SCIENCE AND FOOD TECHNOLOGY
DOI: 10.12957/demetra.2024.74491

DEMETRA
Alimentação, Nutrição & Saúde

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Evaluation of the nutritional composition of growing-up milk available in the Brazilian market

Avaliação da composição nutricional do composto lácteo à venda no mercado brasileiro

Abstract

Introduction: The influence of consuming growing-up milk on the nutrition of infants is still unknown, despite the product driving a multimillion-dollar market. *Objective*: To evaluate the nutritional composition of the growing-up milk and the influence of its consumption on the daily macronutrient and energy needs of young children. *Methods*: The research was divided into three parts, namely: a) evaluation of nutritional composition and ingredients; b) comparison of the Brazilian growing-up milk with a proposed standardization; c) calculation of nutritional inadequacy and the influence of growing-up milk consumption in young children. *Results*: It was possible to categorize the product into three subgroups based on ingredients, namely: group 1 (whey, sugar, and vegetable fat), group 2 (added vitamins and minerals), and group 3 (a wide range of ingredients, no added sugars, and addition of bioactives). Overall, the growing-up milk is characterized by excess protein and added sugars, a predominance of saturated fats, and the presence of chemical additives. Compared to the proposed ideal composition, the Brazilian growing-up milk exceeds all analyzed nutrients. Finally, consuming two 200mL glasses of growing-up milk per day corresponds to 100% of daily protein needs, with children aged 0 to 11 months being the most affected. *Conclusion*: Regardless of the subgroup and ingredient, the product has a negative impact on children's health, and the younger the age of introduction, the greater the impact on health, potentially leading to the development of overweight and obesity.

Keywords: Children's Food. Child Nutrition. Breastmilk Substitutes.

Resumo

Introdução: A influência do consumo de composto lácteo na nutrição de crianças em primeira infância ainda é desconhecida, apesar de o produto movimentar um mercado multimilionário. *Objetivo*: Avaliar a composição nutricional do composto lácteo e a influência de seu consumo sobre as necessidades diárias de macronutrientes e energia de crianças pequenas. *Métodos*: A pesquisa foi dividida em três partes, sendo: a) avaliação da composição nutricional e ingredientes; b) comparação do composto lácteo brasileiro com uma proposta de padronização; c) cálculo de inadequação nutricional e influência do consumo de composto lácteo em crianças pequenas. *Resultados*: Foi possível categorizar o produto em três subgrupos, de acordo com os ingredientes, sendo: grupo 1 (soro de leite, açúcar e gordura vegetal), grupo 2 (adição de vitaminas e minerais) e grupo 3 (ampla lista de ingredientes, sem adição de açúcares e adição de bioativos). De forma geral, o composto lácteo tem como características: excesso de proteínas e açúcares de adição, predominância de gorduras saturadas, além de aditivos químicos. Em comparação com a proposta de composição ideal, o composto lácteo brasileiro excede todos os

nutrientes analisados e, por fim, o consumo de dois copos de 200mL de composto lácteo por dia corresponde a 100% das necessidades diárias de proteína, sendo as crianças de 0 a 11 meses as mais prejudicadas. *Conclusão*: Independentemente do subgrupo e do ingrediente, o produto tem impacto negativo na saúde infantil, e quanto menor a idade de introdução, maior o impacto na saúde, podendo levar ao desenvolvimento de sobrepeso e obesidade.

Palavras-chave: Alimentos Infantis. Nutrição da Criança. Substitutos do leite materno.

INTRODUCTION

Infant feeding should be based exclusively on breastfeeding until 6 months of age, with its continuation recommended until 2 years of age or beyond.[1] Despite the efforts of various health entities and social actors, breastfeeding in Brazil still falls short of the recommendations set by the World Health Organization (WHO).[2]

Early weaning is a serious public health problem in Brazil. One of the main reasons for this is the aggressive marketing proposals of the food industry, which do not always aim to protect the health of their consumers, but instead make lucrative financial gains from breast milk substitutes.[3] Breast milk substitutes are defined as "any food marketed or represented as a partial or total substitute for breast milk, whether or not it is suitable for this purp".[4]

In this sense, it is essential for healthcare systems to encourage and promote breastfeeding, even amidst public health emergencies (such as the one that occurred in 2020 due to the Covid-19 pandemic). These moments are critical for preventing the advancement of the breast milk substitute industry, as without proper guidance, families are vulnerable to infant advertising.[5,6]

Every year, new products are launched into the market. It's a multibillion-dollar industry. A notable success story pertains to the so-called " growing-up milk," which is the fastest-growing segment of breast milk substitutes in terms of sales since the 1990s.[7]

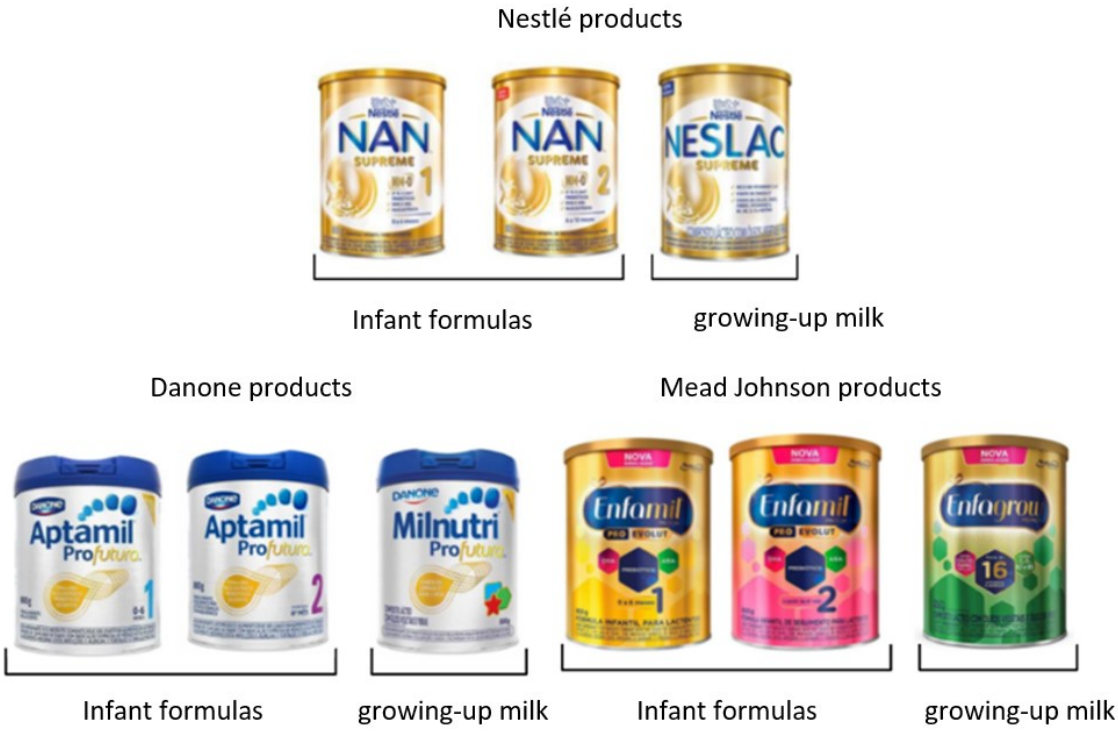
The growing-up milk discussed in this article is the "growing-up milk with addition," regulated in Brazil by the Ministério de Estado da Agricultura, Pecuária e Abastecimento (MAPA - Ministry of Agriculture, Livestock, and Supply), through Normative Instruction No. 028, dated June 12, 2007, defined as:

> The powdered product resulting from the mixture of milk and dairy or non-dairy food product (s) or substance (s), or both, whether or not added with dairy or non-dairy food product (s) or substance (s), or both, permitted in this Regulation, suitable for human consumption, through a technologically appropriate process. Dairy ingredients must represent at least 51% (fifty-one percent) by mass/mass (m/m) of the total ingredients (mandatory or raw materials) of the product.[8]

In general terms, the growing-up milk can be understood as a powdered food product, highly processed, made with milk by-products, sugar, and chemical additives. Its sales appeal is targeted towards the school-age population (7 to 10 years old). However, due to the visual similarity between the growing-up milk, powdered milk, and infant formulas, it can be inferred that there is a possibility of confusion at the time of purchase by parents and caregivers. It must be clarified that the growing-up milk should not be consumed because it is a highly processed product, especially by young children (under 6 years old), as its nutritional composition bears no resemblance to cow's milk, infant formulas, and certainly not breast milk.[7,9]

In addition to the nutritional concerns, the risk posed by the growing-up milk to child health is associated with the legal ambiguity regarding who regulates the product's composition and who should be held accountable for its abusive marketing. Legally, the growing-up milk falls under the jurisdiction of the MAPA.[8]

Figure 1. Visual similarity between infant formula and growing-up milk



Source: IDEC, 2022.

However, growing-up milk is often associated with infant consumption, and the consequences of its consumption are still uncertain.[7,9]

Currently, there are at least 1,599 food products registered as growing-up milk from at least 30 different brands available to Brazilian consumers, according to information provided by MAPA.[10] This is a significant increase compared to the 13 products from three different brands reported in a Brazilian study from 2019.[9]

Despite its commercial success, there is still relatively little discussion in Brazilian literature about this increasingly prevalent and consumed product. There is only one article on the subject, authored domestically, dated 2019,[9] focused on marketing and the debate surrounding labeling and advertising strategies and their negative impact on young children. Since then, there has been little academic progress on the topic.

It is also worth highlighting the difficulty even in researching the topic, as the term "growing-up milk" was only included in the database of the Regional Library of Medicine (BIREME), the institution responsible for creating the Descriptors in Health Sciences (DeCS), in May 2021.

Therefore, this work proposes an initial discussion about the product and suggests a categorization of it, with the objective of evaluating the nutritional composition of the product in relation to the daily macronutrient recommendations for children aged 0 to 6 years old.

METHODS

This is a cross-sectional study aimed at evaluating aspects of the nutritional composition of growing-up milk, focusing on macronutrients and energy.

As this study does not involve direct interaction with humans and uses publicly accessible information, it did not require prior approval from an ethics committee, aligning with Resolution No. 466/2012 of the Brazilian National Health Council.[11]

To gather information about the nutritional composition and ingredient list, product labels were utilized. These data were collected in June 2021 from manufacturers' websites, supermarkets, pharmacies, and other online marketplaces, with supplementary information sourced when necessary

Evaluation of nutritional composition and ingredients

To evaluate the nutritional composition of the product, the averages of macronutrients (carbohydrates, proteins, fats) and energy were used, considering 100g of product ready for consumption.

When surveying products sold as growing-up milk, it was possible to separate them into subcategories based on the repetition of ingredient patterns, as follows: group A (contains whey, vegetable fat, and sugars); group B (same as group A, with the addition of vitamins); and group C (contains whey, essential unsaturated oils, lower added sugar, presence of vitamins, minerals, and bioactive compounds).

The averages for analysis were obtained from 10 different products for each proposed category of growing-up milk meaning a total of 30 products were used. The averages for the ready-to-consume product were developed according to the dilution description provided by the manufacturer.

As inclusion criteria adopted were: products available for sale nationwide and domestically produced; different brands; products sold to end consumers and intended for human consumption. The exclusion criteria considered were: imported products; products intended for industry and businesses (e.g., for ice cream production, baking); products for animal consumption; products from the same brand.

The data on ingredients were compiled into a spreadsheet using Microsoft Excel software®.

Comparison of the composition of Brazilian growing-up milk with a proposed standardization of international nutritional composition.

In 2013, there was a proposal for an ideal composition of growing-up milk due to a wide range of different products available and their lack of regulation.[12]

The authors were chosen because their work did not present conflicts of interest, nor did it involve direct and/or indirect participation from the food industry, which is common in studies addressing the topic of breast milk substitutes.[13]

For comparison between the means of nutritional composition of macronutrients and energy among the three subgroups of growing-up milk and the proposed one, a one-way ANOVA and Tukey's post hoc test at a significance level of 5% were applied using MiniTab software.®.

Calculation of nutritional inadequacy and calculation of the influence of growing-up milk consumption on daily energy and macronutrient recommendations in young children.

The dietary intake resulting from the consumption of growing-up milk was compared to the Dietary Reference Intakes (DRI).[14] Median intake values of 400mL of growing-up milk were used (a value determined

based on manufacturer recommendations, which generally suggest a minimum consumption of 2 cups of 200mL of growing-up milk per day).

For the comparison and calculation of nutritional inadequacy, the values of Estimated Average Requirement (EAR) were used. For nutrients without established EAR, Adequate Intake (AI) values were used as reference.[15]

To calculate the percentage of nutritional inadequacy of macronutrients, the average energy intake resulting from the consumption of 400mL of growing-up milk was used. Macronutrients were analyzed considering the Acceptable Macronutrient Distribution Ranges (AMDR). Regarding the percentage of energy intake inadequacy, the Estimated Energy Requirement (EER) was used, classifying it as: insufficient (up to 80%), adequate (between 80 and 120%), and excess (above 120%).[16]

These values were separated according to life stages of young children, namely: 0 to 6 months; 7 to 11 months; 1 to 3 years; 4 to 8 years (based on the age division in the DRI). The data were organized using an Excel spreadsheet and analyzed through descriptive statistics.

RESULTS

The food product called growing-up milk with addition contains milk by-products and ingredients considered to have low nutritional value, such as sugar (in its various forms of presentation, for example: inverted sugar, dextrose, dextrin, fructose, glucose, glucose syrup, maltodextrin, sucrose, corn syrup, etc.) and vegetable fat, which places it in the category of ultra-processed product according to the NOVA classification.[1]

Analysis of the ingredient list

Regarding carbohydrates, a significant amount of added sugar was observed, a result similar to that of a Spanish study in which fructose, caramel, and honey were also described.[17]

The presence of fibers with sweetening potential also contributes to increasing the perception of sweetness and making the food even more attractive and palatable to the child audience. The most commonly used sweeteners are maltodextrin, polydextrose, and fructooligosaccharides (FOS), as they not only contribute to sweetness but also help give body and volume to the growing-up milk

The proteins are derived from whey and contain large amounts of lactose, accounting for 70% of the total solids.[18] The main fat used is vegetable fat, with palm oil being the most common, in addition to the inherent milk fats.

Upon analyzing the ingredient list, it was possible to establish similarities and group them into three subcategories of growing-up milk, as outlined in Chart 1.

Chart 1. Proposal for categorization of three subgroups of growing-up milk, separated according to the ingredient list and graphical representation of packaging.

Subgroup 1	Subgroup 2	Subgroup 3
Whey Sucrose Glucose syrup Maltodextrin Flavoring Vegetable fat	Whey Powdered milk Sucrose Glucose syrup Maltodextrin Minerals Vitamins Flavoring Vegetable fat	Whey Powdered milk Maltodextrin Lactose Vitamins Minerals Flavoring Fibers Vegetable oil Fish oil
Example Subgroup1	Example Subgroup2	Example Subgroup3
		
		

Source: Authors (2021).

Although lactose is not considered an added sugar, its significant quantity should be highlighted, especially in subgroup 3, where, out of the 10 analyzed products, 4 do not differentiate between the carbohydrates they contain, and in the remaining 6 products, the average lactose content is 5.66g per 100mL of product ready for consumption, representing 76% of the total carbohydrate volume.

It is noteworthy that trans fat is present in 40% of the products in Subgroup 1. Most products in Subgroup 2 contain vegetable fat (without specific designation), as well as butter, and one product registered

trans fat. In Subgroup 3, the presence of vegetable oils such as soybean, canola, sunflower, coconut, palm, and corn, as well as fish oil, is noteworthy in 40% of the products in the subgroup.

Characterization of the growing-up milk subgroups

Subgroup 1 is characterized by the presence of few ingredients and low nutritional quality. It consists mainly of sugar, vegetable fat, and whey. Subgroup 2 differs from subgroup 1 by the addition of vitamins and minerals. Subgroup 3 contains the longest list of ingredients and nutrients of higher nutritional quality compared to the first two subgroups, as it includes: fibers considered prebiotic – e.g., galacto-oligosaccharides (GOS) and fructo-oligosaccharides (FOS); animal-sourced fat with functional claim (e.g., omega-3); and absence of added sugar (only the natural sugar from milk, according to manufacturers' claims).

The estimated average value of the products is: R$ 11.00 for subgroup 1; R$ 12.00 for subgroup 2; and R$ 66.00 for subgroup 3.

Brazilian growing-up milk *versus* proposed ideal composition

Each proposed subgroup of growing-up milk was compared to the ideal product composition determined in 2013,[12] as described in Table 1.

Table 1. Comparison between ideal growing-up milk composition and available Subgroups of growing-up milk in the Brazilian market, considering mean, standard deviation (SD), and confidence interval (CI) per 100 mg of product ready for consumption. Cascavel, Paraná, 2021.

Content	Ideal Composition	Growing-up milk Subgroup 1*	IC 95%**	Growing-up milk Subgroup 2*	CI 95%**	Growing-up milk Subgroup 3*	CI 95%**
Energy, kcal	45-55	64,76^{a} ± 16,68	(57,44; 72,07)	64,1^{a} ± 6,94	(56,79; 71,41)	62,6^{a} ± 7,37	(55,29; 69,91)
Proteins, g	≤ 2	1,39^{b} ± 0.58	(1,05; 1,72)	2,18 ^{a}± 0.62	(1,84; 2,50)	2,17^{a} ± 0.25	(1,83; 2,49)
Fats, g	1,5-2,55	2,51^{a} ± 1,18	(1,92; 3,09)	2,10^{a} ± 0.92	(1,51; 2,68)	2,73^{a} ± 0.41	(2,14; 3,30)
Carbohydrates, g	5	10.16 ^{a}± 3,13	(8,42; 11,89)	10.16^{a} ± 3,13	(8,42; 11,89)	7,43^{a} ± 1,39	(5,69; 9,16)

* Mean ± SD. ** values expressed in percentage.
(1) To determine the macronutrient content of the growing-up milk subgroups, the mean of 10 different brands was calculated. (2) Means followed by the same letters on the same line are statistically equal at 5% significance level by Tukey's test.

In addition to all the described subgroups exceeding the ideal composition proposal, it is also possible to observe the large range of means, as indicated by the confidence interval. This fact reinforces the wide variety of growing-up milk compositions available in the Brazilian market.

In 2018, the nutrition committee of the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition raised the average nutritional composition of growing-up milk sold in Europe, and the results were as follows: energy 67 kcal/ 10.4 g of carbohydrates and 2.6 g of proteins per 100 mL of product ready for consumption.[19] Meanwhile, the overall average of Brazilian growing-up milk (considering the 3 proposed subgroups) found in this study is: energy: 63.62±1.1 kcal/ carbohydrates: 9.25±1.6 g/ proteins: 1.91±0.5 g and lipids: 2.45±0.3 g per 100 mL of product ready for consumption.

Impact of growing-up milk consumption

The impact of growing-up milk consumption on infant health is described in Table 2.

Table 2. Median values (MD) for energy and macronutrients present in the consumption of 400 mL/day in the 3 proposed Subgroups of growing-up milk for children aged 0 to 8 years in relation to DRI recommendations. Cascavel, Paraná, 2021.

SUBGROUP 1	0-6 months (n=10)		7-11 months (n=10)		1-3 years (n=10)		4-8 years (n=10)	
Energy/nutrients	DRI	MD	DRI	MD	DRI	MD	DRI	MD
Energy (kcal)	612[a]	267	721[a]	267	1051[a]	267	1365[a]	267
carbohydrate(g)	60*	34.7	95	34.7	100**	34,7	100**	34.7
protein (g)	9.1*	6.1	11*	6.1	13*	6.1	19*	6.1
fat (g)	31*	9.8	30*	9.8	***	***	***	***

SUBGROUP 2	0-6 months (n=10)		7-11 months (n=10)		1-3 years (n=10)		4-8 years (n=10)	
Energy/nutrients	DRI	MD	DRI	MD	DRI	MD	DRI	MD
Energy (kcal)	612[a]	249	721[a]	249	1051[a]	249	1365[a]	249
carbohydrate(g)	60*	38	95	38	100**	38	100**	38
protein (g)	9.1*	8.3	11*	8,3	13*	8.3	19*	8.3
fat (g)	31*	6.9	30*	6.9	***	***	***	***

SUBGROUP 3	0-6 months (n=10)		7-11 months (n=10)		1-3 years (n=10)		4-8 years (n=10)	
Energy/nutrients	DRI	MD	DRI	MD	DRI	MD	DRI	MD
Energy (kcal)	612[a]	266	721[a]	266	1051[a]	266	1365[a]	266
carbohydrate(g)	60*	32	95	32	100**	32	100**	32
protein (g)	9.1*	8.2	11*	8.2	13*	8.2	19*	8.2
fat (g)	31*	11.3	30*	11.3	***	***	***	***

[a] EER values; * DRI values determined by AI; ** DRI values determined by EAR; *** DRI values not determined

Upon evaluating Table 2, it can be observed that, in relation to the DRI, the consumption of 2 cups of growing-up milk can reach half of the recommended daily value for carbohydrates and almost the total daily value of proteins recommended by age group, with children aged 0 to 6 months being the most affected.

Prevalence of nutritional inadequacy regarding the nutrition of young children

The percentage prevalence of nutritional inadequacy was also calculated and is available in Table 3

Table 3. Percentage of inadequacy in the consumption of energy and macronutrients by age group of young children. Cascavel, Paraná, 2021 (PART 1).

	Nutrients	0-6 months		7-11 months		1-3 years		4-8 years	
		n	%	n	%	n	%	n	%
SUBGROUP 1	**Energy**								
	< 80%	10	100.0	10	100.0	10	100.0	10	100.0
	Between 80 and 120%	0	0.0	0	0.0	0	0.0	0	0.0
	> 120%	0	0.0	0	0.0	0	0.0	0	0.0
	Protein								
	<10%	0	0.0	0	0	0	0.0	0	0.0
	Between 10 and 30%	1	10.0	3	30.0	4	40.0	5	50.0
	>30%	9	90.0	7	70.0	6	60.0	5	50.0
	Carbohydrate								
	< 45%	1	10.0	7	70.0	7	70.0	7	70.0
	Between 45 and 65%	6	60.0	2	20.0	3	30.0	3	30.0
	> 65%	3	30.0	1	10.0	0	0.0	0	0.0
	Lipíd								
	< 25%	3	30.0	3	30.0	*	*	*	*
	Between 25 and 35%	3	30.0	2	20.0	*	*	*	*
	> 35%	4	40.0	5	50.0	*	*	*	*

* DRI values not determined

Table 3. Percentage of inadequacy in the consumption of energy and macronutrients by age group of young children. Cascavel, Paraná, 2021 (PART 2).

	Nutrients	0-6 months		7-11 months		1-3 years		4-8 years	
		n	%	n	%	n	%	n	%
SUBGROUP 2	**Energy**								
	< 80%	10	100.0	10	100.0	10	100.0	10	100.0
	Between 80 and 120%	0	0.0	0	0.0	0	0.0	0	0.0
	> 120%	0	0.0	0	0.0	0	0.0	0	0.0
	Protein								
	<10%	0	0.0	0	0.0	0	0.0	0	0.0
	Between10 and 30%	0	0.0	0	0.0	0	0.0	2	20.0
	>30%	10	100.0	10	100.0	10	100.0	8	80.0
	Carbohydrate								
	< 45%	3	30.0	8	80.0	9	90.0	9	90.0
	Between 45 and 65%	0	0.0	2	20.0	1	10.0	1	10.0
	> 65%	7	70.0	0	0.0	0	0.0	0	0.0
	Lipídio								
	< 25%	6	30.0	6	60.0	*	*	*	*
	Between 25 and 35%	1	30.0	1	10.0	*	*	*	*
	> 35%	3	40.0	3	30.0	*	*	*	*

* DRI values not determined

Tabela 3. Percentage of inadequacy in the consumption of energy and macronutrients by age group of young children. Cascavel, Paraná, 2021 (PART 3).

	Nutrients	0-6 months		7-11 months		1-3 years		4-8 years	
		n	%	n	%	n	%	n	%
SUBGROUP 3	**Energy**								
	< 80%	10	100.0	10	100.0	10	100.0	10	100.0
	Between 80 and 120%	0	0.0	0	0.0	0	0.0	0	0.0
	> 120%	0	0.0	0	0.0	0	0.0	0	0.0
	Protein								
	<10%	0	0.0	0	0.0	0	0.0	0	0.0
	Between 10 and 30%	0	0.0	0	0.0	0	0.0	0	0.0
	>30%	10	100.0	10	100.0	10	100.0	10	100.0
	Carbohydrate								
	< 45%	3	30.0	10	100.0	10	100.0	10	100.0
	Between 45 and 65%	0	0.0	0	0.0	0	0.0	0	0.0
	> 65%	7	70.0	0	0.0	0	0.0	0	0.0
	Lipídio								
	< 25%	1	10.0	0	0.0	*	*	*	*
	Between 25 and 35%	9	90.0	4	40.0	*	*	*	*
	> 35%	0	0.0	6	60.0	*	*	*	*

* DRI values not determined

Children aged 0 to 11 months are the most affected by the consumption of growing-up milk, both in relation to subgroup 1 and subgroup 2. In subgroups 2 and 3, practically all age groups analyzed reach 100% inadequacy in proteins, with children aged 0 to 11 months being the most affected again. Also noteworthy is the distribution of macronutrients in subgroup 3, as unlike the other subgroups, there is a higher percentage of inadequacy in proteins and lipids.

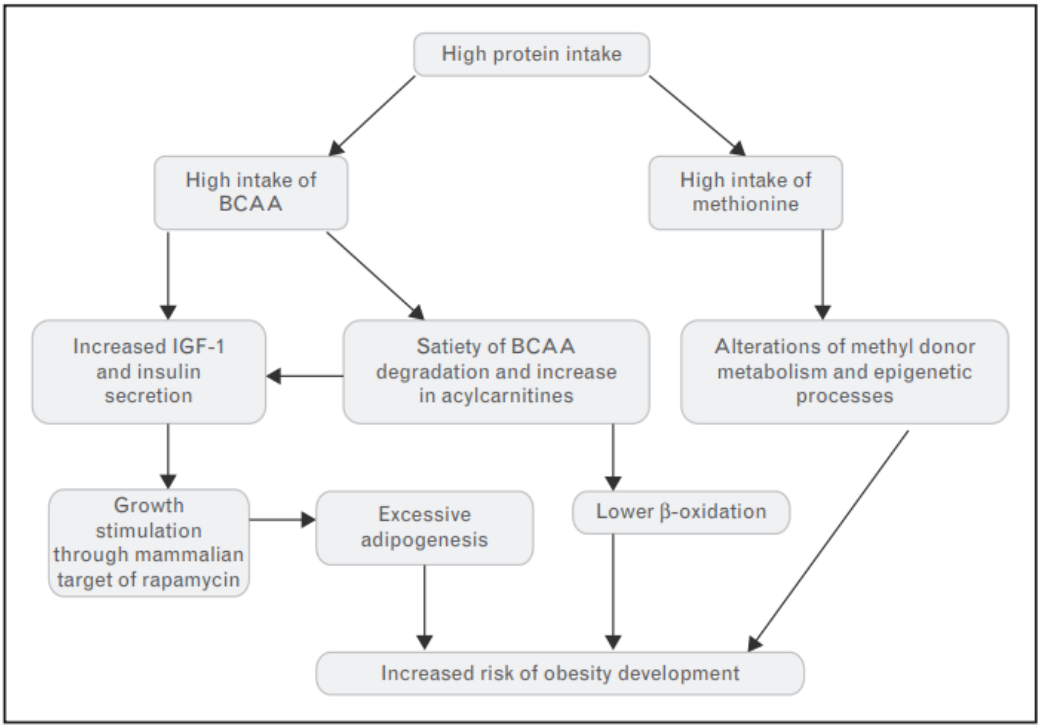
DISCUSSION

The lack of standardization of the product and the need to differentiate growing-up milk from infant formulas are issues addressed by several authors from different countries, especially Europeans.[20] There is great concern due to the inability to effectively determine the long-term outcome of growing-up milk consumption on infant health, although the hypotheses raised indicate a tendency towards the development of childhood obesity, among other risks,[7] such as

> High intake of micronutrients. Risk of confusion at the time of purchase due to the similarity of packaging and labels with infant formulas. Higher cost and consequent negative financial impact on families. Decreased diversity and variety of food and decreased interest of parents and caregivers in healthy (non-processed) foods; and tendency towards delay in the introduction of solid foods.[7]

The consumption of only 2 cups of 200mL of growing-up milk per day can meet 100% of a child's daily protein needs, being directly linked to the development of obesity in childhood,[21,22] a reality also found in previous studies conducted abroad.[23-25] The metabolic pathways leading to overweight due to high protein intake are described in Figure 2.

Figure 2. Biochemical diagram illustrating the relationship between high protein intake and obesity.



Source: Lind et al., 2017.

It is noteworthy that lacteal proteins increase serum insulin-like growth factor I (IGF-1) to a greater extent than other proteins (such as those from meat or eggs), increasing the risk of developing obesity during the child's first two years of life. Studies also suggest that protein consumption above metabolic needs is correlated with intestinal dysbiosis.[20]

The harmful effects of milk consumption in children under 2 years are well known, and by extension should be applied to growing-up milk, since its proteins originate from cow's milk. Even if in practice the growing-up milk may have less than 51% dairy ingredients, the average product (as found in this research) still offers a higher percentage of protein than the amount a child receives with breast milk.

In addition to excess proteins, excess sugars also raise concerns. The Ministry of Health recommends not offering sugar to children under 2 years of age due to interference with taste formation, resulting in a preference for sweeter foods (which hinders the introduction of other foods) and the increased risk of developing obesity, overweight, and diabetes.[1] It is known that 12% of cases of overweight and 9% of cases of childhood obesity in Brazil are attributed to the consumption of sugary drinks, such as growing-up milk.[27] Furthermore, there is a high cariogenic potential due to the early introduction of sugar. The consumption of sucrose in the first year of life allows for the implantation and colonization of dental surfaces by cariogenic bacteria, especially Streptococcus mutans.[28]

The lipid profile of growing-up milk is associated with the promotion of cardiovascular diseases and type 2 diabetes due to its high content of saturated fats.[29] Regarding infant nutrition, studies highlight the importance of consuming monounsaturated and polyunsaturated fatty acids, as these lipids play a crucial role in brain and neurological development. It is suggested that infants' diet should ensure 250 mg of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) per day. For children between 1 and 2 years

old, an additional daily intake of 100 mg of DHA is recommended, while dietary intake of saturated and trans fats should be limited as much as possible.[20]

In addition to the excess of macronutrients found in this research, the degree of food processing also has a negative impact on infant health. Consumption of ultra-processed foods before the age of two years can lead to malnutrition, overweight, and obesity in adulthood.[30] Recently, the consumption of ultra-processed foods has been linked to the development of mental illnesses such as dementia,[31] increased mortality from cardiovascular diseases, and the development of colorectal cancer in men[32] and possible damage to bone structure (fragility and interference with longitudinal bone growth).[33]

The potential nutritional impact of consuming growing-up milk on the health of children aged 0 to 6 years serves as a warning to healthcare professionals, parents, and caregivers. However, the prevalence of inadequacy calculated concerning the Estimated Average Requirement (EAR) may be overestimated and should be interpreted with caution. This is because it is an inference that does not consider the consumption of other foods and individual variability.

Despite its limitations, this study provides relevant insights into the composition of growing-up milk and its potential association with the development of childhood obesity. It highlights the need for specific regulation and the establishment of strict criteria for marketing and advertising.

CONCLUSION

The growing-up milk is an ultraprocessed food product characterized by an excess of proteins, high amounts of added sugars, and predominance of saturated fats, along with the presence of chemical additives.

It was possible to categorize the growing-up milk into three well-defined subgroups according to the type of ingredient presented in each formulation. After statistical analysis, it was concluded that, regardless of the subgroup and ingredient, the product has a negative impact on child health. The earlier the introduction, the greater the potential risks to health, which could lead to the development of overweight/obesity even in childhood. Furthermore, inadequate consumption of the growing-up milk has the potential to alter infant metabolic programming and influence the development of obesity and diabetes in adulthood.

Therefore, oversight, monitoring, and other regulatory measures regarding the growing-up milk are crucial. It is necessary to ensure clarity of information and appropriate labeling, as well as to disseminate basic knowledge to the population so that they can make conscious, autonomous choices that promote health

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Contributors

Lima JF contributed to all stages from the conception of the study to the revision of the final version of the article. Fariña LO and Simões MR participated in the analysis, interpretation of data, and final revision of the article.

Conflict of Interest: The authors declare no conflicts of interest.

.Received: March 29, 2023
Accepted: February 15, 2024