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Abstracts

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and grocery-stores (n=4) in Vadodara, Gujarat, India and the labels were studied for compliance with the legislations laid down by Food Safety and Standards Authority of India (FSSAI). One hundred and fifty four packaged foods were analyzed for sodium content by AOAC 969.23 method using Flame Photometer (Model: Elico CL 361).

Results: Results revealed that 11% of the products had multiple and alternative sources of salt/sodium (common salt, rock salt, sodium-carbonate/caseinate/molybdate, monosodium glutamate) in ingredients list, making them high in sodium content. Ready-to-cook/eat products had the highest percentage (4.4%) of products listing multiple sources of salt followed by snacks (2.9%), wheat and oats based products (1%), bakery products (0.9%), confectionery (0.5%), food adjuncts (0.3%), milk based products (0.1%). When MSG (a source of sodium) and salt were considered together, ready to cook/eat products were found to have highest percentage (4.5%) of Salt+MSG. Four percent of the products had multiple sources of MSG (namely, hydrolyzed-vegetable protein/corn solids, yeast extract, etc). Multiple MSG sources were highest in ready-to-cook/eat products (2.1%) followed by wheat and oats based products (1%), snacks (0.6%) and food adjuncts (0.2%). Ingredient claims like "no added salt" and "No MSG" were not substantiated by any of the product's ingredients list. Products with higher analyzed values for sodium than those reported on the label were found to have multiple/alternate sources of sodium in the ingredients list.

Conclusions: There is lack of accuracy and reliability in reporting of salt/sodium and MSG information on packaged food labels. There is a need to improve compliance with legislation for labeling of packaged foods laid down by FSSAI for improved Public Health and Nutrition outcomes.

Keywords: Salt, Sodium, Mono-sodium glutamate (MSG), Food Labeling, Packaged Foods.

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144/1273

TRANS FATTY ACIDS: AFTER 14 YEARS OF BRAZILIAN LEGISLATION ARE THE LABELING ADEQUATED?

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Background and objectives: The excessive intake of trans fatty acids (TFA) has been related to the development of cardiovascular diseases. Recent researches show the Brazilian population diet exceeds the recommendation for TFA, by high consume of processed food. According to Resolution RDC 360/2003 of the National Health Surveillance Agency/Ministry of Health, it is required the grade of TFA on labeling of packaged foods, this is a strategy for chronic diseases prevention. The World Health Organization warned of the need of less TFA consume, which culminated in the recommendation for its elimination in 2004. The result of this control will be the improvement of the health of the population. Considering the legal requirements and the consumer's right to obtain reliable information, the objective is to address aspects about TFA, emphasizing food labeling and Brazilian legislation.

Methods: SciELO and Lilacs databases were used, with the terms "trans fatty acids" and "hydrogenated fatty" alone or in conjugated with "labeling", "regulation" or "legislation". The search was from 2003 to 2017, were included original articles and excluded researchers outside Brazil or reviews, were selected 10 originals articles.

Results: Several categories of industrialized products were evaluated for the TFA content and their labeling. Among them are snacks, fast foods, pasta, cereals, dairy products, infant formulations, vegetable oils, among others. All the articles analyzed have concluded that industrialized product labels require greater scrutiny and the need to revise national legislation on the amount of TFA to be declared. The TFA content is higher in 56% of the analyzed articles compared to the declared on the label and exceeds the limit allowed by the legislation.

Conclusions: After 14 years of implementation of the legislation in Brazil, the indication of TFA on labels and their use by the industry are still inadequate. Need for revision of the legislation in the indication of the content of TFA in the label and change of the nutritional information for a percentage of the food instead of the portion in grams. Increased vigor in the regulation and monitoring of nutrition labeling will be beneficial to consumer health, thus reducing the risk of developing chronic diseases and public health expenditures.

Keywords: Trans fatty acids. Industrialized foods. Legislation. Nutritional labeling. Public healthy

144/1286

DEVELOPMENT OF NUTRITIONAL AND HEALTHY BAKERY PRODUCTS BY INCORPORATION OF QUINOA

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Background and objectives: Today, nutrition is located as part of the prevention or reduction of certain diseases. The ob-

taining and characterizing new ingredients with high technological potential, high nutritional value and bioactive compounds, opens up a promising field of competitiveness to the food industry with which to be able to establish itself in the food market. Consumption of whole grain or wholemeal can play an important physiological role in maintaining general well-being and health, not only because of its fibre content but also because it contains numerous bioactive components. Quinoa grains (Chenopodium quinoa) are characterized by a high concentration of proteins with excellent amino acid profile in addition to a high content of minerals, vitamins, unsaturated fatty acids and antioxidants. The objective of this research has been to develop new bakery products by replacing flour with whole quinoa flour from Bolivia (white, red and black varieties), to evaluate its functionality as a bakery ingredient.

Methods: The nutritional, technological and sensorial quality of the developed products was determined in terms of moisture, starch, proteins, dietary fibre, ash, polyphenols, colour parameters and sensorial analysis.

Results: The incorporation of quinoa increased significantly the content of dietary fibre (soluble and insoluble), proteins, lipids and minerals. The colour of the crust and crumb was significantly modified with quinoa variety in comparison to control sample. Polyphenolic profile by HPLC showed the presence of more polyphenol classes in quinoa flours than in wheat flour. Their inclusion produced breads with increased polyphenol content and DPPH radical scavenging activity always in levels significantly higher compared to the control. The sensory analysis indicated that the substitution of 25% of flour for quinoa did not significantly affect the overall acceptability of bread, with slightly better scored products with quinoa than control sample.

Conclusions: Whole quinoa flour could be a good replacement for wheat flour in bread formulations, increasing the product's nutritional value and bioactive compounds with only a small depreciation in bread quality at 25g/100 g of flour substitution. The inclusion of quinoa flours had a positive effect on the technological and sensory value of the bread products, and therefore its inclusion is recommended.

Keywords: quinoa, bakery products, dietary fibre, polyphenols, minerals

Further collaborators:

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144/1287

REDUCTION OF SODIUM CONTENT, INCREASE OF DIETARY FIBER AND YEAST, AND NUTRITIONAL INFORMATION: DO THEY AFFECT THE ACCEPTABILITY OF OPTIMIZED BREAD REGARDING CONSUMERS IN BUENOS AIRES, ARGENTINA?

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Background and objectives: A reduction in salt (NaCl) intake and an increase in fiber promote the prevention of cardiovascular diseases. In Argentina, the daily salt intake is higher and dietary fiber is lower than the recommendations. Bread is one of the main sources of sodium in the diet and can carry dietary fiber. Variations in the addition of salt and fiber in the formulation of bread may require changes in amount of yeast. The nutritional information or label may influence its acceptability.

The objectives of this study have been: develop healthful optimized bread and evaluate its sensory acceptability blind and with label.

Methods: The optimized bread was successfully made: 35% less of NaCl added, 50% more of yeast and 75% more of fiber than white bread (in a previous study 15 prototypes had been evaluated using response surface methodology).

112 students and educational and non-educational staff of Facultad de Medicina, Odontología, Farmacia y Bioquímica, and Veterinaria of Universidad Buenos Aires tested it in two stages: blind and with label. Consumers evaluated appearance, smell, texture (crumb's elasticity), taste; and overall acceptance according to a 10-point scale (I=dislike extremely and 10=like extremely). An interval of 7 days was allowed between stages. Participants also answered: willingness to consume and day time in which they would consume it.

Results: The optimized bread was successfully developed. Participants were mainly students (92.8%), 82% female and median age 22 years (RI: 6).

The acceptability average values for attributes and overall acceptance were very good (all above 7). No differences were observed among the age groups. The average scores of willingness to consume were also very good (7 for blind stage, 7.3 with label), no differences between stages. Breakfast (29.7%), lunch (23.3%) and in-between meals (19%) were the most preferable moment to consume it. Cheese was most chosen for being consumed with the bread in-between meals.

Conclusions: It was possible to develop an optimized bakery that obtained good values of acceptability in the evaluation stages. This bread would appear to be an adequate strategy to increase the amount of dietary choices to prevent cardiovascular diseases.

Keywords: acceptability test – sodium reduction – dietary fiber – bread – optimization

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Reference

Title: Development of nutritional and healthy bakery products by incorporation of quinoa

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Background and Objectives: The objective of this research has been to develop new bakery products by replacing flour with whole quinoa flour from Bolivia (white, red and black varieties), to evaluate its functionality as a bakery ingredient.

Methods: The nutritional, technological and sensorial quality of the products developed was determined in terms of moisture, starch, proteins, dietary fibre (soluble and insoluble), ash, polyphenols, colour parameters and sensorial analysis.

Results: The incorporation of quinoa increased significantly the content of dietary fibre (soluble and insoluble), proteins, lipids and minerals. The colour of the crust and crumb was significantly modified with quinoa in comparison to control sample. Polyphenolic profile by HPLC showed the presence of more polyphenol classes in quinoa flours than in wheat flour. Their inclusion produced breads with increased polyphenol content and DPPH radical scavenging activity always in levels significantly higher compared to the control. The sensory analysis indicated that the substitution of 25% of flour for quinoa did not significantly affect the overall acceptability of bread, with slightly better scored products with white quinoa than control sample.

Parameter [1]	FLOUR				BREAD			
	Wheat	White Quinoa	Red Quinoa	Black Quinoa	100% Wheat	25% White Quinoa	25% Red Quinoa	25% Black Quinoa
Moisture, % [3]	11.39±0.03bc	11.49±0.08c	10.29±0.08a	11.24±0.08b	36.60±0.02b	38.6±0.1c	35.62±0.17a	38.50±0.01c
Ash, % [2]	0.41±0.19a	2.37±0.02b	2.32±0.04b	2.50±0.03b	1.04±0.08a	1.50±0.01b	1.51 ±0.06b	1.61 ±0.01b
Soluble fibre, % [3]	1.1±0.1a	3.4±0.2c	3.9±0.7c	2.3±0.4b	1.07±0.05a	2.13±0.03a	2.7±0.7a	1.6±0.7a
Insoluble fibre, % [3]	3.9±0.8a	11.3±0.2b	13.9±0.7bc	17.4±2.3c	4.8±0.7a	6.38±0.01a	6.9±0.7ab	9.1±0.7b
Total fibre, % [3]	5.1±0.8a	14.6±0.3b	17.8±1.5bc	19.7±2.3c	5.9±0.7a	8.51±0.01ab	9.6±1.5b	10.66±0.01b
Starch, % [3]	82±2b	70±4a	67±3a	67±3a	88.2±0.3b	83.7±0.5a	84.8±0.2a	84.2±1.0a
Proteins, % [3]	13.3±0.2a	13.0±1.1a	12.8±1.0a	13.5±0.2a	12.6±0.3a	13.2±2.5b	14.67±0.2b	14.4±0.2b
Lipids, % [3]	2.12±0.07a	7.1±0.1bc	6.87±0.05bc	6.17±0.02b	0.7±0.1a	1.49±0.07b	1.6±0.1c	1.63±0.05c
*L**	89.9±1.8d	85.6±1.8c	73.82±0.01b	69.7±0.8a	69.1±2.2b	64.2±2.2b	50.8±2.0a	46.3±1.0a
*a**	-1.7±0.1a	-1.5±0.2a	2.1±0.0c	0.9±0.1b	-1.6±0.1a	-1.3±0.1a	4.6±0.4c	2.9±0.2b
*b**	10.1±0.3a	13.1±0.8c	12.6±0.0c	11.4±0.2b	14.9±1.3ab	17.5±2.1b	15.5±0.3b	12.2±0.2a

[1]Mean ± SD. Values followed by the same letter in the same column are not significantly different at 95% confidence level; [2]d.b Dry basis; [3]w.b Wet basis

Conclusions: Whole quinoa flour could be a good replacement for wheat flour in bread formulations, increasing the product's nutritional value in terms of nutrients and bioactive compounds with only a small depreciation in bread quality at 25g/100 g of flour substitution. The inclusion of quinoa flours had a positive effect on the technological and sensory value of the bread products, and therefore its inclusion is recommended.

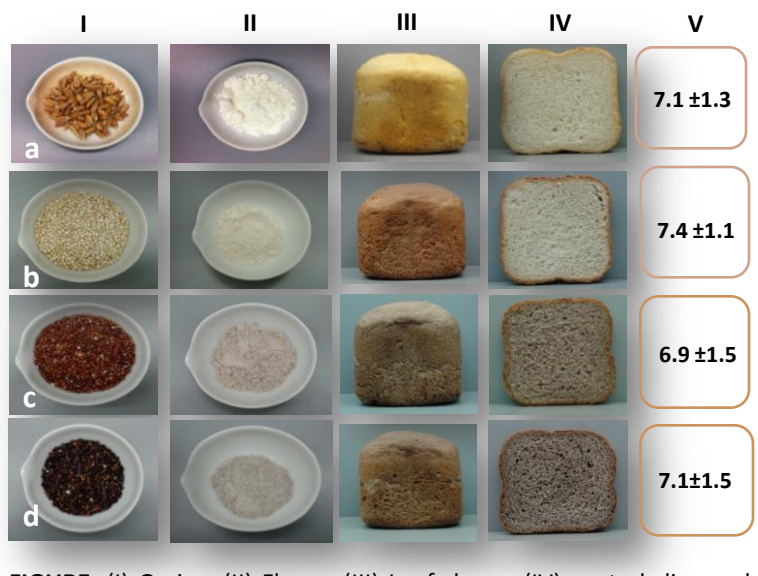

FIGURE. (I) Grains; (II) Flours; (III) Loaf shape; (IV) central slice and crumb structure, and (V) score on the hedonic scale. (a) Refined wheat; (b) Write quinoa; (c) Read quinoa; (d) Black quinoa.

Keywords: quinoa, bakery products, dietary fibre, polyphenols, minerals.

Conflict of Interest: The author has declared that no competing interests exist.

Further Collaborators: This work was financially supported by grants AGL2016-75687-C2-1-R from the Ministry of Economy, Industry and Competitiveness.