SCIENCE AND
FOOD TECHNOLOGY

DOI: 10.12957/demetra.2019.37247

DEMETRA
Alimentação, Nutrição & Saúde

Bruna Pereira do Nascimento[1]
Lia Silveira Adriano[2]
Antônio Augusto Ferreira Carioca[2]
Thalyta Jamile dos Santos Machado[3]

[1] Universidade Estadual do Ceará, Centro de Ciências da Saúde. Fortaleza, CE, Brasil.
[2] Universidade de Fortaleza, Departamento Ciências da Nutrição. Fortaleza, CE, Brasil.
[3] Centro Universitário Estácio do Ceará, Departamento Ciências da Nutrição. Fortaleza, CE, Brasil.

Correspondence
Bruna Pereira do Nascimento
nascimentonut@hotmail.com

Adequacy of allergen labeling in foods for athletes

Adequação da rotulagem de alergênicos em alimentos para atletas

Abstract

Objective: To analyze the declaration of allergens in foods for athletes marketed in the city of Fortaleza, Ceará. ***Methods:*** A checklist based on RDC no. 26/2015 was used toassess195 labels of athletes foods displayed in a specialized store of nutritional products. The selected foods were categorized according to RDC no. 18/2010, available for sale in October 2017, being of different brands with allergenic constituents in the list of ingredients. ***Results:*** Among the labels analyzed, 184 (94.36%) were domestically manufacturd, of 22 different brands and 11 (5.64%) were imported, being of three different brands. One or more nonconformities with respect to the declaration of allergens were found on 90 (46.15%) labels, and nonconformities were more prevalent in imported brands (81.81%) than in national (49.39%) ones (p = 0.0252). Among the 113 labels highlighting the warning, 108 (95.58%) met the legal requirements regarding graphic formatting. Among the allergenic foods investigated, there was a higher prevalence of milk, soy and egg de-

clared. ***Conclusion:*** The results indicate that athlete's food has a high percentage of inadequacy.

Keywords: Nutritional Labeling. Athletes. Allergens.

Resumo

Objetivo: Analisar a declaração de alergênicos em alimentos para atletas comercializados na cidade de Fortaleza, Ceará. ***Métodos:*** Aplicou-se uma ***checklist*** baseada na RDC nº 26/2015, totalizando 195 rótulos de alimentos para atletas, avaliados em loja especializada em produtos nutricionais. Os alimentos selecionados foram categorizados conforme a RDC nº 18/2010 e foram expostos à venda durante o mês de outubro de 2017, sendo de diferentes marcas e com constituintes alergênicos apresentados na lista de ingredientes. ***Resultados:*** Dos rótulos analisados, 184 (94,36%) eram de fabricação nacional, sendo de 22 marcas diferentes e 11 (5,64%) eram importados, sendo de três marcas diversas. Foram verificadas uma ou mais não conformidades em relação à declaração de alergênicos em 90 (46,15%) rótulos, sendo que as não conformidades foram mais prevalentes em marcas importadas (81,81%) do que nacionais (49,39%) (p = 0,0252). Dentre os 113 rótulos que destacavam a frase de alerta, 108 (95,58%) atendiam às exigências legais em relação à formatação gráfica. Entre os alimentos alergênicos investigados, houve maior prevalência de leite, soja e ovo declarados. ***Conclusão:*** Os resultados indicam que os alimentos para atletas possuem elevado percentual de inadequação.

Palavras-chave: Rotulagem Nutricional. Atletas. Alérgenos.

INTRODUCTION

Label can be defined as any written or printed information, legend or image present on food packages with the aim of identifying the products origin, composition and nutritional characteristics, i.e., it is the product identity and, therefore, is considered a vital element in the communication between manufacturer and consumer.[1,2]

Considering the importance of making more conscious and healthful food choices, the ***Agência Nacional de Vigilância Sanitária (ANVISA)***, the Brazilian Health Regulatory Agency, regulates the nutritional information printed on the labels of packaged foods and beverages in Brazil.[3,4] To improve sanitary control actions in the area of foods and aiming to protect the population health, the Resolution of the Collegiate Board (from Portuguese, ***Resolução de Diretoria Colegiada– RDC***) no. 259/2002[5] was approved, which deals with the labeling of packaged foods and aims to guide manufacturers and ensure the consumers' right to information about the foods characteristics and nutritional composition.

Considering that people need to feel safe when consuming a product, Law no. 8078/1990, which regulates the Consumer Protection Act, defines the importance of advising consumers about the risks that a product may pose to their health.[6] An example is the mandatory "gluten-free" and "contains gluten" labeling that already exists since Federal Law no. 10.674/2003 has come into force, which enables people with gluten restrictions to make appropriate choices when consuming food products.[7] Food allergen regulations took a long time to appear, although the risk of allergens intake by allergic individuals may cause serious health problems.

According to Boyce et al.,[8] food allergens are specific components of a food or food ingredients (typically proteins) which elicit specific immunologic responses. The term "food allergy" is used to describe abnormal reactions when consuming foods or food additives, dependent on immunologic mechanisms,[9] which may appear in minutes or hours after ingested and cause the most varied symptoms. They may appear on the skin and in the gastrointestinal and respiratory systems; reactions may be mild or severe, impairing the functioning of various organs, such as the anaphylactic reaction.[10]

Food allergy affects 2 to 10% of the world population, varying according to age, geographic location, race and genetic factors, and its prevalence has increased, especially in developed countries.[11]

In order to meet the diverse demands of this population, the labeling regulation for allergens was vitally important in Brazil. Debates on this matter began in 2014, in face-to-face meetings, consultations and public hearings. On June 24, 2015, the ANVISA Collegiate Board unanimously approved RDC no. 26/2015, which sets mandatory labeling

requirements for the major foods that cause food allergies. This regulation was built with the very important collaboration of civil society, emphasizing the prevention of health damages to the population.[12]

The present research study was focused on an investigative analysis of the category of foods for athletes, which are especially formulated to help meet the specific functional needs of athletes and enhance their performance. High-intensity workouts impair, even temporarily, the immunologic competence, which in turn affects the individual's general health condition, crucial for sports performance.[13,14]

These foods are not used only by athletes, defined as individuals who are proficient in specialized sports that require physical exercises with intense muscular efforts and maximum performance. They are largely used by the population in general, often without proper guidance. These products are sometimes made up by allergenic foods and derivatives, such as milk, soybean and egg proteins.

It is worth emphasizing that in addition to the importance of highlighting the allergens on the labels to comply with legal requirements, the need to ensure transparency in food production for more conscious and safe choices is widely recognized. Until recently, it was not mandatory to identify the allergens in the list of ingredients, where information was not always clear, interfering directly with the consumers quality of life.

Given the above, the aim of this study is to assess the declaration of allergens on labels of foods for athletes marketed in the city of Fortaleza, Ceará.

METHODS

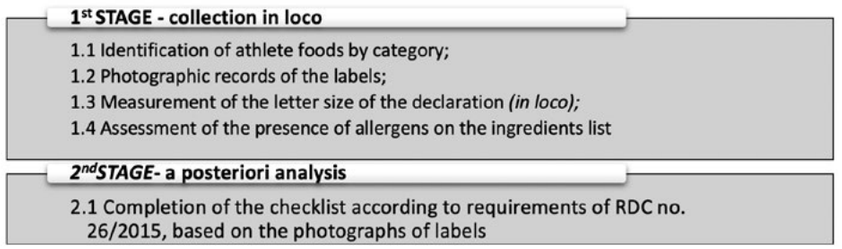
It is an observational study with cross-sectional, quantitative, descriptive and analytical approach. It was conducted in a specialized store of nutritional products located in the city of Fortaleza, Ceará, which is a franchise with more than 400 stores in Brazil, and sells diverse kinds of foods characterized as diet, light, whole, organic, gluten-free, lactose-free foods, as well as nutritional supplements and foods for athletes. The selection of the store was made by convenience.

The selected foods were categorized as described in RDC no. 18/2010, which specifies the classification, designation, composition and labeling requirements for foods for athletes, hydro-electrolytic, protein and energy supplements for partial replacement of meals, and creatine and caffeine.[13] The labels of 195 food products for athletes displayed in the store in October 2017, of different brands and with allergenic substances included in the ingredients list were assessed. Labels that did not contain the list of ingredients were excluded from the study.

The labels assessment was carried out using a checklist developed by the researchers, based on the RDC no. 26/2015,[12] which describes the requirements for mandatory labeling of the major allergenic foods. They are: wheat, rye, barley, oats and their hybrid strains, crustacean shellfish, eggs, fish, peanut, soybean, milk of all mammalian species, almond, hazelnut, cashew nut, Brazil nut, macadamia nut, pecan nut, pistachio nut, pine nut and chestnut.[12]

The collection of data was divided into four stages (Figure 1). The first one was conducted at the store and consisted of: 1.1. identification of the category of foods for athletes; 1.2 photographic record of the labels; 1.3 measurement of the type size; and 1.4 evaluation of the presence of allergens in the ingredients list. The second stage was conducted afterwards by completing the checklist (2.1).

Figure 1. Flowchart of data collection and analysis of the labels of foods for athletes. Fortaleza, CE. 2017.



The checklist, which contained seven questions, was completed with denominations (C) for conform items, (NC) for nonconform items and (NA) when not applicable. The checklist items aimed to evaluate adequacy of the following items: 1 –declaration of food allergens; 2 –declaration of crustaceans, 3 – declaration of cross contamination, 4 –graphic format of the declaration; 5 –location of the declaration; 6 –warnings grouping; and 7 - presence of a claim that the product does not contain allergenic foods or food allergens.

Data were compiled in Microsoft Excel®, version 2013, and described by means of absolute and relative frequency distribution. The rates of adequacy between the labels of domestically manufactured and imported foods were compared by the chi-square test in the R® statistical software, and $p<0.05$ was considered the descriptive level of the test.

Data was collected upon consent of the store manager for analysis of the samples by submitting a letter of agreement after presentation of the project.

RESULTS AND DISCUSSION

Of 195 assessed labels of foods for athletes, 184 (94.36%) corresponded to products manufactured in Brazil, of 22 different brands, and 11 (5.64%) were imported, of three different brands. According to the classification of RDC no. 18/2010,[13] we examined 94 (48.21%) labels of protein, 42 (21.54%) energy, 6 (3.08%) hydro-electrolytic foods, 16 (8.21%) for partial meals replacement, 8 (4.10%) creatine and 29 (14.87%) caffeine supplements.

Among the allergenic foods that composed the list of RDC no. 26/2015,12 this study found that milk (51.79%) was the most present food in the list of ingredients and in the declaration of allergens on the labels examined, followed by soybean (36.41%) and eggs (12.82%) (Table1). However, in many labels, milk was included in the list of ingredients, but not in the declaration, which is a fact of concern, if we take into account that according to *Codex Alimentariu*'[15] the major foods involved in allergies are eggs, milk, fish, crustacean shellfish, tree nuts, peanuts, wheat and soybean, accounting for 90% of food allergy cases.

Table 1. Prevalence of allergenic foods declared on the labels of foods for athletes. Fortaleza-CE, 2017.

Allergens	Present on the list of ingredients n (%)[a]	Present on the declaration n (%)[b]	Adequacy (%)[b]	Declaration of presence of cross-contamination n (%)[a]
Almond	0	0	-	1 (0.51)
Peanut	0	0	-	1 (0.51)
Oats	2 (1.03)	2 (1.03)	100.00	0
Hazelnut	0	0	-	1 (0.51)
Cashew nut	0	0	-	1 (0.51)
Brazil nut	0	0	-	1 (0.51)
Chestnut	0	0	-	0
Rye	0	0	-	0
Barley	0	0	-	0
Crustacean shellfish	2 (1.03)	2 (1.03)	100.00	0
Milk	101 (51.79)	74 (37.95)	73.26	31 (15.90)
Macadamia nut	0	0	-	1 (0.51)
Walnut	0	0	-	1 (0.51)
Eggs	25 (12.82)	16 (8.21)	64.00	46 (23.59)
Pecan nut	0	0	-	0

[a] Calculated percentage in relation to the total of labels analyzed (195).

[b] Calculated percentage in relation to the labels that contained each allergenic ingredient.

Table 1 continued

Allergens	Present on the list of ingredients n (%)[a]	Present on the declaration n (%)[b]	Adequacy (%)[b]	Declaration of presence of cross-contamination n (%)[a]
Fish	3 (1.54)	3 (1.54)	100.00	0
Pine nut	0	0	-	0
Pistachio nut	0	0	-	0
Soybean	71 (36.41)	55 (28.21)	77.46	47 (24.10)
Wheat	4 (2.05)	2 (1.03)	50.00	5 (2.56)

[a] Calculated percentage in relation to the total of labels analyzed (195).

[b] Calculated percentage in relation to the labels that contained each allergenic ingredient.

Milk allergy, for instance, triggers immunologic mechanisms mediated or not by immunoglobulin E (IgE), which is often confused with lactose intolerance for being of the same food source and having similar gastrointestinal symptoms. Casein constitutes about 80% of the proteins present in milk and is responsible for the higher incidence of food sensitivities in individuals.[16] In Brazil, we have not found studies investigating the prevalence of food allergy to cow milk protein in adults, but according to studies conducted in North America, it affects approximately 0.3% of the population.[17]

Another item specified by the allergen legislation is cross-contamination, or cross-contact, when the product does not contain intentional addition of an allergenic food or its derivatives, but may exhibit traces of this food as a consequence of incidental presence during any stage of manufacturing, from primary production to packaging and sale. However, companies may only declare this information after having adopted a Program of Control of Allergens.[15]

With respect to the labels of foods for athletes, there was a higher prevalence of cross-contamination statement also for the foods cited above as allergenic constituents, but there was a change in the classification arrangement, the most predominant being soybean, followed by eggs and milk (Table 1).

According to the RDC no. 26/2015,12 communication on the intentional presence of allergenic foods and their derivatives must mandatorily comply with the standards provided for in law. Of the analyzed food labels, 90 (46.15%) of them exhibited one or more nonconformities (Table 2) regarding the declaration of allergens; nonconformities were more prevalent in imported brands (81.81%) than in domestic products (49.39%) ($p = 0.0252$). The other 105 (53.85%) labels were in conformity with legislation (Figure 2).

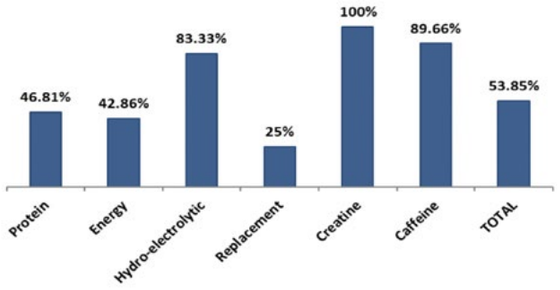
Table 2. Description of nonconformities on the declaration of allergens on the labels of foods for athletes. Fortaleza-CE, 2017

	Nonconform labels n (%)[a]	Nonconformities	n (%)[b]: Description of nonconformities
Protein	50 (53.19)	53	30 (56.60%): absence of declaration 3 (5.66%): absence of the word "derivative" 12 (22.64%): declaration between quotation marks 4 (7.55%): warning was not written in a single sentence 4 (7.55%): declaration was not written immediately after or below the ingredients list
Energy	24 (57.14)	24	17 (70.83%): absence of declaration 7 (29.17%): declaration between quotation marks
Hydroelectrolytic	1 (17.00)	1	1 (100.00%): absence of declaration
Replacement	12 (75.00)	19	3 (15.79%): absence of declaration 7 (36.84%): absence of the word "derivative" 2 (10.53%): warning was not written in a single sentence 7 (36.84%): declaration was not written immediately after or below the ingredients list
Creatine	0	0	-
Caffeine	3 (10.34)	3	3 (100.00%): declaration was not written immediately after or below the ingredients list

[a] Calculated percentage in relation to total labels assessed by category of foods for athletes.

[b] Calculated percentage in relation to total nonconformities assessed by category of foods for athletes.

Figure 2. Conformity of the claim for allergens on the labels of foods for athletes. Fortaleza-CE, 2017.



The labeling rules of the country where foods will be consumed must be observed when the intention is to export or import foods already packaged for sale. Imported foods may use a self-adhesive label to declare the mandatory information, which must be translated with proper type sizes, highlight and visibility, and such tag must be affixed before the product is marketed.[18]

The foods group that exhibited more nonconformities was the group of supplements for partial replacement of meals, followed by the energy, protein, hydro-electrolytic and caffeine group, as shown in Table 2. No nonconformity was found in creatine supplements.

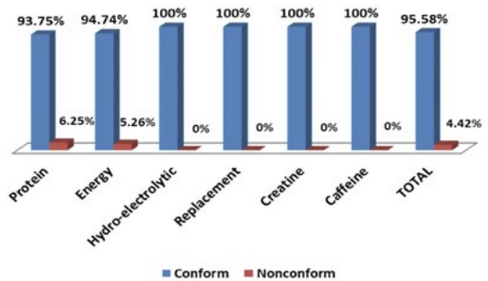
With respect to the declaration of presence of cross-contamination by food allergens in the product, which must be mandatorily followed by the standard declaration "Allergens: May contain (common names of the foods that cause food allergies)" it was found that 27 (28.72%) of the labels of declared protein supplements were conform and four (4.26%) presented nonconformity for having a declaration different from the standardized one: "May contain ***traces*** (common names of the foods that cause food allergies)".[12]

With respect to the presence of cross-contamination in other assessed categories of supplements for athletes, all labels were in conformity, and supplements were: 15 (35.71%) energy; 4 (67%) hydro-electrolytic; 12 (75%) for partial replacement of meals; 4 (50%) creatine and 7 (24.14%) caffeine.

There was declaration of presence of crustaceans in only two labels of caffeine supplements, which were in conformity with legislation because they included the common name of the species as follows: "Allergens: Contains crustaceans (crab)".[12]

With regard to the graphic formatting of the declaration of presence of allergens, current legislation recommends that it is printed with bold, capital letters, color contrasting with the background of the label and the minimum type size.12 Of 113 labels that highlighted the warning sentence, 108 were 100% in conformity with these four legal requirements (Figure 3).

Figure 3. Adequacy of the graphic formatting of the declaration of allergens on the labels of foods for athletes. Fortaleza-CE, 2017.



Nonconformities of graphic formatting found on the labels of protein supplements were labels with italicized declaration and written without capital letters. With respect to energy supplements, we found that the declaration letter was not in bold. The labels of other supplements categories were in conformity with legislation.

The allergens declaration cannot be displayed in covered spaces of the package, removable when opening the seal or difficult to visualize, such as areas of sealing and torsion, as well as foods, ingredients, food additives and technology adjuvants cannot display any kind of claim related to the absence of allergenic foods or food allergens.12 With respect to the 113 assessed labels where there was a claim, all of them were in conformity regarding these criteria.

According to the RDC no. 26/2015,[12] the deadline for the food industries to make the necessary adjustments in the foods labeling was 12 months. Therefore, foods produced from July 03, 2016 were supposed to have their labels in conformity with legislation. We did not find in literature data about allergens conformity in foods for athletes with legislation, but such assessment has already been conducted for other groups of foods after expiration of the period for adjustments.

Nonconformity of declaration of allergens in foods for athletes was higher that the one observed in an investigation of 102 labels for children foods, where only 3.92% did not present a claim for absence of allergens, but it was observed that 6.82% presented some nonconformity. Among the nonconformities of this study, it was found a claim that did not start with the word “allergens”. This word is very important and indicates to which population group this information is targeted, helping them understand the warning properly and preventing them from any mistake about the food components. It was also observed the presence of the phrase “contains gluten” in the allergens claim.[19]

The percentages of inadequacy in our study were also higher than those found in an assessment of allergens labeling of 16 different diet, light and traditional products, such as

peach candy, cereal bar, gelatin, mayonnaise, powder chocolate, margarine and curd. In these products, nonconformities were found in 16.7% of light products, in 12.5% of traditional products and 0% in diet products.[20]

In products marketed in the city of Matão- SP, nonconformities were higher, considering that only 15 (51.72%) of the products labels contained the required allergens warning. The nonconformities found were related to the absence of the warning sentence when there were allergens present in the ingredients list and declaration not according to regulations, which may cause serious problems to allergic consumers.[21]

In other study in which 42 labels of dairy foods were assessed, it was found that 85.71% of the products were in conformity with RDC n° 26/2015, a percentage of adequacy higher than the ones found in the present study. Only 14.29% of the labels had at least one nonconformity according to current legislation, either due to lack of information or graphic illegibility.[22]

Still considering this same study, when the legibility criterion was assessed, it was possible to observe that 73.68% of the labels of whole yogurt, 83.33% of the labels of milk beverages and 100% of the labels of fermented milk met the legal requirements.[22]

It is known that, based on the labels, consumers obtain information on the product, which, if well understood, ensures safer choices. So, they can consume these products safely without causing any damage to their health. Individuals with food allergy must observe the information on the labels to make sure that they are consuming allergens-free products. However, the information provided must be reliable, legible and accessible to everyone. The fact that people tend not to read the labels is due to the difficulty of understanding the information. The use of technical language causes a lack of interest in reading the labels, thus hindering full understanding of these information.[20,23]

Added to the use of technical language, abbreviations and acronyms, the lack of information on potentially allergenic components to specific groups and the use of poorly readable writing are factors that hinder understanding.[24]

Studies show that consumers read labels. A survey with 240 shoppers of supermarkets in Fortaleza-CE, of both sexes, was applied to a group aged over 15 years in neighborhoods of different social classes. The results showed that more than 60% of the interviewees read the labels and check the expiration date at the time of purchase of the products, and 75% of the people know the technical terms but do not know their meaning, especially consumers aged over 45 years. This is an evidence of excess of technical language on the labels and little information on the food components, some of them allergenic.[23]

The results of the studies cited, including the present investigation, indicate a need for corrective actions, taking into account the vulnerability that consumers experience, mainly those who need specific foods. Lack of information or the presence of incorrect labeling may cause misreading by consumers and may endanger their health. Food-related issues cannot be neglected, especially when they refer to specific population groups that require special attention.[24]

However, in order that consumers may benefit from nutritional labels, they must understand them properly. Hence, the importance of making labels more accessible, and it is an obligation of the public power to develop public policies aiming to help understand this kind of information as well as to demand from the food industries the fulfillment of legal requisites and make available to consumers readable, objective and reliable labels.[24]

CONCLUSION

Foods for athletes available in the marketplace still present inadequacies with the requirements of mandatory labeling of foods that cause allergies.

Therefore, when information is not correctly expressed, is wrong or absent, with respect to the presence of allergenic components in the foods, they may jeopardize the health of allergic consumers, and so data on the labels contribute to guide consumers on the most adequate food choices.

Therefore, more supervision by the responsible bodies is necessary to ensure that the food labels comply with current Brazilian laws and regulations, as well as to more awareness and commitment of the industrial sector to improve the labeling of their products.

REFERENCES

1. Araujo E. Rotulagem de alimentos: avanços e desafios. 2015. Disponível em URL: <http://www.mobilizadores.org.br/wp content/uploads/2015/12/Cartilha-Rotulagem-de-Alimentos_Avancos-e Desafios_final.pdf>.
2. Câmara MCC, Marinho CLC, Guilam MC, Braga AMCB. A produção acadêmica sobre a rotulagem de alimentos no Brasil. Rev Panam Salud Publica. 2008; 23(1): 52-58.
3. Agência Nacional de Vigilância Sanitária – ANVISA. Rotulagem Nutricional Obrigatória: Manual de Orientação às Indústrias de Alimentos. 2. ed. Brasília: 2005. 44 p. Disponível em URL: <http://portal.anvisa.gov.br/documents/33916/389979/Rotulagem+Nutricional+Obrigat%C3%B3ria+Manual+de+Orienta%C3%A7%C3%A3o+%C3%A0s+Ind%C3%BAstrias+de+Alimentos/ae72b30a-07af-42e2-8b76-10ff96b64ca4>.
4. Ferreira AB, Lanfer-Marquez UM. Legislação brasileira referente à rotulagem nutricional de alimentos. Rev. Nutr. 2007; 20(1): 83-93.
5. Brasil. Agência Nacional de Vigilância Sanitária. Resolução nº 259, de 20 de setembro de 2002. Regulamento Técnico sobre Rotulagem de Alimentos Embalados. Diário Oficial da União. 21 set. 2002; Seção 1.
6. Brasil. Ministério da Saúde. Lei nº 8078. Dispõe sobre a proteção do consumidor e dá outras providências.1990 set 11. Pub DO 1(1), [Set 12 1990].
7. Brasil. Ministério da Saúde. Lei nº 10.674. Obriga a que os produtos alimentícios comercializados informem sobre a presença de glúten, como medida preventiva e de controle da doença celíaca 2003 maio 16. Pub DO 1(1), [Maio 19 2003].
8. Boyce JA, Amal A, Burks AW , Jones SM, Sampson HA, Wood RA et al. Guidelines for the diagnosis and management of food allergy in the United States: report of the NIAID-sponsored expert panel. J. Allergy Clin. Immunol. 2010; 126(6).
9. Solé D, Silva LR, Rosário Filho NA, Sarni, ROS. Consenso Brasileiro de Alergia Alimentar 2007. Rev. bras. Alergia imuno patol. 2008; 31(2): 65-89.
10. Oliveira ARV, Pires TO, Nascimento LPC, Gonçalves JEM, Nogueira ATB, Rolim LBF. Alergia alimentar: prevalência através de estudos epidemiológicos. Revista de Ciências da Saúde Nova Esperança. 2018; 6(1).
11. Sicherer SH. Food Allergy. Mount Sinai Journal of Medicine. 2011; 78(5): 683-696.
12. Brasil. Ministério da Saúde. Resolução n° 26, de 02 de julho de 2015. Dispõe sobre os requisitos para rotulagem obrigatória dos principais alimentos que causam alergias alimentares. Diário Oficial da União. 3 jul. 2015; Seção 1.
13. Brasil. Ministério da Saúde. Resolução n° 18, de 27 de abril de 2010. Dispõe sobre alimentos para atletas. Diário Oficial da União. 28 abr. 2010; Seção 1.
14. Rosa LFPBC, Vaisberg MW. Influências do exercício na resposta imune. Ver Bras Med Esporte. 2002; 8(4); 167-172.
15. Agência Nacional de Vigilância Sanitária – ANVISA. Perguntas e Respostas sobre Rotulagem de Alimentos Alergênicos. 5. ed. Brasília: 2017. 40 p. Disponível em URL: <http://portal.anvisa.gov.br/documents/33916/2810640/Rotulagem+de+Alerg%C3%AAnicos/283b1a22-d923-4eb1-84fa--cb1a662b7846>.
16. Rangel AHN, Sales DC, Urbano SA, Galvão Júnior JGB, Andrade Neto JC, Macêdo CS. Lactose into-

DEMETRA, Rio de Janeiro, v.14: e37247, mar-2019 | 1-15

lerance and cow's milk protein allergy. Food Sci. Technol. 2016; 36(2): 179-187.

17. Oliveira ARV, Pires TO, Nascimento LPC, Gonçalves JEM, Nogueira ATB, Rolim LBF. Alergia alimentar: prevalência através de estudos epidemiológicos. Rev. Ciênc. Saúde Nova Esperança. 2018; 6(1).

18. Silva JA, Nascimento BS. Análise da adequação de rótulos de alimentos infantis com conteúdo alergênico segundo a RDC 26/2015. In: Anais do 2ºCongresso internacional de ed. física, nutrição e saúde, 2017; Aracaju.

19. Anno LAA, Bianchessi ALV. Análise de adequação da rotulagem de alimentos diet, light e tradicional [monografia]. Rio Verde: Universidade de Rio Verde; 2016.

20. Santos MS, Rodolpho D. Rotulagem dos produtos nos mercados na cidade de matão com o início da legislação de alergênicos. In: Anais do VIII Simpósio Nacional de Tecnologia em Agronegócio, 2016; Jales.

21. Rodrigues DEB, Santos CM, Machado SG. Avaliação da adequação da rotulagem de iogurte integral, bebida láctea e leite fermentado em relação à RDC nº 26, de 02 de julho de 2015. In: Anais do VI Seminário de Iniciação Científica do IFNMG, 2017; Almenara.

22. Marins BR, Jacob SC, Peres FF. Avaliação qualitativa do hábito de leitura e entendimento: percepção das informações de produto alimentícios. Ciênc. Tecnol. Aliment. 2008; 28(3): 579-585.

23. Soares DJ, Moura Neto, LG, Silva, LMR. Análise do comportamento dos consumidores com relação à compreensão e entendimento das informações dos rótulos de alimentos. Agropecuária Técnica. 2016; 37(1): 105-111.

24. Marins BR, Jacob SC. Avaliação do hábito de leitura e da compreensão da rotulagem por consumidores de Niterói, RJ. Vigil. sanit. debate. 2015; 3(3): 122-129.

Contributors

Nascimento BP and Adriano LS worked in all stages, from the study conception and final version. Carioca AAF conducted the statistical analysis of data, and Machado TJS participated in the final revision of the manuscript.

Conflict of interest: the authors declare that there are no conflicts of interest.

Received: September 12, 2018
Reviewed: January 20, 2019
Accepted: January 31, 2019

DEMETRA, Rio de Janeiro, v.14: e37247, mar-2019 | 1-15