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SUGAR CONTENT IN INFANT YOGURTS

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RESUMEN:

INTRODUCCIÓN : El primer año de vida representa un período crítico para el establecimiento de hábitos alimentarios que pueden influir en los resultados de salud más adelante en la vida. Durante la alimentación complementaria, el yogur se introduce con frecuencia en la dieta infantil porque se percibe ampliamente como un alimento nutritivo que aporta calcio, proteínas y microorganismos beneficiosos. Sin embargo, se han planteado preocupaciones sobre el contenido de azúcar de los yogures infantiles disponibles comercialmente y su posible contribución a una exposición temprana a los azúcares libres. El consumo excesivo de azúcar durante la infancia se ha asociado con un mayor riesgo de caries de la primera infancia (CPI) y también puede influir en las preferencias de sabor por alimentos dulces a largo plazo.

OBJETIVO : El objetivo de este estudio fue evaluar el contenido de azúcar de los yogures comercializados para lactantes en España y analizar si su composición es coherente con las recomendaciones internacionales sobre la ingesta de azúcar en las primeras etapas de la vida.

METODOLOGÍA : Se realizó un estudio descriptivo transversal de productos en 2026, centrado en yogures infantiles disponibles en las principales cadenas de supermercados en España. La información nutricional y las listas de ingredientes se obtuvieron a partir del etiquetado proporcionado por los fabricantes.

RESULTADOS : Las variables analizadas incluyeron el contenido total de azúcares (g/100 g) y la presencia de ingredientes clasificados como azúcares libres, según las definiciones establecidas por la Organización Mundial de la Salud (OMS) y la European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN). El análisis reveló una variabilidad considerable en el contenido de azúcar entre los productos. El contenido medio de azúcar fue de 6.19 g por 100 g, con valores que oscilaron entre 2.3 y 13.0 g/100 g. Los yogures naturales generalmente presentaron niveles de azúcar más bajos, mientras que las formulaciones con fruta mostraron valores

más altos y con frecuencia contenían ingredientes que contribuyen a los azúcares libres, como purés o concentrados de fruta.

CONCLUSIONES : Estos resultados indican que, aunque algunos yogures infantiles contienen niveles de azúcar relativamente moderados, otras formulaciones aún pueden contribuir a una exposición temprana a los azúcares libres. La reformulación de ciertos productos y una orientación nutricional más clara para los cuidadores podrían ayudar a reducir la exposición innecesaria a los azúcares libres durante la infancia.

PALABRAS CLAVE:

Odontología, yogur infantil, azúcares libres, caries de la primera infancia, nutrición infantil.

ABSTRACT:

INTRODUCTION : The first year of life represents a critical period for the establishment of dietary habits that may influence health outcomes later in life. During complementary feeding, yogurt is frequently introduced into the infant diet because it is widely perceived as a nutritious food that provides calcium, protein, and beneficial microorganisms. However, concerns have been raised regarding the sugar content of commercially available infant yogurts and their potential contribution to early exposure to free sugars. Excessive sugar intake during infancy has been associated with an increased risk of early childhood caries (ECC) and may also influence long-term taste preferences for sweet foods.

OBJECTIVE : The aim of this study was to evaluate the sugar content of yogurts marketed for infants in Spain and to assess whether their composition is consistent with international recommendations regarding sugar intake in early life.

MATERIAL AND METHODS : A descriptive cross-sectional product study was conducted in 2026, focusing on infant yogurts available in the main supermarket chains in Spain. Nutritional information and ingredient lists were obtained from manufacturer-provided product labeling. The variables analyzed included total sugar content (g/100 g) and the presence of ingredients classified as free sugars, according to the definitions established by the World Health Organization (WHO) and the European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN).

RESULTS: The analysis revealed substantial variability in sugar content among products. The mean sugar content was 6.19 g per 100 g, with values ranging from 2.3 to 13.0 g/100 g. Natural yogurts generally presented lower sugar levels, whereas fruit-based formulations showed higher values and frequently contained ingredients contributing to free sugars, such as fruit purées or concentrates.

CONCLUSION : These results indicate that while some infant yogurts contain relatively moderate sugar levels, other formulations may still contribute to an early exposure to

free sugars. Reformulation of certain products and clearer nutritional guidance for caregivers could help reduce unnecessary exposure to free sugars during infancy.

KEYWORDS:

Odontology, infant yogurt, free sugars, early childhood caries, infant nutrition.

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1. INTRODUCTION

The first year of life represents a crucial stage in which nutritional habits, metabolic development, and long-term health trajectories begin to take shape. During this period, feeding practices progressively evolve from exclusive milk feeding toward the introduction of complementary foods (1). International health organizations recommend initiating complementary feeding around six months of age, when breast milk or infant formula alone no longer fully satisfies the increasing nutritional requirements of the child (2). At this stage, semi-solid and solid foods are gradually incorporated into the diet while milk feeding continues to play a central role. This transition represents a critical window for the development of dietary habits, as early exposure to different foods can influence taste preferences and eating behaviors later in childhood (3). Consequently, the nutritional quality of foods offered during complementary feeding is particularly important for both general health and long-term disease prevention (1).

Parents usually introduce yogurt as part of complementary feeding (2), as it is widely perceived as a nutritious and well-tolerated food due to its calcium content, probiotic properties, and high acceptability among infants (4). However, despite this perception, many commercially available yogurts contain considerable amounts of added and free sugars, which raises concerns about whether these products are appropriate for children under one year of age (5).

Early Childhood Caries (ECC) is one of the most common chronic diseases in children under six years old and represents a major public health challenge due to its high prevalence and impact on quality of life (6). ECC results from the frequent exposure of dental surfaces to fermentable carbohydrates, particularly free sugars, combined with immature enamel, altered oral microbiota, and feeding practices that promote prolonged sugar contact with teeth (7). In infants, the incomplete mineralization of primary enamel, reduced salivary flow during sleep, and the early establishment of cariogenic bacterial colonization further increase susceptibility (8).

Frequent sugar consumption during infancy contributes to enamel demineralization by lowering intra-biofilm pH and favoring the growth of cariogenic microorganisms such as Streptococcus mutans (9). Conversely, appropriate complementary-feeding practices help maintain a neutral oral environment and support long-term oral health (10).

In addition, repeated intake of sweetened foods and beverages during this developmental period has been linked not only to ECC but also to higher risks of overweight, obesity, and metabolic disturbances later in life, highlighting the relevance of controlling early dietary sugar exposure (11,12)

To mitigate these risks, international health authorities have defined recommendations to limit sugar intake. Assessing the presence and quantity of free sugars also allows a better evaluation of how closely infant yogurts align with current nutritional recommendations and with preventive strategies for reducing ECC risk. The World Health Organization (WHO) advises that free sugars should represent less than 10% of total daily energy intake, with an optimal target below 5% (11).

Likewise, the Spanish Agency for Food Safety and Nutrition (AESAN) recommends restricting free sugar intake to under 10% of total energy consumption (13). Although these guidelines apply to children and adults in general, no specific numerical limit exists for infants under 12 months, creating uncertainty in the regulation of foods intended for this age group (14).

The European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) adopts a more restrictive position, recommending that free sugars should provide less than 5% of total energy intake in infants below 2 years old (14).

Despite these public health messages, recent european studies show that many commercial baby foods exceed recommended sugar thresholds (15). Yogurts marketed for infants often labeled as appropriate “from 6 months” frequently include fruit purées, juices, concentrates, or other sweetening agents that increase free sugar content. According to WHO and ESPGHAN definitions, these ingredients must be classified as free sugars despite being marketed as “natural” leading to a discrepancy between parental perceptions and actual nutritional composition.

Understanding the sugar composition of these products is therefore essential for guiding parental decisions, informing manufacturers, and supporting regulatory frameworks (11,14).

However, although international guidelines address sugar intake in early childhood, there is currently no specific published analysis evaluating the sugar composition of infant yogurts available on the Spanish market. This absence of localized data makes it difficult to determine whether products marketed for infants truly comply with existing nutritional recommendations and preventive strategies.

Therefore, this study aims to evaluate the sugar content of yogurts marketed for infants in Spain and to compare these values with international and national dietary recommendations.

Based on these considerations, the following hypotheses were established: **H_0:** Infant yogurts do not exceed international recommendations for sugar intake. **H_1:** Infant yogurts exceed international sugar intake recommendations.

2. OBJECTIVE

The aim of this study was to assess the total sugar content and identify the presence of free-sugar ingredients in commercially available infant yogurts in Spain, and to examine their consistency with international recommendations on sugar intake in early childhood.

3. MATERIAL AND METHODS

3.1 Study Design

This study was designed as a cross-sectional descriptive study of commercial products conducted in 2026, evaluating the sugar content of infant yogurts commercially available in Spain. The analysis was based exclusively on manufacturer-declared nutritional information and ingredient lists, without laboratory chemical testing. This approach is consistent with methodologies used in European food-composition audits.

3.2 Product Identification and Search Strategy

A structured product search was conducted between October 2025 and January 2026 across the five major supermarket chains operating nationwide in Spain: Mercadona, Carrefour, Alcampo, Lidl, and DIA. Both physical store visits and official online catalogues were reviewed to ensure comprehensive coverage.

All products meeting inclusion criteria and available at the time of data collection were included.

3.3 Eligibility Criteria

Products were considered eligible only when explicitly labeled for infants (e.g., "from 6 months" or "from 8 months").

Inclusion criteria

-Yogurts or fermented dairy products marketed specifically for infants under 12 months.
-Products available for purchase in major Spanish supermarkets.
-Products with complete and accessible ingredient and nutritional labeling.
-Products containing dairy as a base (milk, fermented milk, or yogurt culture).

Exclusion criteria

-Yogurts intended for children over 12 months or for the general population.
-Plant-based baby yogurts without dairy.

-Desserts, puddings, mousse, or other sweetened dairy snacks not marketed as infant yogurts.

-Products lacking nutritional or ingredient information.

3.4 Sample Size

The final sample consisted of 14 products, representing all infant yogurt products meeting inclusion criteria and available in major Spanish supermarkets at the time of data collection.

3.5 Variables Collected

Nutritional and compositional information was extracted directly from product labels and manufacturer-declared nutritional tables. For each product, the following variables were recorded:

1. Nutritional data (per 100 g)

- Total sugar content (g)

-Total carbohydrates (g)

-Energy value (kcal)

2. Ingredient analysis

Ingredient lists were examined to identify potential sources of free sugars according to WHO and ESPGHAN definitions.

Ingredients were categorized as:

1. Free sugar sources:

-Fruit purées

-Fruit juices or juice concentrates

-Sucrose, glucose, fructose

-Honey, syrups, maltodextrin

-Processed fruit preparations

2. Non–free-sugar sources:

- Lactose naturally present in milk
- Yogurt cultures
- Thickeners, starches, flavorings

Each product was categorized as containing or not containing free-sugar ingredients.

Due to labeling limitations, the exact quantity of free sugars could not be quantified separately from total sugars; therefore, analysis focused on total sugar content and presence of free-sugar ingredients.

3.6 Product Classification

Products were categorized according to:

- Natural yogurt
- Fruit-based yogurt
- Cereal-based yogurt
- Mixed formulations (fruit + cereal)
- Supermarket-own brand vs commercial brand
- "No added sugar" claim vs fruit-based marketing

3.7 Compliance Assessment

Each product was evaluated according to:

-WHO recommendation: free sugars <10% of daily energy intake (ideally <5%)

-AESAN recommendation: <10% of total energy from free sugars

-ESPGHAN recommendation: less than 5% for infants under 2 years old

Because no specific daily energy-intake threshold exists for infants under 12 months, compliance was interpreted using surrogate indicators including total sugar content per 100g and the presence of free-sugar ingredients.

3.8 Data Analysis

Descriptive statistical analysis was performed using Microsoft Excel. The following parameters were calculated: mean, median, range, standard deviation, proportion of products exceeding 10 g of sugar per 100 g, and frequency of products containing free-sugar ingredients.

No inferential statistical analysis was conducted.

3.9 Ethical Considerations

This study was approved by the ethics committee and the department of odontology of the UEM with the following approval code: OD.022/2526

4. RESULTS

4.1 Sample Characteristics

A total of 14 infant yogurts met the predefined inclusion criteria and were included in the analysis. The products represented a range of formulations commercially available in Spain, including natural yogurts, fruit-based yogurts, and mixed preparations. All products were marketed for infants under 12 months of age.

4.2 Descriptive Analysis of Sugar Content

The declared total sugar content per 100 g varied substantially across products, ranging from 2.3 g to 13 g.

Table 1. Descriptive statistics of sugar content in infant yogurts analyzed in this study (g/100 g).

Parameter	Value (g/100 g)
Sample size (n)	14
Mean	6.19
Median	5.75
Standard Deviation	3.14
Minimum	2.3
Maximum	13
Range	10.7

As shown in Table 1, the mean sugar content was 6.19 g/100 g, while the median was 5.75 g/100 g. The standard deviation of 3.14 g suggests that sugar levels differed considerably between products. The overall range of 10.7 g highlights considerable differences in sugar levels within the infant yogurt category.

4.3 Sugar Content by Product

Table 2. Nutritional composition of infant yogurts marketed in Spain (per 100 g).)

Product	Category	Age recommendation	Energy (kcal/100 g)	Carbohydrates (g/100 g)	Total sugars (g/100 g)
Hero Baby Yogur natural	Yogurt / fermented dairy	6 months	71	7.8	4.5
Hero Baby Yogur plátano y fresa	Yogurt / fermented dairy	6 months	71	9.7	5.8
Yogolino Natural (sin azúcar añadido)	Yogurt / fermented dairy	6 months	71	8	3.3
Yogolino Melocotón Plátano	Yogurt / fermented dairy	6–8 months	70	10	5.7
Yogolino Natillas	Dairy dessert	6 months	93	13	9.4
Yogolino fresa	Yogurt / fermented dairy	8 months	79	11.6	6.5
Hacendado plátano, pera y mandarina	Fruit puree	4 months	70	15	11
Hacendado fruta variada	Fruit puree	4 months	65	16	13
Babybio yogurt	Yogurt / fermented dairy	6 months	60	7	3.7
Yogolino bolsa plátano	Dairy + fruit puree pouch	6 months	81	12	7.3
Yogolino bolsa natural	Dairy + fruit puree pouch	6 months	65	7	2.3
Yogolino bolsa plátano-fresa	Dairy + fruit puree pouch	6 months	83	11.2	6.5
Yogolino bolsa fresa-manzana	Dairy + fruit puree pouch	6 months	70	9.6	5.1
Danone My First Yogurt	Yogurt / fermented dairy	6 months	63	6.8	2.6

Natural yogurts consistently exhibited the lowest sugar levels, generally ranging between 2.3 g and 4.5 g per 100 g. In contrast, fruit-based and mixed formulations presented higher values, frequently exceeding 6 g/100 g.

The highest sugar contents were observed in fruit-containing products, reaching 11 g and 13 g per 100 g.

4.4 Products Exceeding Reference Thresholds

Using 10 g/100 g as a reference threshold commonly applied in European baby-food evaluations, two products (14.3% of the sample) exceeded this value.

Although several yogurts were labeled as "no added sugar," all products contained measurable sugar levels according to their nutritional declarations. In these cases, sugars were primarily derived from lactose naturally present in milk and from fruit ingredients.

4.5 Summary of Key Findings

The analysis demonstrates substantial variability in sugar content among infant yogurts available on the Spanish market. Natural yogurts showed comparatively low sugar values, whereas fruit-based formulations presented significantly higher levels. A minority of products exceeded commonly referenced thresholds, but overall variability suggests inconsistent formulation practices across brands.

5. DISCUSSION

The present study analyzed the total sugar content and the presence of free-sugar ingredients in infant yogurts commercially available in Spain. The results demonstrate substantial variability between products, with values ranging from 2.3 g to 13 g per 100 g and a mean of 6.19 g/100 g. This suggests that sugar levels highly depend on how products are formulated rather than being an inherent characteristic of yogurt itself.

Natural yogurts consistently showed lower sugar levels, which are mainly attributable to lactose naturally occurring in milk. According to WHO, intrinsic sugars such as lactose are not classified as free sugars. In contrast, fruit-based and mixed formulations presented higher total sugar values. WHO defines free sugars as those added to foods as well as sugars naturally present in syrups, fruit juices, honey, and fruit concentrates (11).

Therefore, the use of fruit purées or concentrates in infant yogurts contributes to free sugar exposure even in the absence of added sucrose. This distinction is clinically relevant because international pediatric nutrition authorities adopt a preventive approach toward early sugar exposure. ESPGHAN recommends that free sugar intake in infants should ideally not exceed 5% of total daily energy intake under 2 years old (14).

Food choices and preferences are shaped by several factors. Genetics plays a role in taste perception, but the environment also has an important influence. The types of foods

available, as well as cultural habits and parental practices, can affect the way eating patterns develop during early life. From birth, infants generally show a natural preference for sweet tastes and tend to prefer sweet solutions rather than neutral liquids such as water (14).
Early-life exposure to sweet flavors has been associated with long-term taste preference formation and increased likelihood of sugar consumption later in childhood (16).

The findings of the present study are consistent with european analyses reporting elevated sugar levels in commercial baby foods. Grammatikaki et al. found that many baby foods available in Europe contain ingredients contributing to free sugar intake (15). Similarly, Hutchinson et al. reported that a significant proportion of European commercial baby foods have high sugar content and frequently include fruit-derived sugar sources (16). These data suggest that the Spanish infant yogurt market follows a broader European trend.

From an oral health perspective, the implications are significant. ECC is strongly linked to frequent exposure to fermentable carbohydrates (7). ECC remains highly prevalent worldwide (17), and early dietary patterns play a central role in its development. Even moderate sugar quantities may increase caries risk when consumed frequently, particularly in infants with immature enamel and developing oral microbiota.

Frequent nighttime bottle-feeding with milk or juice and unrestricted breastfeeding have been associated with early childhood caries, although the evidence is not always consistent, these practices may contribute to an increased risk of caries (18).

Beyond oral health, excessive sugar intake during infancy has broader metabolic implications. WHO highlights that high free sugar consumption contributes to overweight, obesity, and non-communicable diseases (11). Early nutrition influences growth patterns and long-term health trajectories (1). Monitoring weight-for-age and growth standards is part of assessing adequate infant nutrition (19), and excessive sugar intake may negatively influence these trajectories if it contributes to excess caloric intake.

Evidence also suggests that commercially produced baby foods often contain sugar levels that may not align with optimal feeding recommendations (15).

Furthermore, research examining commercial baby foods has shown that labeling practices may mislead caregivers into perceiving products as healthier than they actually are when sugar-contributing ingredients are present (16).

Public perception plays an important role in this context. Yogurt is commonly perceived as a healthy food due to its protein, calcium, and probiotic content (4).

However, despite reformulation initiatives, variability remains considerable, as demonstrated by the present results.

When evaluating compliance with international recommendations, interpretation must remain cautious. WHO recommends limiting free sugars to less than 10% of total daily energy intake, ideally below 5% (11). AESAN adopts a similar threshold for the general population (13). However, no specific quantitative limit is established for infants under 12 months. ESPGHAN advocates further reduction of added sugars during early childhood (less than 5%) (14).

Because nutritional labeling does not distinguish intrinsic from free sugars, precise compliance assessment was not possible in this study. This limitation reflects a broader structural issue in food labeling transparency (20).

Prolonged or frequent consumption of sweetened foods increases cariogenic potential, and dietary habits formed during complementary feeding may influence later behavior. Indeed, early exposure to sweet foods during infancy may shape taste preferences and influence dietary habits later in childhood, potentially contributing to higher sugar consumption (3,18).

Therefore, even if only 14.3% of products exceeded 10 g/100 g, the overall pattern of fruit-based formulations containing free-sugar ingredients remains relevant from a preventive standpoint.

This study has limitations. It relied exclusively on manufacturer-declared data without laboratory analysis. The sample was restricted to products available during the data collection period. Consumption frequency and portion sizes were not evaluated.

Nonetheless, this research addresses a documented gap: the absence of published analyses specifically evaluating sugar content in infant yogurts in Spain. Generating localized data supports informed parental choices, potential product reformulation, and alignment with public health strategies aimed at reducing early sugar exposure (13).

Overall, while not all infant yogurts presented excessively high sugar levels, fruit-based formulations frequently contained ingredients classified as free sugars according to WHO definitions (11).

In addition, exposure to sweet foods early in life may influence taste preferences later on. This is particularly relevant in dentistry, since sugar intake is closely related to caries development (16,18), and broader metabolic consequences have been described in the literature (1,21).

Promoting natural yogurt options and encouraging reformulation toward lower-sugar products appears consistent with preventive pediatric nutrition principles (22).

These findings provide insight into the validity of the initial hypothesis. The results do not fully support the null hypothesis, as some of the analyzed products exceeded recommended sugar thresholds and frequently contained sources of free sugars. However, since this was not observed across all products, the null hypothesis cannot be entirely rejected. Instead, the findings highlight variability in sugar content among infant yogurts and suggest partial inconsistency with current nutritional recommendations.

6. CONCLUSIONS

This study evaluated the sugar content of yogurts marketed for infants in Spain and identified considerable variability between products. Natural yogurts generally contained lower levels of sugar, while fruit-based yogurts presented higher values and frequently included ingredients that may contribute to free sugar intake according to international definitions.

Overall, the findings do not fully support the null hypothesis, highlighting variability in sugar content and the presence of some products exceeding recommended levels.

Although yogurt is commonly perceived as a healthy complementary food for infants, the results suggest that some commercially available products may expose infants to higher levels of sugars than expected. Considering the potential role of early sugar exposure in the development of dental caries and long-term dietary preferences, careful product selection and reformulation strategies may be beneficial. Dental professionals should be aware of the sugar content of infant foods and play an active role in providing dietary guidance to parents during early childhood. Promoting products with lower sugar content and improving transparency in labeling could support healthier feeding practices during infancy and contribute to broader public health efforts aimed at reducing sugar consumption in early life.

These findings underline the need for clearer nutritional standards and improved product formulation to better align infant foods with current health recommendations.

7. SUSTAINABILITY

This study promotes sustainability by addressing its social, economic, and environmental dimensions. By analyzing and encouraging lower sugar levels in infant yogurts, it contributes to SDG 3 (Good Health and Well-Being) through the prevention of dental caries, obesity, and other sugar-related diseases. Socially, it raises awareness among parents and manufacturers about the importance of healthy feeding habits during infancy, fostering early health education and responsible consumption. Economically, it emphasizes prevention as a cost-effective approach that reduces future healthcare expenses and improves the efficiency of medical and dental care systems. Environmentally, promoting the reformulation of food products aligns with SDG 12 (Responsible Consumption and Production) by encouraging sustainable food manufacturing practices. Overall, improving the nutritional quality of infant foods supports both present and future generations, reinforcing the idea that small dietary changes in early life can lead to long-term health benefits and a more sustainable society.

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