

# Sodium content in packaged foods and beverages in **Argentina in 2024 and policy implications**

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Suggested citation Guarnieri L, Cámara F, Tiscornia MV, Pirola M, Castronuovo L. Sodium content in packaged foods and beverages in Argentina in 2024 and policy implications. Rev Panam Salud Publica. 2025;49:e98. https://doi.org/10.26633/RPSP.2025.98

# **ABSTRACT**

Objectives: To analyze the sodium content of packaged foods and beverages sold in Argentina in 2024, evaluate changes since 2022, and assess compliance with national regulations and the Updated Pan American Health Organization (PAHO) Regional Sodium Reduction Targets.

Methods: A cross-sectional survey was conducted using nutrition label data from 3 915 products collected in April-May 2024 in Buenos Aires supermarkets. Two chains were selected among the six major retailers covering 80% of the national market. Sodium levels were compared against limits established by the National Sodium Reduction Law (866 products) and PAHO regional targets (2 630 products). The 2024 data were compared with a 2022 sample of 3 665 products collected using the same methodology.

Results: Categories with the highest median sodium content included meat and fish condiments (4417 mg/100 g), appetizers (1 873 mg/100 g), luncheon meat and sausages (1 050 mg/100 g), hard cheese (900 mg/100 g), and dressings (788 mg/100 g). Significant sodium reductions occurred in 11 of 66 categories (16.7%) between 2022 and 2024, including condiments (-9 083 mg/100 g) and bread (-167 mg/100 g). Compliance with the National Law was high; only 5.8% of products exceeded limits, mainly hamburger buns (27.8%) and mayonnaise (22%). Compared to the PAHO targets, 44.5% of products exceeded the 2022 thresholds and 52.5% the 2025 thresholds, with the highest noncompliance in fresh pasta (94.3%) and savory snacks (68-77%).

Conclusion: Updating the National Sodium Reduction Law and strengthening policies are essential to further reduce sodium intake and improve health.

# **Keywords**

Sodium; food, processed; health policy; Argentina.

Cardiovascular diseases (CVDs) are the leading cause of morbidity and mortality worldwide, representing a significant global health burden. Hypertension is one of the strongest risk factors for cardiovascular events, underscoring its critical role in the development of CVDs (1). High sodium intake is a major, modifiable cause of elevated blood pressure in adults, making it a key target for public health interventions aimed at reducing hypertension and its associated risks (2).

Globally, the average salt consumption reaches 11 g/day among adults over 25 years old (3), while in the Americas, this figure can triple the WHO recommendation (4). In Argentina, the average consumption is 7.9 g/day (5), significantly exceeding the recommended 5 g/day (2 g of sodium) (6). Nationally,

the prevalence of hypertension exceeds 46% (7) and it has been identified that the main source of sodium comes from processed foods rather than table salt (8).

Reducing sodium intake has been recognized as a cost-effective and high-impact strategy to improve public health (9). To address this, the WHO and other international organizations have proposed several initiatives, including the SHAKE technical package, which provides guidance on reducing sodium intake through reformulation, labeling, and consumer education (10).

In Argentina, two regulations currently aim to reduce sodium consumption among the population. In 2013, the country became a pioneer in Latin America by implementing the National Sodium Reduction Law (No. 26.905). This legislation established

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maximum sodium limits for three food groups (meat and meat products; farinaceous and soups; bouillons and dressings) and included educational campaigns and strategies for restaurants, such as low-sodium menus and restrictions on salt shakers (11).

Since its implementation, various analyses of sodium content in packaged foods and beverages have been conducted, contributing to monitoring the law and identifying its main challenges (12–14). The last study showed that while over 90% of the products included in the law comply with the established limits, when compared with the stricter regional targets of the Pan American Health Organization (PAHO), over 50% of products exceed the proposed values. Moreover, a considerable proportion of foods with high sodium levels, such as seasonings, sauces, self-rising flours, and snacks, remain unregulated (14). Therefore, this scenario underscores the importance of further strengthening the law.

Another relevant public policy is the Healthy Food Promotion Law (No. 27.642), enacted in 2021 and gradually implemented starting in 2022. This law includes the adoption of front-of-package warning labels for products high in critical nutrients such as sodium, regulates their advertising, and prohibits their availability in school environments (15). Similar legislation implemented in other countries, such as Chile, has shown significant reductions in sodium content in products and a decrease in the purchase of products high in critical nutrients (16–18), suggesting that a similar trend could be expected in Argentina.

In 2021, PAHO updated its Regional Sodium Reduction Targets and established revised targets for 2022 and 2025 for 16 food categories and 75 subcategories. These targets aim to serve as input for reducing sodium intake in the countries of the Region by establishing maximum nutrient limits (4).

Despite the progress made, there is a lack of recent data evaluating the effectiveness and impact of the sodium reduction strategies implemented in Argentina, underscoring the need for updated evidence to inform policy improvements. In this context, the present study aimed to (i) analyze the sodium content of packaged foods and beverages sold in Argentina; (ii) compare the sodium content of these products between 2022 and 2024; (iii) assess compliance with the National Sodium Reduction Law (maximum limits); and (iv) evaluate compliance with the Updated PAHO Regional Sodium Reduction Targets.

# **MATERIAL AND METHODS**

A cross-sectional and systematic survey was conducted on the sodium content of packaged foods and beverages in Argentina, based on the information provided in the nutrition facts table. Sodium levels in 2024 were compared with the maximum values established by national law 26.905 (11) and with the Updated PAHO Regional Sodium Reduction Targets (4). A comparison was also made of the distribution of sodium content within the same food categories in 2022 and 2024, based on data collected from a previous monitoring study (14).

## **Data Collection**

The data were collected during April and May 2024 from the same two stores located in the city of Buenos Aires that were surveyed in the study conducted in 2022 (14). These stores were selected as part of a convenience sampling strategy to ensure comparability with a previous study (14) and access to a wide variety of products within logistical constraints. Both supermarkets are part of the six main retailers in Argentina, which together account for 80% of the grocery retail market (19).

Food groups and categories included in the analysis were defined prior to data collection. The selection of categories covered a wide range of packaged foods and beverages previously identified in the literature as major contributors to sodium intake in Argentina (20). For the purpose of this study, "packaged foods and beverages" are defined as all products sold with a barcode and subject to mandatory nutritional labeling, as established by the Argentine Food Code (Código Alimentario Argentino, CAA) (21). Data collectors walked all the aisles and observed product displays in each store to ensure that all products available for purchase and belonging to the food categories of interest were recorded. All packaged foods and nonalcoholic beverages were included by scanning their barcodes, and then all sides of the packaging were photographed to capture complete labeling information. Products sold at more than one retailer were recorded only once.

The data were entered into the Food Label Information and Price for Latin American and Caribbean countries (FLIP-LAC) system, a web-based tool developed by the University of Toronto (22). FLIP-LAC enables standardized data collection and analysis of nutrient content, including sodium, and has been validated for use in Latin America (23). The database included the manufacturer, brand, product name, portion size, package size, ingredients, and complete nutritional information for products as sold and as consumed. Data quality was ensured through consolidation and validation processes, including duplicate removal, identification of outliers, and adherence to standard calculations (e.g., Atwater factors).

## **Product Classification**

Food products were further grouped into 19 predefined groups and 66 subcategories based on shared raw materials and manufacturing processes (e.g., meat and meat products, baked goods), following classification schemes used in previous studies (12–14). The number and definitions of these categories remained consistent between the 2022 and 2024 data sets, ensuring comparability across time points (Tables 1 and 2).

For compliance assessment, a subset of products was analyzed, categorized into three main groups: meat and meat products (n = 203); farinaceous products (n = 566); and soups, bouillons, and dressings (n = 97). These groups, and their respective 26 subcategories, were selected in accordance with the classification established by the National Sodium Reduction Law (11) to evaluate adherence to the specific sodium targets defined by the regulation (Table 3).

For the Updated PAHO Regional Sodium Reduction Targets (4), products were grouped into 15 categories and 58 subcategories, following the groups and classification scheme defined by PAHO for these targets (Table 4).

# **Data Analysis**

For the data analysis, the nutritional information of the food was considered per 100 g of ready-to-consume product. Information on sodium content was obtained from the nutrition facts

TABLE 1. Sodium content per food product category in Argentina, 2024

				SD		Range
ood group	Food category	% of total products (n)	Median (mg/100 g)	(mg/100 g)	CV	(mg/100 g)
Bread and bakery	Bread	3 (118)	254.3	184.6	58.3	0.0-1 282.1
roducts	Toast	1 (38)	289.0	211.0	72.1	0.0-783.3
	Sweet biscuits	6.5 (253)	195.0	202.9	96.5	0.0-2 706.7
	Savory biscuits	3.8 (148)	310.0	276.2	67.4	0.0-1 310.0
	Bakery products	3.2 (125)	254.5	200.8	65.7	1.8-930.0
	Total	17.4 (682)				
ereal and cereal	Cereal bars	1.6 (62)	71.7	85.5	98.6	0.0-296.0
roducts	Breakfast cereal	2.6 (103)	136.7	184.3	101.9	0.0-842.5
	Pasta	1.9 (74)	363.9	196.0	46.9	0-1 146.2
	Noodles	0.3 (13)	11.0	103.0	263.7	0-385
	Soy-based products	0.5 (21)	252.5	146.6	48.3	144.8-810.7
	Leavening flour	0.2 (7)	392.0	326.2	66.0	0.0-900.0
	Other	0.1 (2)	NA	NA	NA	NA
	Total	7.2 (282)				
Convenience foods	Puff pastry for pies	0.5 (20)	640.0	192.7	29.9	208.3-1 016.7
	Puff pastry for empanadas	0.7 (28)	639.4	189.7	27.4	214.8-972.0
	Soup	1.1 (44)	260.5	475.2	117.5	4.8-1 822.2
	Bouillon cubes	0.2 (7)	107.2	122.7	63.5	91.5-359.2
	Pizza	0.5 (21)	559.4	208.3	35.6	122.7-952.2
	Ready-made meals	2.3 (90)	383.3	272.8	67.6	0.0-1 095.0
	Precooked meals	0.7 (29)	152.9	340.3	134.3	14.1-1 708.8
	Premixtures	1.8 (69)	271.7	197.9	65.0	0.0-990.0
	Instant dessert mixtures	1.3 (51)	86.7	40.2	47.3	0.0-206.7
	Frozen vegetables	0.5 (21)	30.0	66.6	111.3	0.0-226.0
	Other	0.0 (1)	NA	NA	NA	NA
	Total	9.7 (381)				
airy	Hard cheese	0.7 (27)	900.0	298.1	31.3	350.0-1 800.0
	Semi-hard cheese	1.7 (68)	591.7	260.5	41.5	254.3-1 506.7
	Fresh cheese	3 (119)	380.0	280.8	65.8	36.7-1 370.0
	Other cheese	0.6 (24)	583.3	579.6	81.5	116.7-3 000.0
	Dairy-based desserts	0.8 (33)	81.7	28.7	34.8	35.0-143.2
	Yoghurt	4.5 (176)	58.8	14.8	26.0	25.0-102.4
	Condensed milk	0.1 (2)	NA	NA	NA	NA
	Flavored or sweetened milk	0.5 (21)	52.5	25.4	41.9	36.5-120.5
	Total	12 (470)				
dible oils and oil	Butter	0.4 (16)	91.0	97.1	119.4	0.0-360.0
mulsions	Margarine	0.2 (8)	145.0	208.0	117.2	0.0-550.0
	Total	0.6 (24)				
ish and derivatives	Canned tuna	0.5 (18)	418.3	153.5	36.5	148.3-711.7
	Canned mackerel	0.3 (13)	138.3	134.9	77.4	60.8-580.0
	Other fish	0.4 (16)	325.3	502.8	100.0	38.0-2 000.0
	Canned sardines	0.1 (3)	NA	NA	NA	NA
	Breaded fish products	0.3 (13)	473.8	187.5	49.3	44.0-614.6
	Total	1.6 (63)				
leat and meat	Hamburger	0.9 (34)	662.0	139.9	21.3	241.2-844.6
roducts	Luncheon meat and sausages	3.9 (153)	1 050.0	772.1	59.3	312.5–4 500.0
	Spreads	0.3 (12)	765.0	97.5	12.2	632.5–990.0
	Breaded chicken products	0.8 (31)	422.3	162.5	39.2	161.5–701.5
	Other	0.2 (7)	632.3	257.0	41.0	317.7–1 027.5
	Total	6.1 (237)	302.0			0 1 027.0
Snacks and appetizers	Snacks	4.7 (184)	598.0	257.3	41.7	0.0-1 240.0
masks and appenzers	Appetizers	1.1 (44)	1 872.5	677.5	36.7	228.0–3 280.0
	Total	5.8 (228)	1 012.3	011.0	50.7	220.0-0 200.0

(Continued)

TABLE 1. (Cont.)

Food group	Food category	% of total products (n)	Median (mg/100 g)	SD (mg/100 g)	CV	Range (mg/100 g)
Sauces and spreads	Sauces	0.8 (32)	273.3	401.4	120.0	0.0–1 890.0
	Dressings	4.4 (174)	787.5	1 246.6	103.7	0.0–6 750.0
	Total	5.3 (206)		. 2 . 5 . 5		0.0 0.00.0
Nonalcoh	nolic beverages	9.4 (369)	10.5	16.8	105.1	0.0-130.0
Canned fruit and	Canned vegetables	2.7 (105)	70.8	207.5	144.6	5.0–1 094.0
vegetables	Canned fruit	0.7 (29)	5.9	9.6	106.2	0.0–32.1
	Total	3.4 (134)	0.0	0.0	100.2	0.0 02.1
Chocolates	Alfajores	2.3 (91)	120.0	55.8	46.7	11.4–293.4
Onocolates	Chocolate icing	0.2 (8)	74.0	37.6	67.1	0.0–96.0
	Dipping chocolate	0.0 (1)	NA	NA	NA	0.0 30.0 NA
	Chocolate bars	2.5 (99)	90.9	55.1	66.8	0.0–240.0
	Cocoa powder	0.4 (14)	53.7	14.2	27.8	10.5–65.0
	Other	1.6 (61)	80.0	63.3	63.6	0.0–256.7
	Total	7 (274)	00.0	03.3	03.0	0.0-230.7
la		3.3 (131)	63.3	40.6	70.8	0.0-215.1
	e cream  Meat and fish condiments	,		3 935.6		
Condiments		0.3 (11)	4 416.7	3 935.6 128.2	97.1	75.3–8 620.0
	Bouillon cubes and powders	0.6 (24)	195.8		59.9	40.1–384.4
	Other	0.1 (4)	NA	NA	NA	NA
	Total	1 (39)				
	andies	4.3 (169)	26.6	127.1	214.2	0.0-884.0
Jam	Dulce de leche	0.5 (20)	127.5	29.6	23.5	46.5-155.0
	Jam	2.4 (94)	_	93.9	314.8	0.0-420.0
	Other	0.5 (19)	34.0	47.1	104.9	0.0-195.0
	Total	3.4 (133)				
Artificial sweeteners	Artificial sweeteners in powder or tablet	0.7 (28)	_	221.4	367.4	0.0-875.0
	Liquid artificial sweeteners	0.5 (20)	_	189.5	221.8	0.0-560.0
	Total	1.2 (48)				
Peanut or legum	e butters and spreads	0.6 (23)	208.3	192.0	88.1	0.0-468.3
Foods for infant	s and young children	0.6 (22)	24.5	11.5	43.5	0.0-49
7	TOTAL	100 (3 915)				

Source: Original table for this article based on the study results.

Note: NA signifies that in categories with  $n \le 5$ , conducting this analysis is not considered appropriate due to the small sample size. Dashes (—) indicate categories with zero values. CV = coefficient of variation (%).

TABLE 2. Comparison between median sodium content per food product category in Argentina, 2022 vs. 2024

		Sodium content 2022			n content 024	Difference in the median sodium		
Food group	Food category	Total products (n) <sup>a</sup>	Median (mg/100 g) <sup>a</sup>	Total products (n)	Median (mg/100 g)	content (mg/100 g)	p-value <sup>a</sup>	
Bread and bakery products	Bread	136	421.0	118	254.3	-166.7	0.001	
	Toast	33	560.0	38	289.0	-271.0	<0.001	
	Biscuits	354	271.7	401	256.7	-15.0	0.018	
	Bakery products	142	292.0	125	254.5	-37.5	0.081	
Cereal and cereal	Cereal bars	33	104.3	62	71.7	-32.6	0.053	
oroducts	Breakfast cereal	88	221.7	103	136.7	-85.0	0.054	
	Pasta and noodles	90	377.0	87	352.0	-25.0	0.911	
	Soy-based products	21	388.8	21	252.5	-136.3	0.002	
	Leavening flour	12	757.0	7	392.0	-365.0	0.469	
	Other	9	383.5	2	NA	NA	NA	

(Continued)

TABLE 2. (Cont.)

		Sodium content 2022			m content 2024	Difference in the median sodium	
Food group	Food category	Total products (n) <sup>a</sup>	Median (mg/100 g) <sup>a</sup>	Total products (n)	Median (mg/100 g)	content (mg/100 g)	<i>p</i> -value <sup>a</sup>
Convenience foods	Puff pastry for pies	19	630.0	20	640.0	10.0	0.866
	Puff pastry for empanadas	28	638.6	28	639.4	0.8	0.682
	Soup	39	280.0	44	260.5	-19.5	0.343
	Bouillon cubes	18	314.0	7	107.2	-206.8	0.163
	Pizza	22	513.8	21	559.4	45.6	0.138
	Ready-made meals	87	325.4	90	383.3	57.9	0.114
	Precooked meals	39	385.7	29	152.9	-232.8	0.031
	Premixtures	81	282.5	69	271.7	-10.8	0.805
	Instant dessert mixtures	76	80.8	51	86.7	5.9	0.597
	Frozen vegetables	17	47.0	21	30.0	-17.0	0.309
	Other	_	_	1	22.0	NA	NA
airy	Hard cheese	39	910.0	27	900.0	-10.0	0.783
	Semi-hard cheese	56	630.0	68	591.7	-38.3	0.149
	Fresh cheese	106	361.7	119	380.0	18.3	0.956
	Other cheese	52	600.0	24	583.3	-16.7	0.929
	Dairy-based desserts	47	91.0	33	81.7	-9.3	0.062
	Yoghurt	193	58.6	176	58.8	0.2	0.305
	Condensed milk	4	NA	2	NA	NA	NA
	Flavored or sweetened milk	34	63.5	21	52.5	-11.0	0.119
dible oils and oil	Butter	12	54.0	16	91.0	37.0	0.831
mulsions	Margarine	7	240.0	8	145.0	-95.0	0.217
Fish and derivatives	Canned tuna	23	341.7	18	418.3	76.6	0.222
	Canned mackerel	7	255.0	13	138.3	-116.7	0.060
	Other fish	19	338.3	16	325.3	-13.0	0.619
	Canned sardines	1	NA	3	NA	NA	NA
	Breaded fish products	4	NA	13	473.8	NA	NA
leat and meat	Hamburger	16	664.6	34	662.0	-2.6	0.594
roducts	Luncheon meat and sausages	97	940.0	153	1 050.0	110.0	0.125
	Spreads	14	750.0	12	765.0	15.0	0.559
	Breaded chicken products	25	467.1	31	422.3	-44.8	0.089
	Other	29	645.0	7	632.3	-12.7	0.562
nacks and	Snacks	160	686.7	184	598.0	-88.7	0.096
ppetizers	Appetizers	45	1 900.0	44	1 872.5	-27.5	0.831
auces and spreads	Sauces	29	288.3	32	273.3	-15.0	0.659
	Dressings	165	783.3	174	787.5	4.2	0.386
Nonalcoholid	c beverage	323	13.0	369	10.5	-2.5	0.026
anned fruit and	Canned vegetables	105	163.8	105	70.8	-93.0	0.011
egetables	Canned fruit	17	5.9	29	5.9	_	0.863
hocolates	Alfajores	64	109.4	91	120.0	10.6	0.205
	Chocolate icing	11	80.0	8	74.0	-6.0	0.528
	Dipping chocolate	_	_	1	NA	NA	NA
	Chocolate bars	106	105.9	99	90.9	-15.0	0.053
	Cocoa powder	13	63.5	14	53.7	-9.8	0.253
	Other	71	100.0	61	80.0	-20.0	0.337
Ice cre	eam	82	48.7	131	63.3	14.6	0.014

(Continued)

**TABLE 2. (Cont.)** 

		Sodium content 2022			n content 024	Difference in the median sodium		
Food group	Food category	Total products (n) <sup>a</sup>	Median (mg/100 g) <sup>a</sup>	Total products (n)	Median (mg/100 g)	content (mg/100 g)	p-value <sup>a</sup>	
Condiments	Meat and fish condiments	15	13 500.0	11	4 416.7	-9 083.3	0.001	
	Bouillon cubes and powders	17	349.2	24	195.8	-153.4	0.038	
	Other	6	_	4	NA	NA	NA	
Candies		118	29.7	169	26.6	-3.1	0.987	
Jam	Dulce de leche	29	150.0	20	127.5	-22.5	0.030	
	Jam	93	_	94	_	_	0.896	
	Other	14	43.5	19	34.0	-9.5	0.839	
Artificial sweeteners	Artificial sweeteners in powder or tablet	24	_	28	_	_	0.699	
	Liquid artificial sweeteners	16	_	20	_	_	0.439	
Peanut or legume bu	utters and spreads	5	NA	23	208.3	NA	NA	
Foods for infants ar	nd young children	8	43.9	22	24.5	-19.4	0.003	
TOTA	AL	3 665		3 915				

Source: Original table for this article based on the study results.

Note: In categories with n < 5, conducting this analysis is not considered appropriate due to the small sample size. NA signifies that the analysis is not reported due to lack of data for the category in both periods or due to the small sample size in at least one of the periods. Dashes (—) indicate categories with zero values.

\*Bolded p-values are statistically significant (p < 0.05).

table (mg/serving) shown in the food product label and was converted to standardized units (mg/100 g), considering the products as consumed. Median values were used to characterize the distribution of the data set in each food group and category. The range is included as a reference; the coefficient of variation (CV) percentage is provided as an alternative index of dispersion.

The differences in sodium content between the 2022 and 2024 samples by product category were examined using the Wilcoxon rank-sum test. This test was chosen due to the small sample sizes for several of the product categories and due to its ability to evaluate differences in overall distribution (position, dispersion, etc.) of the variable between samples. A significance level of 5% (p-value < 0.05) was considered.

The median sodium content of products was compared with targets established by the National Sodium Reduction Law and the Updated PAHO Regional Sodium Reduction Targets. This paper presents the percentage of products in each group/category that exceed the sodium thresholds in each system.

In addition to noncompliance rates, the extent to which products exceeded the law and the PAHO sodium targets was assessed using average and median percentage excess.

All data analyses were conducted in RStudio 2023.6.1 running on R v4.3.1. The Wilcoxon rank-sum test was performed using R's "stats" v4.3.1 package.

## **RESULTS**

# **Sodium Content by Argentine Food Categories**

The total sample (n = 3 915) was mainly composed of the following five categories: bread and bakery products (n = 682, 17.4%), dairy products (n = 470, 12.0%), convenience foods (n = 470, 12.0%) 381, 9.7%), nonalcoholic beverages (n = 369, 9.4%), and cereal and cereal products (n = 282, 7.2%).

The five categories with the highest median sodium content were meat and fish condiments (median: 4 416.7 mg/100 g), appetizers (median: 1 872.5 mg/100 g), luncheon meat and sausages (median: 1 050 mg/100 g), hard cheese (median: 900 mg/100 g), and dressings (median: 787.5 mg/100 g).

Sodium content was variable among products belonging to the same category. Maximum variability was reported for artificial sweeteners in powder or tablet form (range: 0–875 mg/100 g, CV: 367.4%), jam (range: 0-420 mg/100 g, CV: 314.8%), liquid artificial sweeteners (range: 0–560 mg/100 g, CV: 221.8%), candies (range: 0–884 mg/100 g, CV: 214.2%), and canned vegetables (range: 5–1 094 mg/100 g, CV: 144.6%) (Table 1).

# Comparison of Sodium Content 2022–2024

The comparison of median sodium content (mg/100 g) across different food categories between 2022 and 2024 showed statistically significant decreases (p < 0.05) in 11 out of 66 categories: condiments for meat and fish (-9083.3 mg/100 g), toast (-271 mg/ 100 g), precooked meals (-232.8 mg/100 g), bread (-166.7 mg/ 100 g), bouillon cubes and powders (-153.4 mg/100 g), soybased products (-136.3 mg/100 g), canned vegetables (-93 mg/ 100 g), dulce de leche (-22.5 mg/100 g), foods for infants and young children (-19.4 mg/100 g), biscuits (-15 mg/100 g), and nonalcoholic beverages (-2.5 mg/100 g). The only category where a significant change in distribution was observed that included an increase in median sodium content was ice cream (difference between medians: 14.6 mg/100 g) (Table 2).

# Comparison of Sodium Content against the Maximum Levels Set by National Law No. 26.905

From the total sample set analyzed (n = 3 915), the sodium content of the products included in National Law No. 26.905

TABLE 3. Products exceeding the maximum sodium levels established by Argentina's National Sodium Reduction Law 26.905, 2024

		Products (n)	Median (mg/100 g)	Maximum national _	Products a	above target	Average excess
Food group	Food category			level (mg/100 g)	(n)	(%)	over limit (%) <sup>a</sup>
Meat and meat	Cooked sausages	47	914.0	1 136.0	_	_	_
products	Luncheon meat	29	865.0	1 136.0	1	3.4	124.5
	Dry sausages	47	1 500.0	1 805.0	4	8.5	63.5
	Fresh sausages	15	830.0	903.0	1	6.7	81.6
	Hamburgers	34	662.0	808.0	3	8.8	4.4
	Breaded chicken products	31	422.3	699.0	1	3.2	0.4
	Total	203			10	4.9	47.4
Farinaceous	Bran crackers	17	564.7	890.0	_	_	_
	Non-bran crackers	36	510.0	890.0	_	_	_
	Snack crackers	45	820.0	1 205.0	1	2.2	2.9
	Snacks	139	552.0	855.0	20	14.4	10.2
	Dry sweet cookies	144	225.4	485.0	3	2.1	82.2
	Filled sweet cookies	101	164.0	405.0	1	1.0	33.3
	Wholemeal bread	30	242.0	503.0	3	10.0	11
	White bread	20	243.4	476.0	_	_	_
	Hot dog buns	14	252.6	476.0	_	_	_
	Hamburger buns	18	371.2	476.0	5	27.8	1.3
	Frozen bread	2	377.0	527.0	_	_	_
	Total	566			33	5.8	16.0
Soups, bouillons,	Bouillons	7	107.2	405.0	_	_	_
and dressings	Clear soup	15	261.2	330.0	1	6.7	1.4
	Cream soup	8	234.6	290.0	_	_	_
	Instant soup	8	201.0	330.0	_	_	_
	Mayonnaise	30	754.2	833.0	6	20.0	35.4
	Ketchup	11	725.0	980.0	_	_	_
	Golf sauce	2	NA	850.0	_	_	_
	Ready-made sauces in sachet	15	273.3	315.0	_	_	_
	Ready-made canned sauces	1	NA	315.0	_	_	_
	Total	97	_	_	7	7.2	30.4
TOTAL		866			50	5.8	

Source: Original table for this article based on the study results.

Note: NA signifies that in categories with n ≤ 5, conducting this analysis is not considered appropriate due to the small sample size. Dashes (—) indicate categories with zero values.

Average percentage by which noncompliant products exceed the regulatory sodium limit in each category.

(n = 866) was evaluated along with the level of noncompliance with the current maximum allowable values (Table 3). Overall, 5.8% (n = 50) of the products exceed the current maximum values set by the law, corresponding to 13 of the 26 categories analyzed. In the group of meat and meat products, 4.9% (n =10) of the products exceeded the values; 5.8% (n = 33) in the farinaceous group; and 7.2% (n = 7) in the soups, bouillon, and dressings. Within the meat and meat products group, the products exceeding the law's maximum limits correspond to the categories of hamburgers (8.8%), dry sausages (8.5%), fresh sausages (6.7%), luncheon meat (3.4%), and breaded chicken products (3.2%). In the farinaceous group, the categories with the highest percentage of noncompliance are hamburger buns (27.8%), snacks (14.4%), wholemeal bread (10%), snack crackers (2.2%), dry sweet cookies (2.1%), and filled sweet cookies (1.0%). In the soups, bouillon, and dressings group, the products exceeding the maximum limits belong to the categories of mayonnaise (22.0%) and clear soup (6.7%).

According to Table 3, the categories with the highest average percentage of sodium content exceeding the regulatory limits among noncompliant products were luncheon meats (124.5%), dry sweet cookies (82.2%), fresh sausages (81.6%), dry sausages (63.5%), and mayonnaise (35.4%).

# Comparison of Current Sodium Levels in Argentina with PAHO Regional Sodium Reduction Targets

From the total analyzed sample (n = 3.915), compliance with the PAHO regional targets for 2022 and 2025 in mg/100 g was evaluated in a subsample of products corresponding to the food groups and categories defined in those targets (n = 2 627). Of this total, it was found that 44.5% (n = 1 170) of the products exceed the targets set for the year 2022, and 52.5% (n = 1.379) exceed the targets set for the year 2025.

The food groups with the highest percentage of products exceeding the 2022 targets were fresh or dried plain pasta and

TABLE 4. Products exceeding the maximum sodium content levels established by the PAHO Regional Sodium Reduction Targets, Argentina, 2024

		Exceeding 2022 (mg/10			Average excess Median excess		Exceeding 2025 PAHO targets (mg/100 g)		Median excess over
Food group	Total products (n)	(n)	(%)	over limit (%) 2022 PAHO	over limit 2022 PAHO	(n)	(%)	limit (%) 2025 PAHO	limit 2025 PAH0
Bread, bread products, and crisp breads	225	106	47.1	58.1	191.9	110	48.9	82.4	230
Cakes, biscuits, pastries, and sweet breads	676	240	35.5	40.1	68.3	298	44.1	50	83.3
Breakfast cereal	94	24	25.5	66.4	60.8	39	41.5	63.1	56.7
Savory snacks	176	120	68.2	53.7	220	135	76.7	71.4	256
Cheese	234	68	29.1	47	185	89	38.0	51.8	183.3
Processed vegetables, beans, and legumes	144	61	42.4	55.8	414	68	47.2	85.3	478.3
Processed meat and poultry	237	156	65.8	45.2	170	176	74.3	57.7	250
Processed fish and seafood	65	32	49.2	71.5	200	32	49.2	96.5	240
Soy products and meat alternatives	70	18	25.7	34.4	136	32	45.7	30.3	85.9
Soups	44	14	31.8	174	173.5	27	61.4	122.3	50
Ready-made foods, convenience foods, and mixed dishes	143	50	35.0	35.9	100.3	66	46.2	41	131.5
Fresh or dried plain pasta and noodles	140	132	94.3	NA	10	132	94.3	NA	10
Granola and energy bars, and nut butters/ spreads	62	11	17.7	30.1	38	17	27.4	34.1	31
Fats and oils	95	38	40.0	36.1	125.8	39	41.1	50	191.7
Sauces, dips, gravy and condiments	222	100	45.0	101.5	637.5	119	53.6	114.5	708.9
TOTAL	2 627	1 170	44.5			1 379	52.5		

Source: Original table for this article based on the study results.

**Note:** NA signifies that the PAHO target sodium content for fresh or dried plain pasta and noodles is 0.

noodles (94.3%); savory snacks (68.2%); processed meat and poultry (65.8%); processed fish and seafood (49.2%); and bread, bread products, and crisp breads (47.1%). The food groups with the highest percentage of products exceeding the 2025 targets were fresh or dried plain pasta and noodles (94.3%); savory snacks (76.7%); processed meat and poultry (74.3%); sauces, dips, gravy, and condiments (5%); and processed fish and seafood (49.2%) (Table 4).

The analysis of average and median percentage excess showed that soups had the highest levels of excess sodium, with average excesses of 174% and 122.3% over the 2022 and 2025 targets, respectively, with median excess values of 173.5 mg/100 g and 50 mg/100 g. Sauces, dips, gravy, and condiments also showed substantial excess levels, averaging 101.5% and 114.5% above the 2022 and 2025 targets, with corresponding median excess values of 637.5 mg/100 g and 708.9 mg/100 g, respectively (Table 4).

# **DISCUSSION**

This study contributes to the ongoing monitoring of sodium content in packaged foods and beverages in Argentina and serves as a key tool for informing and strengthening public policies aimed at reducing sodium intake in the population. Argentina has two national laws in force that are relevant to this objective: the National Sodium Reduction Law (No. 26.905), which establishes maximum sodium levels for selected food categories (11), and the Healthy Food Promotion Law (No. 27.642), which includes front-of-pack warning labels (15).

The analysis of compliance with Law No. 26.905 shows that, as in previous studies (12–14), most products fall below the established maximum sodium levels. However, this apparent success must be interpreted with caution, since the current limits are permissive and outdated. This is evidenced by the

analysis using the Updated PAHO Regional Sodium Reduction Targets, which revealed that nearly 45% of the products exceeded the 2022 targets and over 50% exceeded the 2025 targets—figures aligned with other countries in the Americas such as Canada, Costa Rica, and Peru (24). At the global level, although Argentina has been recognized as one of the few World Health Organization (WHO) Member States that adopted sodium limits in more than five food categories (2), the regulation still covers a limited number of products and omits major contributors to sodium intake, such as condiments, hard cheeses, and appetizers (11).

In addition, the findings presented herein confirm a wide variability in sodium content within the same product categories—a pattern observed consistent with previous studies conducted in Argentina (12–14) and other Latin American countries (25). This variability supports the technical feasibility of reformulation. Previous studies have shown that sodium can be reduced by up to 40% in bread and 70% in processed meats without compromising sensory characteristics or consumer acceptability (26).

Despite early regulatory leadership, recent surveys continue to report a high sodium intake in Argentina (5). This situation underscores the urgency of implementing effective public health interventions. The Inter-American Commission on Human Rights (IACHR) has explicitly stated that not all food fulfills the right to adequate food (27). Nutrient composition—including critical nutrients such as sodium—must be considered in determining whether a food supports the right to health and nutrition. In this light, the continued availability and promotion of sodium-rich foods represents a challenge to fulfilling countries' human rights obligations.

According to Allemandi et al., while Argentina and other countries in the region have taken steps toward sodium reduction, progress is hindered by low prioritization of the issue on political agendas, limited funding, and institutional instability (28). Implementation barriers are not unique to Argentina. A recent regional review (29) identified cross-cutting challenges to sodium policy implementation, including conflicts of interest with the food industry, insufficient human and financial resources, and lack of coordination across government agencies. At the same time, facilitators such as robust scientific evidence, international technical assistance, and partnerships between governments, nongovernmental organizations, and academic institutions were found to play an important role in advancing reformulation strategies.

Another policy identified as effective in reducing sodium intake is the implementation of the front-of-pack warning labels, which Argentina has incorporated through the Healthy Food Promotion Law(15). International evidence has shown that front-of-pack warning labels contribute to sodium reduction in foods by incentivizing reformulation (16, 17). In this study, a comparison between 2022 and 2024 revealed significant sodium reductions in several categories, including bread, canned vegetables, and meat and fish condiments. These reductions coincided with the implementation of the new labeling policy, suggesting a possible influence on industry reformulation efforts. A recent national survey also supports this impact: 43% of participants stated that the "excess sodium" warning label influenced their purchasing decisions (30).

Among the limitations of this study, it is worth noting that the information on the sodium content of the products was obtained from the nutrition facts table rather than through chemical analysis. In this regard, it is important to consider that the Argentine Food Code allows for a 20% difference between the declared value and the laboratory-analyzed value. However, official monitoring conducted with laboratory-tested samples has shown results consistent with those of the authors, demonstrating a high level of compliance with the National Sodium Reduction Law, which suggests that the use of label data is an appropriate and valid approach (31).

Another limitation is that the sample does not cover informal market products (e.g., artisanal or bakery foods) and may also exclude products sold in other supermarket chains, such as those produced under store brands, which limits the generalizability of the findings. However, since this survey was conducted in two of the leading supermarket chains in Argentina (19) and included all available packaged foods and beverages within the categories of interest, it provides information on the sodium content of a large number of products. Additionally, by including the same chains as in a study conducted in 2022 (14), comparability across surveys was ensured.

A major strength of this study is the use of a standardized, replicable methodology that allows for temporal and international comparisons (22, 24). These findings can support the evaluation and improvement of national sodium reduction policies and serve as a reference for other countries in the region seeking to advance similar efforts.

# **CONCLUSION**

Although Argentina has made significant regulatory progress in reducing sodium intake among the population, through measures such as the National Sodium Reduction Law and the Healthy Food Promotion Law, each of these regulations presents specific challenges. Regarding the first one, this study particularly emphasizes the need to incorporate new food categories, prioritizing those with high sodium content that also represent a significant source of sodium in the Argentine diet, such as cheeses (20), as well as adjusting the maximum sodium limits to make them more stringent. Moreover, any updates should be aligned with regional standards (4). As for the Healthy Food Promotion Law, it is important to continue monitoring its impact and to ensure its correct implementation. In both cases, the enforcement of compliance remains a critical issue.

**Author contributions.** All authors contributed to the conception and design of the study, data analysis and interpretation, drafting, and critical revision of the manuscript for important intellectual content. All authors reviewed and approved the final version of the manuscript.

**Acknowledgments.** The authors thank Martina Scalise, Mayra Farfan, Clara Zárate, and Florencia Sotelo, for their help in collecting the data presented here; Federico Duarte, Juliana Lettieri, Giuliana Corvalán, Abril Allende, and Camila Martinoya, for their collaboration in the data entry activity.

Conflicts of interests. None declared.

**Financial support.** This work was supported by the Pan American Health Organization. The funders had no role in the

study design, data collection and analysis, interpretation of results, writing of the manuscript, or the decision to submit the article for publication.

**Disclaimer.** Authors hold sole responsibility for the views expressed in the manuscript, which may not necessarily reflect the opinion or policy of the RPSP/PAJPH and/or PAHO.

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Manuscript submitted 16 April 2025. Revised version accepted for publication on 1 August 2025.

# Contenido de sodio de alimentos y bebidas envasados en Argentina en el 2024 y consecuencias para las políticas de salud

#### **RESUMEN**

**Objetivo.** Analizar el contenido de sodio de los alimentos y bebidas envasados a la venta en Argentina en el 2024, evaluar los cambios ocurridos desde el 2022 y analizar el cumplimiento de las regulaciones nacionales y las metas regionales actualizadas de la Organización Panamericana de la Salud (OPS) para la reducción del sodio

**Método.** Se realizó una encuesta transversal con el uso de los datos de las etiquetas nutricionales de 3915 productos examinados entre abril y mayo del 2024 en supermercados de Buenos Aires (Argentina). Se seleccionaron dos de entre las seis principales cadenas de supermercados minoristas que abarcan el 80% del mercado nacional. Los niveles de sodio se compararon con los límites establecidos por la Ley nacional de promoción de la reducción del consumo de sodio (866 productos) y con las metas regionales de la OPS (2630 productos). Se compararon los datos del 2024 con una muestra de 3665 productos del 2022 examinados utilizando la misma metodología.

**Resultados.** Las categorías con una mediana más alta de contenido de sodio fueron los condimentos para carne y pescado (4417 mg/100 g), los aperitivos (1873 mg/100 g), los embutidos y salchichas (1050 mg/100 g), los quesos duros (900 mg/100 g) y los aderezos (788 mg/100 g). Entre el 2022 y el 2024, se produjeron reducciones significativas del sodio en 11 de las 66 categorías (16,7%), entre ellas los condimentos (-9083 mg/100 g) y el pan (-167 mg/100 g). El nivel de cumplimiento de la ley nacional fue elevado. Solo el 5,8% de los productos superó los límites recomendados de contenido de sodio, principalmente los panes para hamburguesas (27,8%) y la mayonesa (22%). En comparación con las metas de la OPS, el 44,5% de los productos superó los umbrales del 2022 y el 52,5 % los del 2025; el mayor incumplimiento fue el observado en las pastas frescas (94,3%) y los tentempiés salados (68-77%).

**Conclusiones.** Actualizar la Ley nacional de promoción de la reducción del consumo de sodio y fortalecer las políticas de salud es esencial para reducir aún más el consumo de sodio y mejorar la salud.

Palabras clave

Sodio; alimentos procesados; política de salud; Argentina.

# Teor de sódio em alimentos e bebidas embalados na Argentina em 2024 e implicações para políticas públicas

# **RESUMO**

**Objetivos:** Analisar o teor de sódio nos alimentos e bebidas embalados vendidos na Argentina em 2024, avaliar as mudanças desde 2022 e verificar a conformidade com a legislação nacional e com as metas regionais atualizadas de redução de sódio da Organização Pan-Americana da Saúde (OPAS).

**Métodos:** Foi realizada uma pesquisa transversal utilizando dados de rótulos nutricionais de 3915 produtos coletados entre abril e maio de 2024 em supermercados de Buenos Aires. Foram selecionadas duas redes entre as seis principais varejistas, que juntas cobrem 80% do mercado nacional. Os níveis de sódio foram comparados com os limites estabelecidos pela Lei Nacional de Redução de Sódio (866 produtos) e as metas regionais da OPAS (2630 produtos). Os dados de 2024 foram comparados com uma amostra de 3665 produtos coletados com a mesma metodologia em 2022.

**Resultados:** As categorias com a maior mediana de teor de sódio incluíram condimentos para carne e peixe (4417 mg/100 g), salgadinhos (1873 mg/100 g), carnes processadas e salsichas (1050 mg/100 g), queijos duros (900 mg/100 g) e molhos (788 mg/100 g). Entre 2022 e 2024, ocorreram reduções significativas de sódio em 11 das 66 categorias (16,7%), incluindo condimentos (–9083 mg/100 g) e pães (–167 mg/100 g). A conformidade com a Lei Nacional foi significativa; apenas 5,8% dos produtos excederam os limites, principalmente pães de hambúrguer (27,8%) e maionese (22%). Em comparação com as metas da OPAS, 44,5% dos produtos excederam os limites para 2022 e 52,5%, para 2025. O maior índice de não conformidade foi observado em massas frescas (94,3%) e salgadinhos (68 a 77%).

**Conclusão:** Atualizar a Lei Nacional de Redução de Sódio e fortalecer as políticas públicas são medidas essenciais para reduzir ainda mais a ingestão de sódio e melhorar a saúde.

#### Palavras-chave

Sódio; alimento processado; política de saúde; Argentina.