

## Revisión

# The last decade of salt reduction policies in Portugal. What next?

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### Abstract

**Background:** Portugal was not exception to the European panorama of high salt consumption, registering high prevalence of hypertension and being cardiovascular diseases the leading cause of death in the last decade. In 2012, Portugal compromised to target the reduction of salt intake in the population by 30% until 2025 with a target of 5 g per day. Therefore, the aim of this study is to present an overview of the last decade (2009–2019) of salt reduction policies implemented in Portugal with the objective of reducing the dietary salt intake of the population, through one narrative review.

**Methods:** A documentary and bibliographical review of scientific articles and governmental documents published between January 2009 and December 2019 was carried out.

**Results:** Was identified fourteen initiatives implemented using different policy tools (voluntary agreements with industry, mandatory legislation, etc.), and trying comprehensive food system interventions to promote the production, distribution and consumption of less salt.

**Conclusions:** To achieve the 2025 goals, the challenge is the implementation of effective action strategies (including innovative approaches) and the monitoring of consumption trends.

*Key words:* Table salt. Sodium chloride dietary. Health policy. Public health.

### LA ÚLTIMA DÉCADA DE LAS POLÍTICAS DE REDUCCIÓN DE SAL EN PORTUGAL. ¿QUÉ SIGUE?

#### Resumen

**Fundamento:** Portugal no fue una excepción al panorama europeo de alto consumo de sal, registrando una alta prevalencia de hipertensión y siendo las enfermedades cardiovasculares la principal causa de muerte en la última década. En 2012, Portugal se comprometió a reducir la ingesta de sal en la población en un 30% hasta 2025 con un objetivo de 5 g por día. Por lo tanto, el objetivo de este estudio es presentar una visión general de la última década (2009–2019) de las políticas de reducción de sal implementadas en Portugal con el objetivo de reducir la ingesta de sal en la dieta de la población, a través de una revisión narrativa.

**Métodos:** Se realizó una revisión documental y bibliográfica de artículos científicos y documentos gubernamentales publicados entre enero de 2009 y diciembre de 2019.

**Resultados:** Se identificaron catorce iniciativas implementadas utilizando diferentes herramientas (acuerdos voluntarios con la industria, legislación obligatoria, etc.), e intentando intervenciones integrales del sistema alimentario para promover la producción, distribución y consumo de menos sal.

**Conclusiones:** Para lograr los objetivos de 2025, el desafío es la implementación de estrategias de acción efectivas (incluidos enfoques innovadores) y el monitoreo de las tendencias de consumo.

*Palabras clave:* Sal de mesa. Cloruro de sodio en la dieta. Política de salud. Salud pública.

### Introduction

It is well documented the effect of excessive chronic salt intake on raising of blood pressure and on increasing the risk of development of hypertension, cardiovascular diseases and other noncommunicable chronic diseases (NCD), causes of high morbidity and mortality rate worldwide<sup>1</sup>, compromising social and economic development of populations<sup>2</sup>.

Portugal was not exception to the European panorama of high salt consumption<sup>3,4</sup>, registering high prevalence of hypertension (36% of population in 2015)<sup>5</sup> and being cardiovascular diseases the leading cause of death in the last decade<sup>6</sup>. In 2016, the second most important risk factor to early death of Portuguese population was poor diet and third-leading risk factor was high systolic blood pressure, both highly related to salt intake<sup>7</sup>.

In order to reduce the risk of cardiovascular disease, stroke and coronary disease, the World Health Organization

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(WHO) established the recommendation of daily salt consumption less than 5 grams for the adult population and the adjustment of this value to energy intake in the case of children<sup>8</sup>. Therefore, the reduction of salt intake by the population was recognized and adopted by the WHO as a priority<sup>9,10</sup> and a best buy policy to countries due to its cost-effectiveness<sup>11</sup>. Later in 2012, all members states compromise to target the reduction of salt intake in the population by 30% until 2025 with a target of 5 g per day<sup>12</sup>.

The aim of this study is to present an overview of the last decade (2009–2019) of salt reduction policies implemented in Portugal with the objective of reducing the dietary salt intake of the population. The present paper focuses on the processes of national salt reduction policy making and not on the results of those processes. The findings will inform global and national stakeholders about progress towards achieving their commitments, could brought important evidence in the field of the design of health policies and make considerations about possible future developments.

## Methods

A documentary and bibliographical review of scientific articles and governmental documents published between January 2009 and December 2019 was carried out. Searches were conducted in December 2019 on Web of Science<sup>®</sup> and Scopus<sup>®</sup> databases for references containing the term "public health" OR "health policy" AND "salt" OR "sodium" OR "Portugal" OR "Portuguese". All papers related to the description of dietary salt policies were included. Titles and abstracts were screened for relevance and further duplicates removed. For governmental documents the search was conducted in Diário da República Eletrónico for references containing the term "sal", and all documents related to dietary salt policies were included in this study.

## Results and discussion

### *Levels of dietary salt consumption in Portugal*

No data about salt consumption by the Portuguese population before 2005 are available. In 2005, Polónia and colleagues<sup>13</sup> performed a study that estimated salt intake by urinary sodium excretion in a Portuguese adult sample. Although the sample selection was not representative of the population, the study showed that the Portuguese had high levels of salt consumption ( $12.3 \pm 3.8$  g/d). Later, in 2011, the same group of researchers estimated that Portuguese salt consumption decreased to 10.7 g/d, studying one representative sample of the population through one single 24-hour urinary collection<sup>4</sup>, the gold standard method for the estimation of dietary salt intake.

In 2015–2016, the National Food, Nutrition and Physical Activity Survey was developed in Portugal to

collect national and regional data on dietary habits in a representative sample of the population<sup>14</sup>. Average daily salt consumption by the adult population was 7.4 g of salt (2,962 mg sodium/ day), being higher in men than in women<sup>15</sup>. In this study, salt intake estimation was performed using 24-hour recalls. This method is less accurate than the 24-hour urinary sodium excretion due to an underestimation of salt added during the cooking process, a misdescription of food portions, or the omission of any intake during the day. Portugal actually has no nutrition monitoring system established and, therefore, the reporting of salt intake is particularly challenging.

If we look to trends in the salt consumption of vulnerable groups such as children and the elderly through the last decade including studies that estimate salt intake by using 24-hour urine collection from a sample population higher than 100 participants<sup>16</sup>, the available studies show little evolution of salt consumption reduction.

In 2013, Cotter and colleagues<sup>17</sup> evaluated 24-hour urinary sodium excretion in children of 10–12 years at a school in the north of Portugal, and in 139 subjects, the mean salt intake was  $7.8 \pm 2.5$  g/d. Later, in 2015 a cross-sectional survey in Portuguese 8–10 year-old children (163 subjects) showed  $7.5 \pm 2.7$  g/d for boys and  $6.0 \pm 2.7$  g/d for girls<sup>18</sup>. In relation to adolescents, in 2016, one cross-sectional study with a sample of 250 Portuguese adolescents (median age of 14 years) estimated mean salt intake of 7 g/d for boys and 5 g/d for girls<sup>19</sup>. According to the National Food, Nutrition and Physical Activity Survey, the mean salt consumption of children (< 10 years) was 5.5 g/d and 7.3 g/d for adolescents (10–17 years)<sup>15</sup>.

Regarding the elderly population, Moreira and colleagues<sup>20</sup> described 8.42 g/d of salt consumption in a representative sample of the Portuguese elderly population evaluation (1,318 subjects,  $\geq 65$  years) conducted in 2015 and 2016, with a higher proportion of the participants having an inadequate intake (80.0% in women and 91.5% in men). According to the National Food, Nutrition and Physical Activity Survey, the mean salt consumption of the elderly population was 7.1 g/d<sup>15</sup>.

At this point, with five years left to reach the WHO agreed values<sup>12</sup>, more individual and collective efforts will have to be made to achieve the objective, especially among vulnerable groups such as children and adolescents.

### *The Portuguese "salinogenic" food environment*

A "salinogenic" food environment was defined for the first time by Gonçalves et al.<sup>21</sup> as a high salt intake promoting environment, either by the availability of foods with high salt content or by promoting dietary habits associated with the development of liking the taste of foods with a high salt level. A 'salinogenic' food environment can be divided into the physical domain, sociocultural domain and political and economic domain<sup>21</sup>.

The physical domain of this 'salinogenic' environment is represented by the accessibility of foods, namely foods that are available and accessible (for example, for price reasons) to individuals with a salt content that makes it difficult to comply with dietary intake recommendations. Recent studies have shown that processed foods available in Portuguese supermarkets have a high salt content<sup>22-24</sup> often this excessive salt value is adopted by the food industry due to consumer preference issues or standardized product recipes and not due to food safety issues or technological constraints. This can be verified by the fact that the salt content of processed foods is highly variable, and even the same food category has very different salt values between different brands<sup>22</sup>. On the other hand, nowadays the consumption of meals outside the home (in canteens, bars, restaurants, etc.) is very prevalent and occurs from very early ages, so the salt content of meals served by public and collective catering will play an important role in this domain. There are several Portuguese works that demonstrate the high salt content in the soup and the dishes of these meals<sup>25-27</sup>. These high values are inconsistent with the consumer's ability to meet the WHO recommended levels by ingesting these meals, as only one meal can provide or even exceed the recommended amount of salt for the whole day.

The sociocultural domain of this 'salinogenic' environment may encompass not only the fact that Portugal is a well-known salt producer, but also the issues of the gastronomic tradition, where the consumption of salty foods is very much rooted in traditional products such as cheese, olives, pickles, cold cuts and smoked meats and the "faithful friend": the cod. Salt cod has a unique status in Portuguese cuisine and is a symbol of the Portuguese national identity<sup>28</sup>. Traditional salt cod consumed in Portugal, even after a day or more of soaking it in water, still has about 3.8 g of salt/100 g<sup>29</sup>.

At the political and economic level, the establishment of legislative measures, the introduction of tax measures for high salt products, the stimulation of voluntary salt reduction by industry and restaurants, or the development of national food education programmes could constitute strategies to reduce salt consumption at the population level.

### *Salt reduction policies*

Considering worldwide epidemiological evidence on the association between high salt intake and population mortality and morbidity, in 2004, the World Health Assembly endorsed the WHO Global Strategy on Diet, Physical Activity and Health in view of implementing measures for salt reduction. In response, in 2008, the European Union (EU) developed a Framework for National Salt Initiatives describing a common vision for a general European approach towards salt reduction. The Framework set a benchmark of a 16% salt reduction

over four years for all food products, also encompassing salt consumed in restaurants and catering<sup>30</sup>.

Several countries have developed operational salt reduction programmes. Finland and the United Kingdom (UK) have been identified as good examples of successful salt reduction strategies. In the UK, since the salt reduction programme started, over seven years, significant progress has been made, as demonstrated by the reductions in salt content in processed food and a 15% reduction in 24-hour urinary sodium from 9.5 to 8.1 g/day. This was possible by the strategy that added a voluntary basis on the part of the industry and the greater campaign of public health that gave the consumer sensitization to the reduction of salt<sup>1</sup>.

The main food policies to reduce salt consumption in Portugal in the last decade must be framed in the European and global context (table I), being many of the measures taken in the country the result of the European experience and are stimulated by evidence-based tools for the planning, implementation and surveillance of national salt reduction provided by international organizations.

In Portugal, in 2009, national legislation concerning salt content in bread set a maximum of 550 mg sodium/100 g bread, corresponding to 1.4 g salt/100 g serving of bread<sup>31</sup>. It should be noted that Portugal was a pioneer in this area by using legislation for maximum salt in bread as a measure to promote the reduction of salt consumption by the population. This legislation appeared after the European Union (EU) organized a seminar on salt reduction in bread, including technical, taste, and other parameters for healthy eating, inviting national and EU level bakery associations<sup>32</sup>.

In 2012, Portugal signed the WHO target for the reduction of NCD, including the reduction of salt intake in the population by 30% until 2025 with a target of 5 g per day<sup>12</sup>, and in the same year the government introduced the National Programme for the Promotion of Healthy Eating<sup>33</sup>.

One year later, the Portuguese Directorate General of Health, inspired by the WHO key measures to reduce salt consumption at population level<sup>34</sup>, published a national strategy to reduce salt consumption. It defined four strategic objectives: provide labelling capable of assisting consumer decision-making; modify availability, creating conditions for foods with a higher salt content to be more inaccessible; raise awareness and empower citizens to a reduced salt intake; and implement evaluation systems of intake and monitor the supply of salt in food<sup>35</sup>.

In 2015, the Portuguese government assumed that salt reduction was imperative for public health, and promoted the creation of an interministerial Working Group composed of government, food industry and researchers<sup>36</sup> to elaborate a consensus document<sup>37</sup> that highlights the necessity to set quantifiable reduction targets and monitor salt consumption. The Working Group presented 14 proposals summarizing the priorities and strategies of consumer education and, mainly, the availability of food with a focus on its nutritional reformulation.

**Table I**  
*Timeline of some important dates of salt reduction policies in Portugal in last decade (2009-2019)*

Year	Events
2009	Portuguese legislation fixed an upper limit 1.4 g salt/100g bread.
2011	Portugal adopts the Political Declaration of the High-level Meeting of the United Nations General Assembly on the Prevention and Control of Non-communicable Diseases.
2012-2016	Endorsement of the Action Plan for Implementation of the European Strategy to Prevent and Control Noncommunicable Diseases.
2012	Discussion of the global monitoring framework for noncommunicable diseases.
2012	Portugal as WHO member state signed up to the target to reduce salt intake in population by 30% by 2025 with a target 5 g per day.
2012	Government creation of National Programme for the Promotion of Healthy Eating.
2013	Portuguese Ministry of Health reports the strategy to reduce salt consumption in Portugal.
2015	Creation of the Interministerial Portuguese Government Working Group to presented proposals with priorities and strategies to reduce population salt intake.
2017	Portuguese Government approves the Integrated Strategy for the Promotion of Healthy Eating, which defines salt reduction objectives in some food categories and monitor the salt content in larger food categories.
2017	Portuguese Government signed a voluntary agreement with the Portuguese Association of Bakery Manufacturers to reduce salt in bread to a maximum level of 1 g of salt per 100 g of bread, to be achieved by 2021 (reduce 0.1 g per year).
2017	Mass media campaign against high salt consumption "Juntos contra o sal" ("Together against salt").
2018	Prohibition of some food products that contain high levels of fat, sugar and salt for sale within all government health institutions.
2019	Portuguese Ministry of Health and the food industry representatives signed a broad 'Food Industry Co-regulation Agreement.
2019	Portuguese legislation forbids the advertising of food and beverages high in sugar, fat or salt during children's television programmes as well as on the internet or web pages with content intended for children and around schools.

More recently, the Portuguese government approved the Integrated Strategy for the Promotion of Healthy Eating (EIPAS) proposed by the interministerial Working Group<sup>38</sup>, organized into four different strategic axes: 1 - change the environment where people choose and buy food; 2 - improve the quality and accessibility of the information available to consumers; 3 - promote and develop literacy and autonomy for the exercise of healthier consumer choices; and 4 - promote innovation and entrepreneurship in encouraging healthy eating<sup>39</sup>. In relation to salt, the strategy defines salt reduction objectives in some food categories (toast, breakfast cereals, cookies/biscuits, ham, cheese, salted snacks, ready-to-eat soup) and monitors salt content in larger food categories. These food categories were prioritized according to the results of National Survey, which shows that the largest contributors to the salt intake of the Portuguese population are the salt added during cooking (29.2%), followed by the bread and toasts (18.0%), soup (8.2%) and charcuterie and processed meat (7.0%) subgroups<sup>15</sup>.

On the sequence of EIPAS, the Health Ministry signed a voluntary collaboration agreement with the Portuguese Association of Bakery Manufacturers to reduce salt in bread to a maximum level of 1 g of salt per 100 g of bread to be achieved by 2021, through gradual reductions of 0.1 g per year<sup>39</sup>.

In the mass media campaign "Juntos contra o sal" ("Together against salt") nationally famous actors and

public personalities promoted less salt consumption through television commercials and the internet in 2017<sup>40</sup>. The consumer is paramount in salt reduction policies and strategies to increase awareness of salt intake and intention to change are always fundamental.

In June 2018, a list of excluded food products, which includes products that contain high levels of fat, sugar and salt for sale within all government health institutions, was decreed<sup>41</sup>.

Recently in 2019, the Portuguese Ministry of Health and food industry representatives signed a broad 'Food Industry Co-regulation Agreement' with salt reduction targets for crisps and other snacks, breakfast cereals, ready-to-eat soups and bread<sup>42</sup>. Other food categories such as processed meats have not been agreed upon.

In the same year, Portuguese legislation forbade the advertising of food and beverages high in sugar, fat or salt during children's television programmes as well as on the internet or web pages with content intended for children and around schools<sup>43</sup>.

The present study focused on national initiatives for salt reduction, however, regional and local initiatives should not be neglected. For example, the Regional Health Administration of Central Portugal implemented the strategy Minorsal.saude with excellent results since 2009 in the reduction of salt in bread and in soup<sup>44</sup>.

This study is in line with previous studies<sup>45</sup>, showing that additional effort is required, from the consumer to

the policy maker, from national to international, and from governmental to nongovernmental organizations to achieve the 2025 targets.

Other initiatives like taxation, tried in other countries<sup>46</sup>, and the optimization of front-of-pack information could be used in Portugal. Indeed, in 2018, the government proposed a tax on salty processed foods, but the Parliament voted against this proposal<sup>42</sup>. Another measure could be the adoption of the usage of front-of-pack information as a Nutri-Score labelling scheme to ensure clear consumer choice<sup>47</sup>.

In the future, new technologies to monitor the salt content in food or to regulate the addition of salt during the cooking process can be used. These new technologies can help consumers to cook with adequate level of salt at home or help catering industry to monitor level of salt in meals served at public canteens.

## Conclusion

In last decade, several initiatives were implemented in order to reduce population salt consumption, using different policy tools (voluntary agreements with industry, change of the food environments in public settings, and mandatory legislation), and trying comprehensive food system interventions to promote the production, distribution and consumption of less salt.

Excessive salt consumption after one decade of policies is still a public health problem. Thus, to achieve the 2025 goals, the challenge for all players in the food environment, from the consumer to the policy maker, is the implementation of effective action strategies (including innovative approaches) and the monitoring of consumption trends so the reduction of salt consumption by the population Portuguese becomes a reality and thereby achieves great long-term health benefits.

## Conflicts of interest

The author declares no conflict of interest.

## Author contribution

CG was involved in the conceptualization of the work, collection and interpretation of the data and drafting the paper.

## References

1. He FJ, MacGregor GA. A comprehensive review on salt and health and current experience of worldwide salt reduction programmes. *J Hum Hypertens*. 2009; 23 (6): 363-84.
2. World Health Organization. Draft action plan for the prevention and control of noncommunicable diseases 2013-2020. Geneva; 2013.
3. Brown IJ, Tzoulaki I, Candias V, Elliott P. Salt intakes around the world: implications for public health. *Int J Epidemiol*. 2009; 38 (3): 791-813.
4. Polonia J, Martins L, Pinto F, Nazare J. Prevalence, awareness, treatment and control of hypertension and salt intake in Portugal: changes over a decade. The PHISA study. *J Hypertens*. 2014; 32 (6): 1211-21.
5. Barreto M, Gaio V, Kislava I, Antunes L, Rodrigues A, Silva A, et al. 1º Inquérito Nacional de Saúde com Exame Físico (INSEF 2015): Estado de Saúde. Instituto Nacional de Saúde Doutor Ricardo Jorge (INSA, IP); 2016.
6. Óbitos por algumas causas de morte (%) [Internet]. Fundação Francisco Manuel dos Santos. 2019. Available from: [https://www.pordata.pt/Portugal/%C3%93bitos+por+algumas+causas+de+morte+\(percentagem\)-758](https://www.pordata.pt/Portugal/%C3%93bitos+por+algumas+causas+de+morte+(percentagem)-758).
7. Direção-Geral da Saúde, Institute for Health Metrics and Evaluation. Portugal: The Nation's Health 1990-2016: An overview of the Global Burden of Disease Study 2016 Results. Seattle, WA: IHME; 2018.
8. World Health Organization. Guideline: Sodium intake for adults and children. Geneva: World Health Organization; 2012. Available from: [http://www.who.int/nutrition/publications/guidelines/sodium\\_intake/en/](http://www.who.int/nutrition/publications/guidelines/sodium_intake/en/).
9. Beaglehole R, Bonita R, Horton R, Adams C, Alleyne G, Asaria P, et al. Priority actions for the non-communicable disease crisis. *The Lancet*. 2011; 377 (9775): 1438-47.
10. Selmer RM, Kristiansen IS, Haglerod A, Graff-Iversen S, Larsen HK, Meyer HE, et al. Cost and health consequences of reducing the population intake of salt. *J Epidemiol Commun H*. 2000; 54 (9): 697-702.
11. World Health Organization. Global status report on noncommunicable diseases 2010. Geneva; 2011.
12. World Health Organization. A Comprehensive Global Monitoring Framework Including Indicators and a Set of Voluntary Global Targets for the Prevention and Control of Non-Communicable Diseases 2012 Jun 2015]. Available from: [http://www.who.int/nmh/events/2012/discussion\\_paper2\\_20120322.pdf](http://www.who.int/nmh/events/2012/discussion_paper2_20120322.pdf).
13. Polonia J, Maldonado J, Ramos R, Bertoquini S, Duro M, Almeida C, et al. Estimation of salt intake by urinary sodium excretion in a Portuguese adult population and its relationship to arterial stiffness. *Revista portuguesa de cardiologia: orgao oficial da Sociedade Portuguesa de Cardiologia = Portuguese journal of cardiology: an official journal of the Portuguese Society of Cardiology*. 2006; 25 (9): 801-17.
14. Lopes C, Torres D, Oliveira A, Severo M, Guiomar S, Alarcão V, et al. National Food, Nutrition, and Physical Activity Survey of the Portuguese General Population (2015-2016): Protocol for Design and Development. *JMIR Res Protocols*. 2018; 7 (2): e42.
15. Lopes C, Torres D, Oliveira A, Severo M, Alarcão V, Guiomar S, et al. Inquérito Alimentar Nacional e de Atividade Física, IAN-AF 2015-2016: Relatório de resultados. Universidade do Porto; 2017.
16. WHO/PAHO Regional Expert Group for Cardiovascular Disease Prevention through Population-wide Dietary Salt Reduction. Protocol for population level sodium determination in 24-hour urine samples. 2010.
17. Cotter J, Cotter MJ, Oliveira P, Cunha P, Polonia J. Salt intake in children 10-12 years old and its modification by active working practices in a school garden. *J Hypertens*. 2013; 31 (10): 1966-71.
18. Oliveira AC, Padrao P, Moreira A, Pinto M, Neto M, Santos T, et al. Potassium urinary excretion and dietary intake: a cross-sectional analysis in 8-10 year-old children. *BMC Pediatrics*. 2015; 15: 60.
19. Gonçalves C, Abreu S, Padrao P, Pinho O, Graca P, Breda J, et al. Sodium and potassium urinary excretion and dietary intake: a cross-sectional analysis in adolescents. *Food Nutr Res*. 2016; 60: 29442.
20. Moreira P, Sousa AS, Guerra RS, Santos A, Borges N, Afonso C, et al. Sodium and potassium urinary excretion and their ratio in the elderly: results from the Nutrition UP 65 study. *Food Nutr Res*. 2018; 62.
21. Gonçalves C, Bento A. Ambiente alimentar "salinogénico" - um alerta. *Revista Factores de Risco*. 2017; 43 (1): 7-10.
22. Cardoso S, Pinho O, Moreira P, Pena MJ, Alves A, Moreira JL, et al. Salt content in pre-packaged foods available in Portuguese market. *Food Control*. 2019; 106: 106670.

23. Albuquerque TG, Santos J, Silva MA, Oliveira M, Costa HS. Multivariate characterization of salt and fat content, and the fatty acid profile of pastry and bakery products. *Food Funct.* 2017; 8 (11): 4170-8.
24. Albuquerque TG, Santos J, Silva MA, Oliveira M, Costa HS. An update on processed foods: Relationship between salt, saturated and trans fatty acids contents. *Food Chemistry.* 2018; 267: 75-82.
25. Gonçalves C, Silva G, Pinho O, Sandra C, Amaro L, Teixeira V, et al. Sodium content in vegetable soups prepared outside the home: identifying the problem. SHO 2012 - International Symposium on Occupational Safety and Hygiene; Guimarães 2012.
26. Barbosa MI, Fernandes A, Gonçalves C, Pena MJ, Padrão P, Pinho O, et al. Sodium and Potassium Content of Meals Served in University Canteens. *Port J Public Health.* 2017; 35 (3): 172-8.
27. Paiva I, Pinto C, Queiros L, Meister MC, Saraiva M, Bruno P, et al. [Low caloric value and high salt content in the meals served in school canteens]. *Acta Medica Port.* 2011; 24 (2): 215-22.
28. Sobral J, Rodrigues P. O fiel amigo : o bacalhau e a identidade portuguesa. *Etnográfica.* 2013; 17 (3): 619-49.
29. Instituto Nacional de Saúde Dr. Ricardo Jorge. Tabela da Composição de Alimentos. Lisboa: INSA; 2007.
30. European Commission. National Salt Initiatives implementing the EU Framework for salt reduction initiatives. 2009.
31. Assembleia da República. Lei n.º 75/2009 Estabelece normas com vista à redução do teor de sal no pão bem como informação na rotulagem de alimentos embalados destinados ao consumo humano. Diário da República n.º 155/2009, Série I de 2009-08-12. 2009.
32. Ballesteros JM. Workshop on salt reduction in bread. Seminar on Salt in Bread: Technical, Taste and Other Parameters for Healthy Eating. Brussels: Directorate General for Health and Consumers; 2009.
33. Graça P, Gregório MJ. A Construção do Programa Nacional para a Promoção da Alimentação Saudável: Aspectos Conceptuais, Linhas Estratégicas e Desafios Iniciais. *Rev Nutricias.* 2013: 06-9.
34. World Health Organization. Creating an enabling environment for population-based salt reduction strategies: report of a joint technical meeting held by WHO and the Food Standards Agency, United Kingdom, July 2010. Geneva: WHO; 2010.
35. Graça P. Estratégia para a redução do consumo de sal na alimentação em Portugal. Lisboa: Programa Nacional para a Promoção da Alimentação Saudável; 2013.
36. Diário da República. 2.ª série — N.º 146 — 29 de julho de 2015, Despacho n.º 8272/2015 - Determina a criação de um grupo de trabalho interministerial com o objetivo de propor um conjunto de medidas para a redução do consumo de sal pela população. 2015.
37. Direção Geral da Saúde. Proposta de Estratégia para a redução do consumo de sal na população portuguesa através da modificação da disponibilidade da oferta. In: Programa Nacional para a Promoção da Alimentação Saudável, editor. 2015.
38. Diário da República. 2.ª série — N.º 249 — 29 de dezembro de 2017, Despacho n.º 11418/2017 - Aprova a Estratégia Integrada para a Promoção da Alimentação Saudável (EIPAS). 2017.
39. Goiana-da-Silva F, Cruz-e-Silva D, Gregório MJ, Nunes AM, Graça P, Bento A, et al. Bringing government sectors together to address noncommunicable diseases: Portugal's interministerial healthy eating strategy. *Public Health Panor.* 2018; 04 (03): 426-34.
40. Direção-Geral da Saúde. Juntos contra o sal 2018 [Available from: <https://www.sns.gov.pt/noticias/2018/05/16/juntos-contra-o-sal-3/>].
41. Diário da República. 2.ª série — N.º 248 — 28 de dezembro de 2017, Despacho n.º 11391/2017. 2017.
42. Goiana-da-Silva F, Cruz-E-Silva D, Allen L, Nunes AM, Calhau C, Rito A, et al. Portugal's voluntary food reformulation agreement and the WHO reformulation targets. *J Glob Health.* 2019; 9 (2): 020315-.
43. Assembleia da República. Lei n.º 30/2019, de 23 de abril. Diário da República n.º 79/2019, Série I de 2019-04-23. 2019.
44. Duarte I, Pimentel J, Veloso S, Feliciano E, Abrantes P, Rodrigues C, et al. Strategy "minorsal.saude". *Eur J Public Health.* 2019; 29 (Suppl. 1).
45. Silva da Costa A, Ribeiro da Silva C, Jakubowski E, Nogueira P, World Health Organization. Regional Office for E. Noncommunicable diseases 2030: assessing Portugal's progress towards the noncommunicable disease-related target of the Sustainable Developmental Goals. *Public Health Panor.* 2018; 04 (03): 321-9.
46. Gonçalves C, Cordeiro T, Bento A. Medidas económicas na promoção da alimentação saudável na Europa: taxaço e subsídio. *Acta Port Nutr.* 2016: 24-30.
47. Goiana-da-Silva F, Cruz ESD, Gregorio MJ, Nunes AM, Calhau C, Hercberg S, et al. Nutri-Score: A Public Health Tool to Improve Eating Habits in Portugal. *Acta Medica Port.* 2019; 32 (3): 175-8.