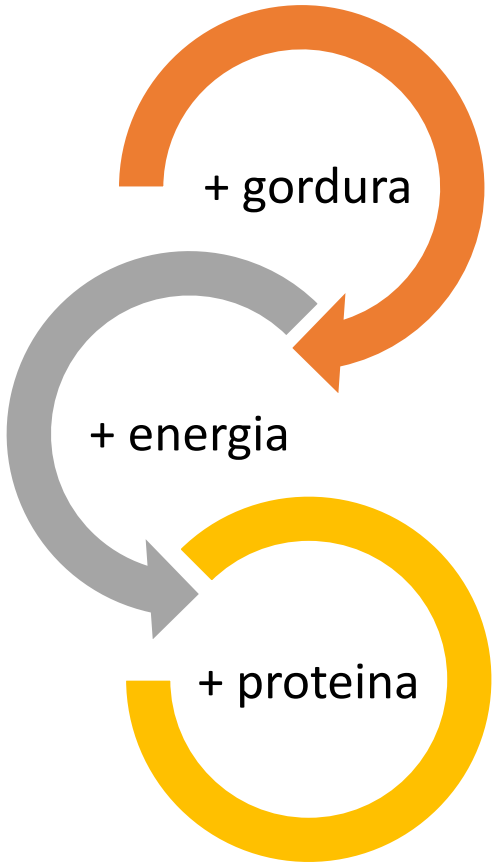
	A	B
Um	8	8
MM	7	7
MF	3	3
Proteina	21	21
Gordura	**9**	**18**
ENN	52	43
Kcal/g	**3,73**	**4,18**

→ + 12%





Nala	30 kg	
PM	12,8	
Nec. PB	63,36	(4,95*PM)
Kcal/dia	1.152	(90*PM)



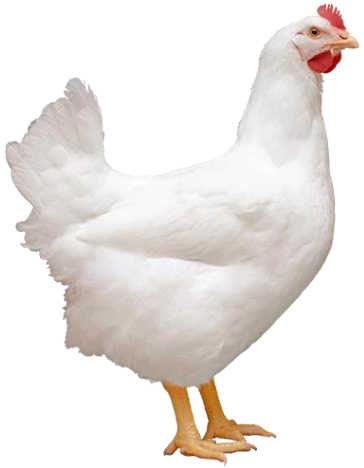


Nec. PB	63,36
Kcal/dia	1.152

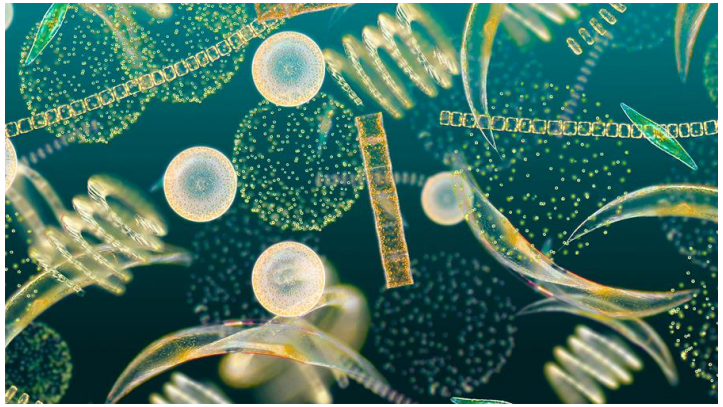
	A	**B**
Um	8	8
MM	7	7
MF	3	3
Proteina	21	21
Gordura	**9**	**18**
ENN	52	43
Kcal/g	**3,73**	**4,18**
g/dia	**309**	**276**
PB/dia	**65**	**58**

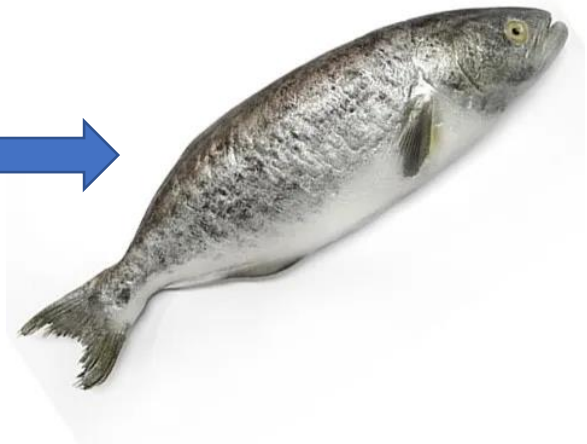
Quanto mais perto da base, melhor.






100
APPROX
80
60
125
250
200
150

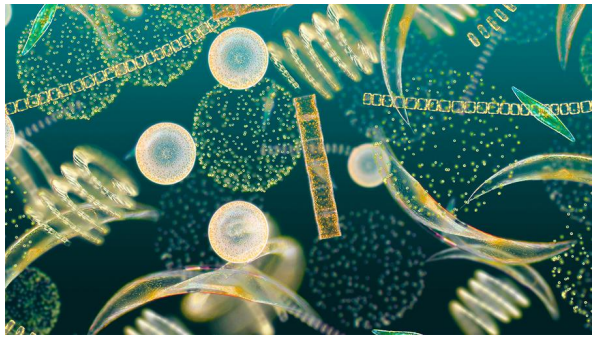




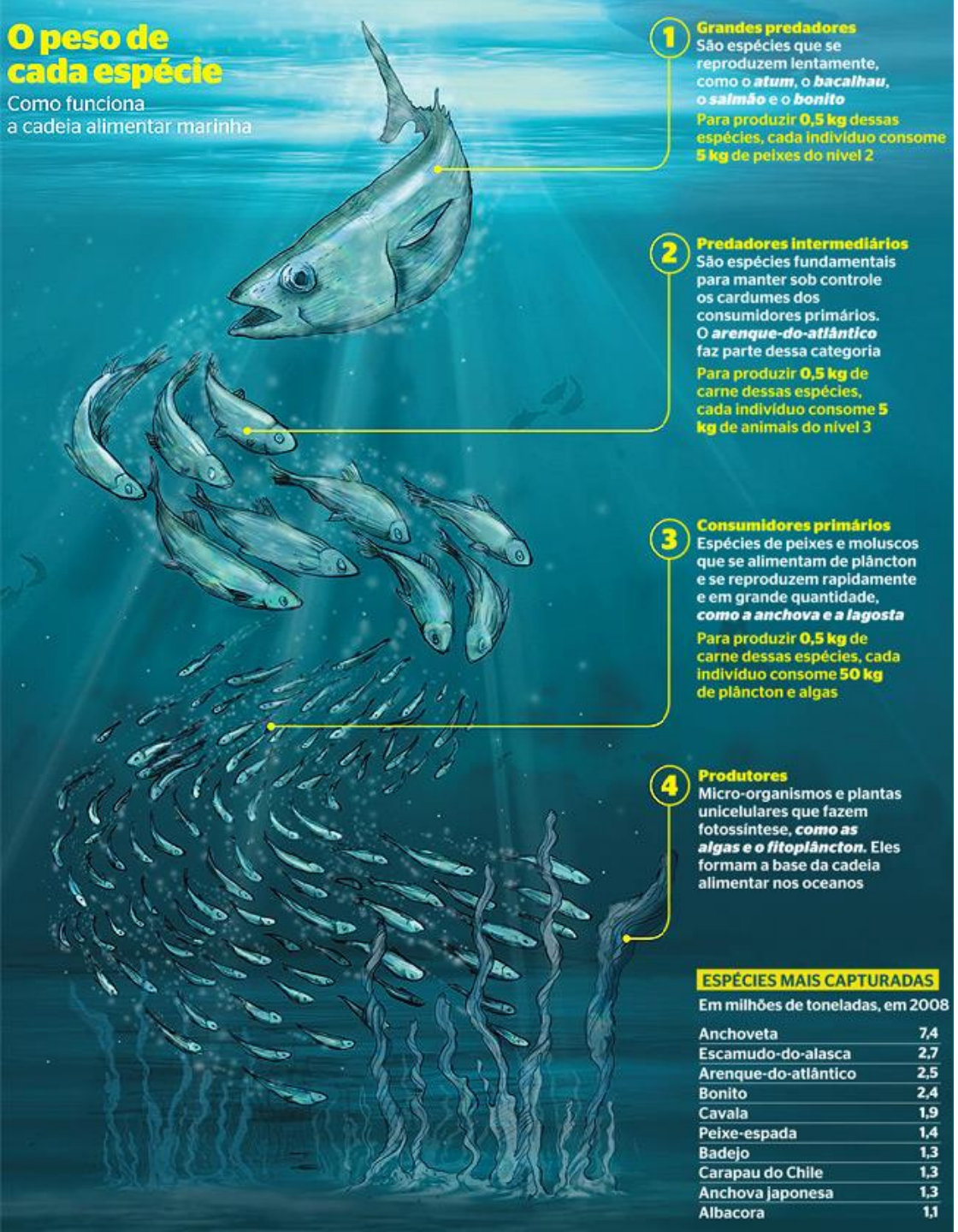












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