

CHARACTERIZATION AND COMPARISON OF THE NUTRIENT PROFILES OF PLANT-BASED BURGERS AND YOGURTS WITH ANIMAL ORIGIN EQUIVALENTS AVAILABLE IN THE PORTUGUESE MARKET

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INTRODUCTION: The transition from an animal-based diet to a plant-based dietary pattern, which emphasizes foods derived from plant sources jointly with lower consumption or exclusion of animal products, has been driven by concerns over human health, environment, sustainability and other social and ethical issues, including animal welfare. This growing search for animal-origin alternatives has been contributing to worldwide plant-based processed foods innovations and availability. However, the rapid consumption growth of these products has raised questions about their overall healthiness, mainly because of their predominant ultra-processed nature and limited perception about their nutritional quality and potential health effects. To the nutritional characterization of plant-based foods, it is crucial to assess their nutrient profiles and compare them with the animal-origin equivalents and nutrient reference values established.

OBJECTIVES: To characterize and compare the nutrient profiles of plant-based burgers and yogurts available in the Portuguese market with their animal-origin equivalents and with some national reference values.

METHODS: It was carried out the collection of the nutritional information of plant-based burgers and yogurts and of the animal-origin equivalents, in 2022 and 2023, from the websites of food producers and retailers in Portugal. The nutritional values of the plant-based burgers and yogurts were compared with the animal-origin counterparts and with the nutrient reference values defined in the Integrated Strategy for the Promotion of Healthy Eating (EIPAS) (Table 1) and in the Directorate-General of Health (DGS) Label Decoder (Fig. 1).

Food category	EIPAS objectives	EIPAS reference values (g / 100 g or 100 ml)	
		Sugars	Salt
Food products in general	Achieve the values established by Regulation (EC) No. 1924/2006 on nutrition and health claims made on foods, for foods low in sugar and low in sodium/salt.	≤ 5 (solids) ≤ 2,5 (liquids)	≤ 0,3
Soups & meals	Achieve the reference value defined by a national inter-ministerial working group.		< 0,2

Table 1 - EIPAS reference values for food products in general and for soups and meals in particular (adapted from: Despacho No. 11418/2017, of December 29th, 2017¹).

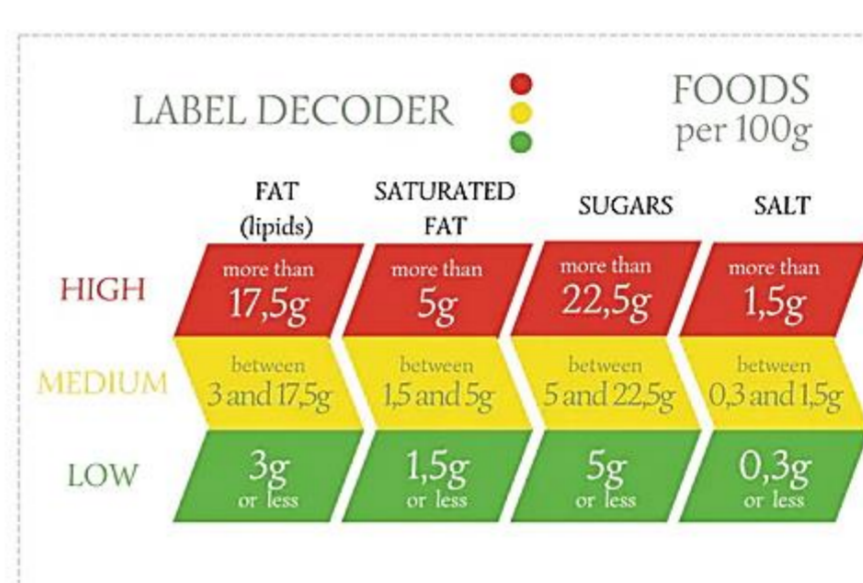


Fig. 1 – Label decoder - Foods per 100 g.²

RESULTS: Nutrient data were collected from 234 plant-based products and 503 animal-origin equivalents. When compared plant-based burgers (BurgVeg) had on average lower levels of fat, saturates and protein and higher levels of carbohydrate, sugars and salt than animal counterparts (Burg) (Fig. 2). Plant-based yogurts (YogVeg) had on average higher levels of fat and saturates but lower levels of carbohydrate, sugars and protein compared to animal-origin yogurts (Yog) (Fig.3). Both plant-based categories had higher average energy density per 100 g (kcal/100 g): BurgVeg = 202 and YogVeg = 83 in comparison to Burg = 175 and Yog = 72.

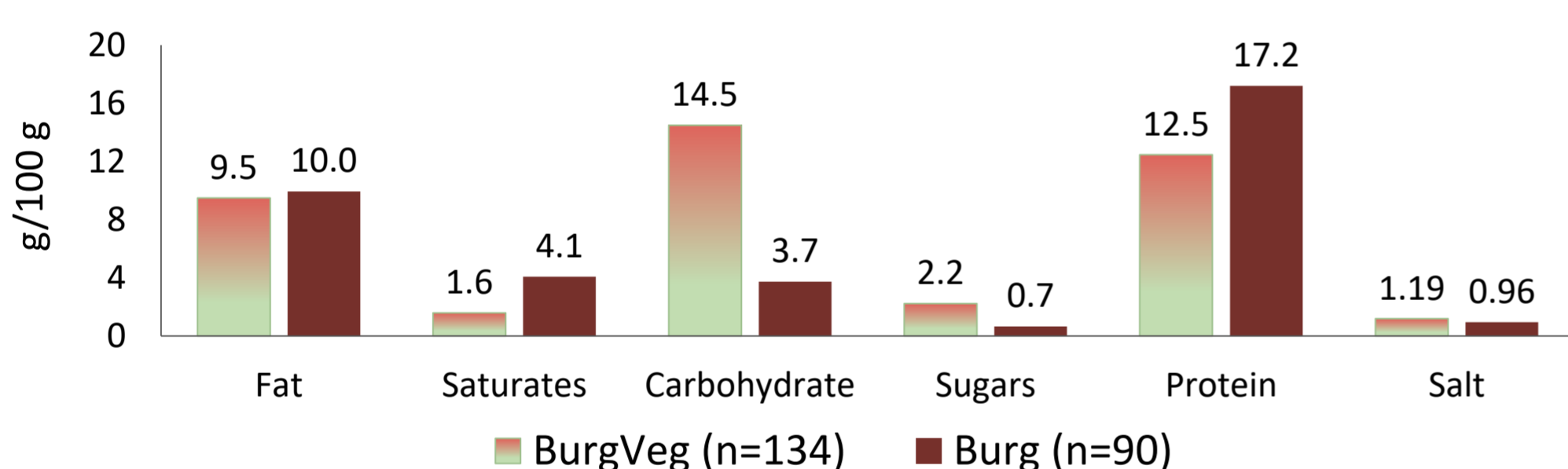


Fig. 2 – Average nutrient content for BurgVeg and Burg.

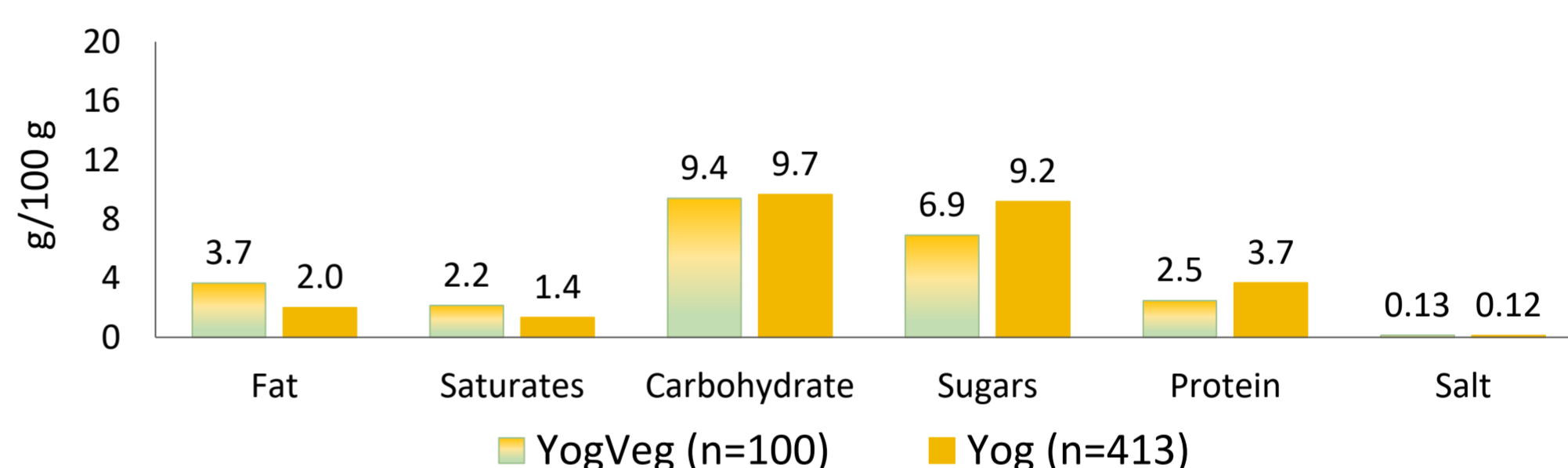


Fig. 3 – Average nutrient content for YogVeg and Yog.

When jointly evaluated sugars and salt, 88.5% of all plant-based products did not comply with EIPAS reference values, compared to 76.7% of the animal-origin equivalents (Fig. 4). When considering the DGS Label Decoder reference values, 3.0%, 3.7% and 16.4% of the BurgVeg had high levels of fat, saturates and salt, respectively, compared to 13.3%, 36.7% and 11.1% of their counterparts (Burg). Regarding the imitation yogurts and the yogurts, high levels of saturates were observed in 19.0% and 3.9% of the products, respectively, and low levels of sugars were found in 28.0% of YogVeg and 25.4% of Yog (Figs 5 & 6).

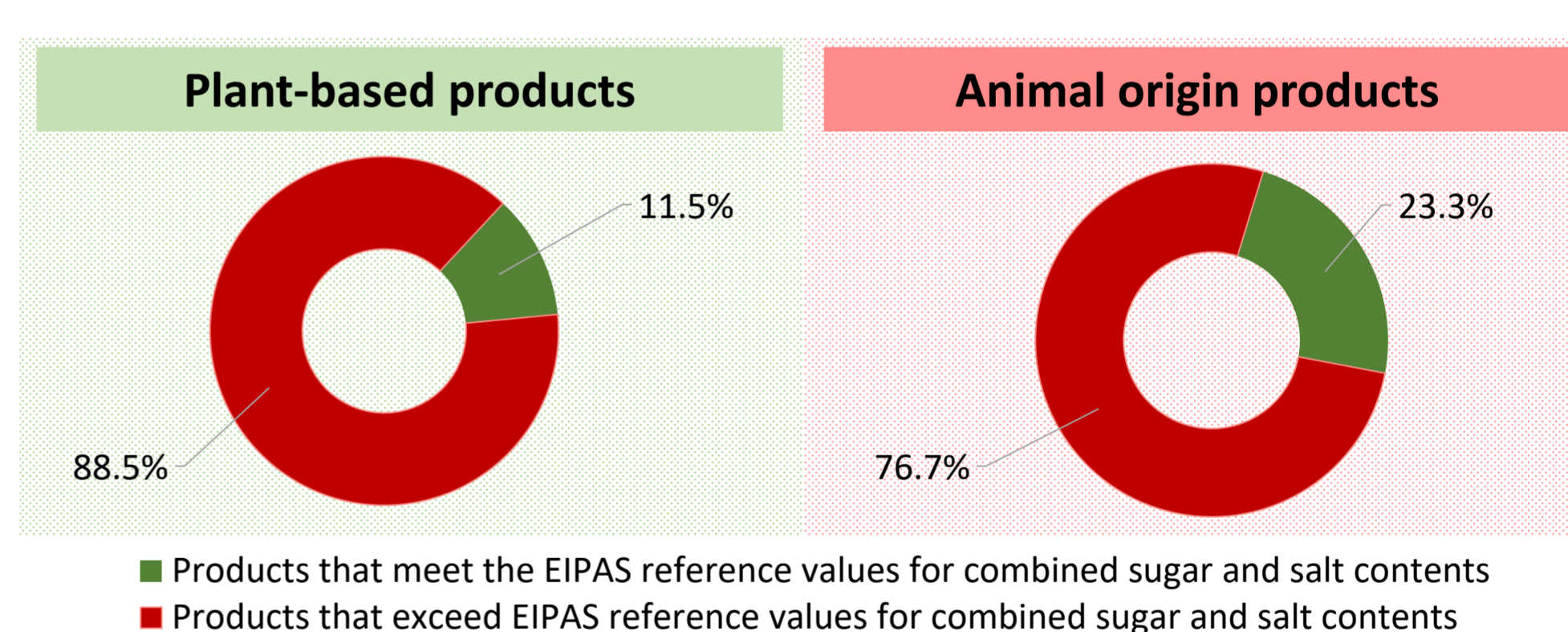


Fig. 4 – Agreement of the food categories studied with the EIPAS reference values.

Plant-based products	BurgVeg	n _{total} = 134	Fat	Saturates	Sugars	Salt
			High	3.0%	3.7%	0.0%
Medium	97.0%	28.4%	2.2%	82.8%		
Low	0.0%	67.9%	97.8%	0.8%		

Plant-based products	YogVeg	n _{total} = 100	Fat	Saturates	Sugars	Salt
			High	0.0%	19.0%	0.0%
Medium	38.0%	17.0%	72.0%	6.0%		
Low	62.0%	64.0%	28.0%	94.0%		

Fig. 5 – Distribution of plant-based products (BurVeg & YogVeg) by “High”, “Medium” and “Low” nutrient contents.

Animal origin products	Burg	n _{total} = 90	Fat	Saturates	Sugars	Salt
			High	13.3%	36.7%	0.0%
Medium	76.7%	40.0%	0.0%	74.4%		
Low	10.0%	23.3%	100%	14.4%		

Animal origin products	Yog	n _{total} = 413	Fat	Saturates	Sugars	Salt
			High	0.0%	3.9%	0.0%
Medium	22.3%	25.4%	74.6%	0.2%		
Low	77.7%	70.7%	25.4%	99.8%		

Fig. 6 – Distribution of animal origin products (Bur & Yog) by “High”, “Medium” and “Low” nutrient contents.

CONCLUSIONS: There is a wide variation in the energy density and nutrient content in all products evaluated. Plant-based burgers had lower levels of fat and saturates but higher salt content, while plant-based yogurts had higher levels of fat and saturates but lower levels of sugars compared with their animal origin counterparts. Nearly 90% of the plant-based products did not meet the EIPAS reference values for sugar and salt jointly evaluated. In this context, replacing certain food groups by plant-based alternatives does not necessarily guarantee an equivalent or improved diet. Therefore, regarding the plant-based foods it is important for consumers to make informed purchasing decisions about the nutritional content of the products and for manufacturers to improve the nutritional quality of their products.

REFERENCES: ¹Diário da República, 2.ª série – N.º 249 – 29 de dezembro de 2017. Despacho n.º 11418/2017. Available in:

² <https://alimentacaosaudavel.dgs.pt/descodificador-de-rotulos/>