

A comparison of the cost and nutritional composition of gluten-free and gluten-containing products available on the Irish market



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Introduction & Aims

Abbreviations: GF, gluten-free; GC, gluten-containing.

Gluten-related disorders, such as coeliac disease, are characterised by intolerance to gluten, a protein found in wheat, rye, barley, oats, spelt, Kamut, and their hybridised strains. Gluten-related disorders are increasing at national and international levels, with an estimated global prevalence of 5%¹. Medical nutritional management is through the careful elimination of foods that contain gluten². Previous studies have highlighted cost and nutritional discrepancies between gluten-free (GF) and gluten-containing (GC) foods³⁻⁶. However, no similar study has been published in Ireland to date. This study aimed to compare the cost and nutritional composition of GF and GC products on the Irish market. The objectives were 1) to collect a representative sample of GF and similar GC products, 2) to compare the cost between GF and GC products, 3) to compare the nutritional composition, including reported iron and B vitamins fortification, between GF and GC products.

Methodology

Procedure

- An observational comparative approach was taken.
- Comprehensive data collection was carried out between August 2023 and January 2024 using the online databases of the four leading Irish supermarkets.
- For each GF product, two similar GC products were selected: a popular GC product and a low-cost option.
- Cost and nutritional information (energy, protein, carbohydrate, sugar, fat, saturated fat, fibre, and salt) were recorded per 100g product. Information regarding reported iron and B-vitamins fortification was also collected as Yes/No.
- Products were organised into categories and subcategories.

Statistical analysis

- Statistical analysis was carried out using IBM SPSS Version 29 at a significance level of *0.05*.
- Independent samples t-tests were carried out to compare means between GF and GC products across the following dependent variables: cost, energy, protein, carbohydrate, sugar, fibre, fat, saturated fat, and salt.
- Chi-square tests for association were carried out to check for associations between gluten status and food fortification, i.e., iron and B vitamins.
- Clustered bar charts were created to visually compare the mean content of fibre, sugar, fat, saturated fat and salt in each category against the national labelling cut-off ranges set by the Food Safety Authority of Ireland (FSAI)⁷ and the Irish Heart Foundation⁸.

Results

A total of 442 (34.2%) unique GF and 850 (65.8%) unique GC products were collected.

Table 1: Descriptive characteristics of the sample.

Categories (n=11)	GC n (%)	GF n (%)	Total n (%)
Total	850 (65.8)	442 (34.2)	1292 (100)
Bread	150 (11.6)	82 (6.3)	232 (18)
Biscuits	60 (4.6)	30 (2.3)	90 (7.0)
Breakfast Cereals	60	30 (2.3)	90 (7.0)
Pasta	38 (2.9)	19 (1.5)	57 (4.4)
Baking Ingredients & Flours	48 (3.7)	25 (1.9)	73 (5.7)
Dessert	58 (4.5)	30 (2.3)	88 (6.8)
Meat & Meat Products	88 (6.8)	44 (3.4)	132 (10.2)
Snacks	112 (4.6)	56 (4.3)	168 (13.0)
Snack Bars	98 (7.6)	49 (3.8)	147 (11.4)
Cooking Sauces	72 (5.6)	44 (3.4)	116 (9.0)
Condiments	66 (5.1)	33 (2.6)	99 (7.7)

Values are total count (percentage). Percentages represent the proportion of the total products in each category. GC, gluten-containing; GF, gluten-free.

- GF products were 54.1% more expensive than GC products.
- GF bread was significantly higher in fibre ($p<0.001$) and fat ($p<0.001$).
- GC pasta was significantly higher in fibre ($p=0.012$) and sugar ($p<0.001$).
- GF snack bars contained more saturated fat ($p<0.001$), whereas GF cooking sauces contained less saturated fat ($p=0.002$).
- No significant differences in salt content were found between GF and GC products.
- In total, 40.0% and 41.2% of GC products were fortified with iron and B vitamins, respectively, compared to 1.4% and 3.2% of GF products ($p<0.001$).

Scan the following QR codes to view the results tables for cost, nutritional composition, and fortification between GF and GC products.



1.Cost



2.Nutritional composition



3.Fortification

Results

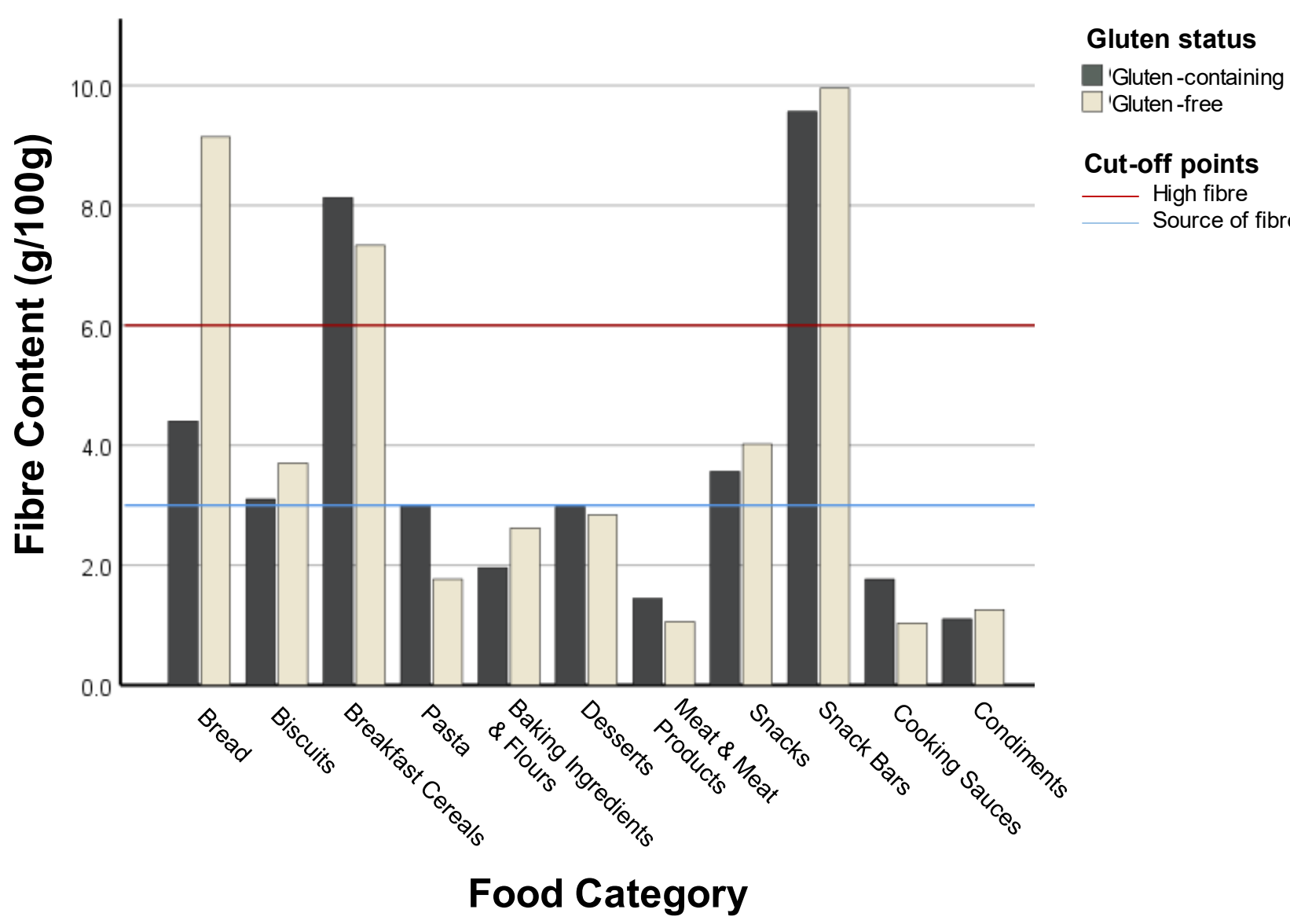


Figure 1: Comparison of mean GF and mean GC fibre content per category with the national labelling cut-offs for 'High fibre' ($>6\text{g}/100\text{g}$) and 'Source of fibre' ($>3\text{g}/100\text{g}$)⁷.

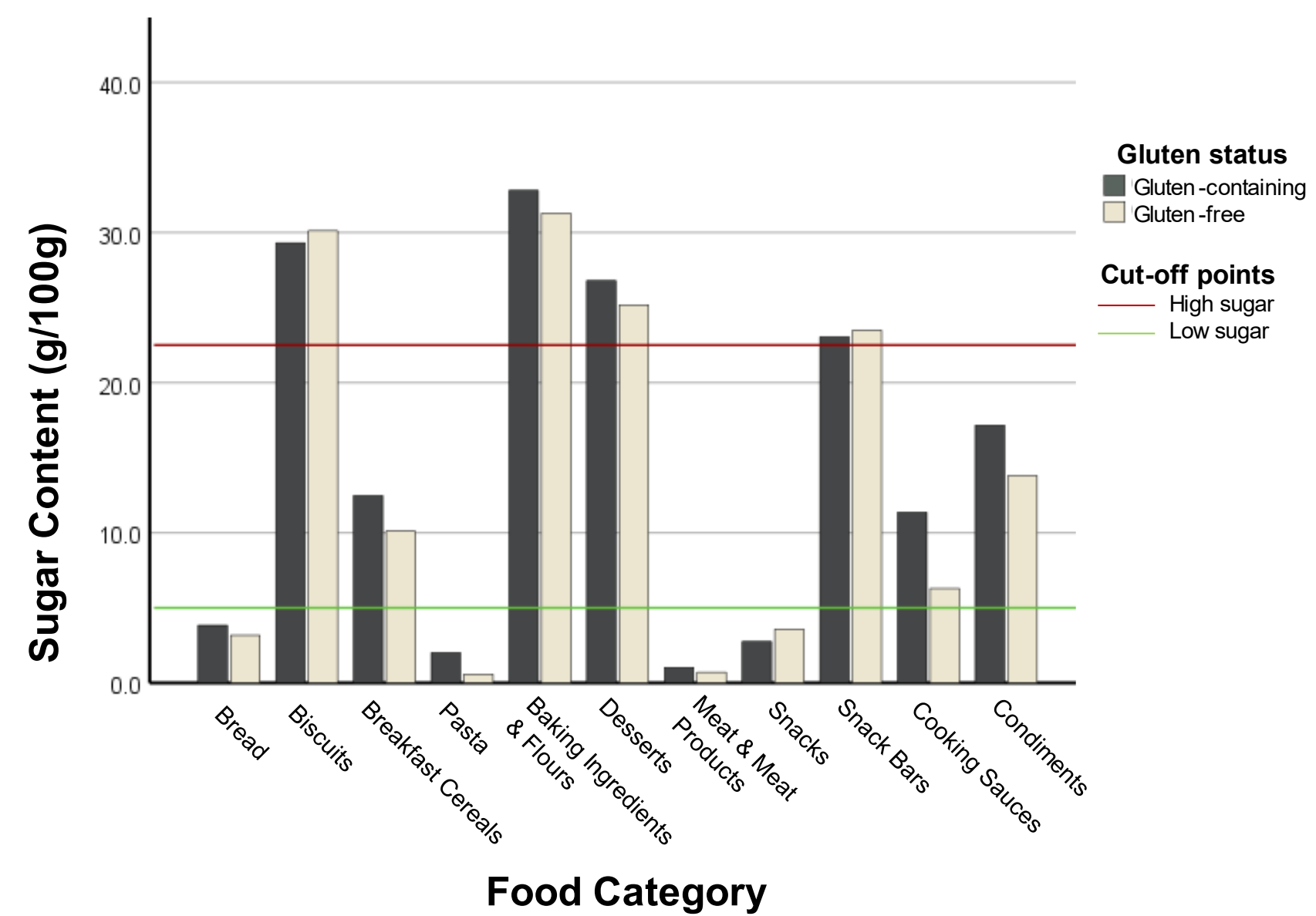


Figure 2: Comparison of mean GF and mean GC sugar content per category with the national labelling cut-offs for 'High sugar' ($>22.5\text{g}/100\text{g}$) and 'Low sugar' ($\leq 5\text{g}/100\text{g}$)⁷⁻⁸.

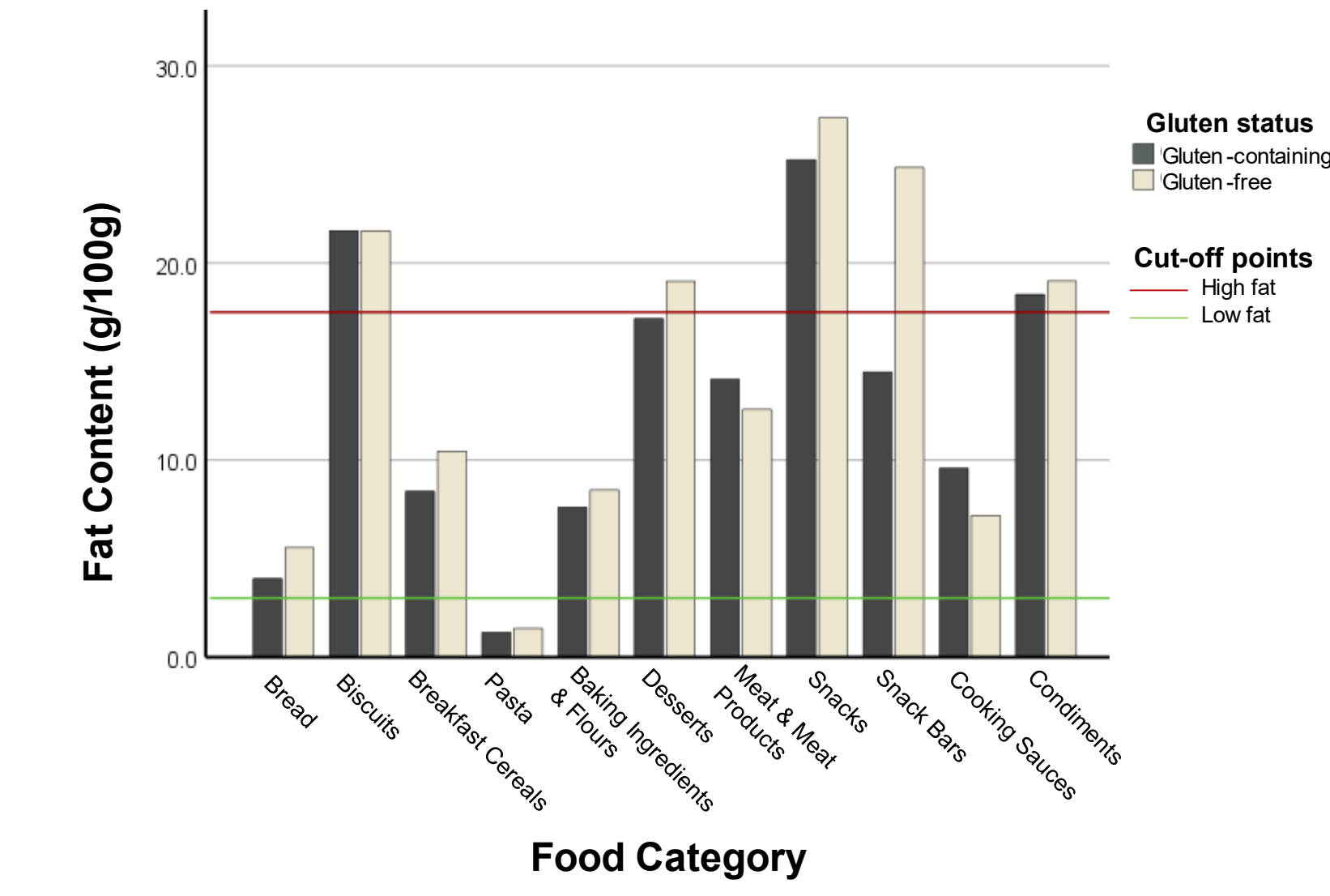


Figure 3: Comparison of mean GF and mean GC fat content per category with the national labelling cut-offs for 'High fat' ($>17.5\text{g}/100\text{g}$) and 'Low fat' ($\leq 3\text{g}/100\text{g}$)⁷⁻⁸.

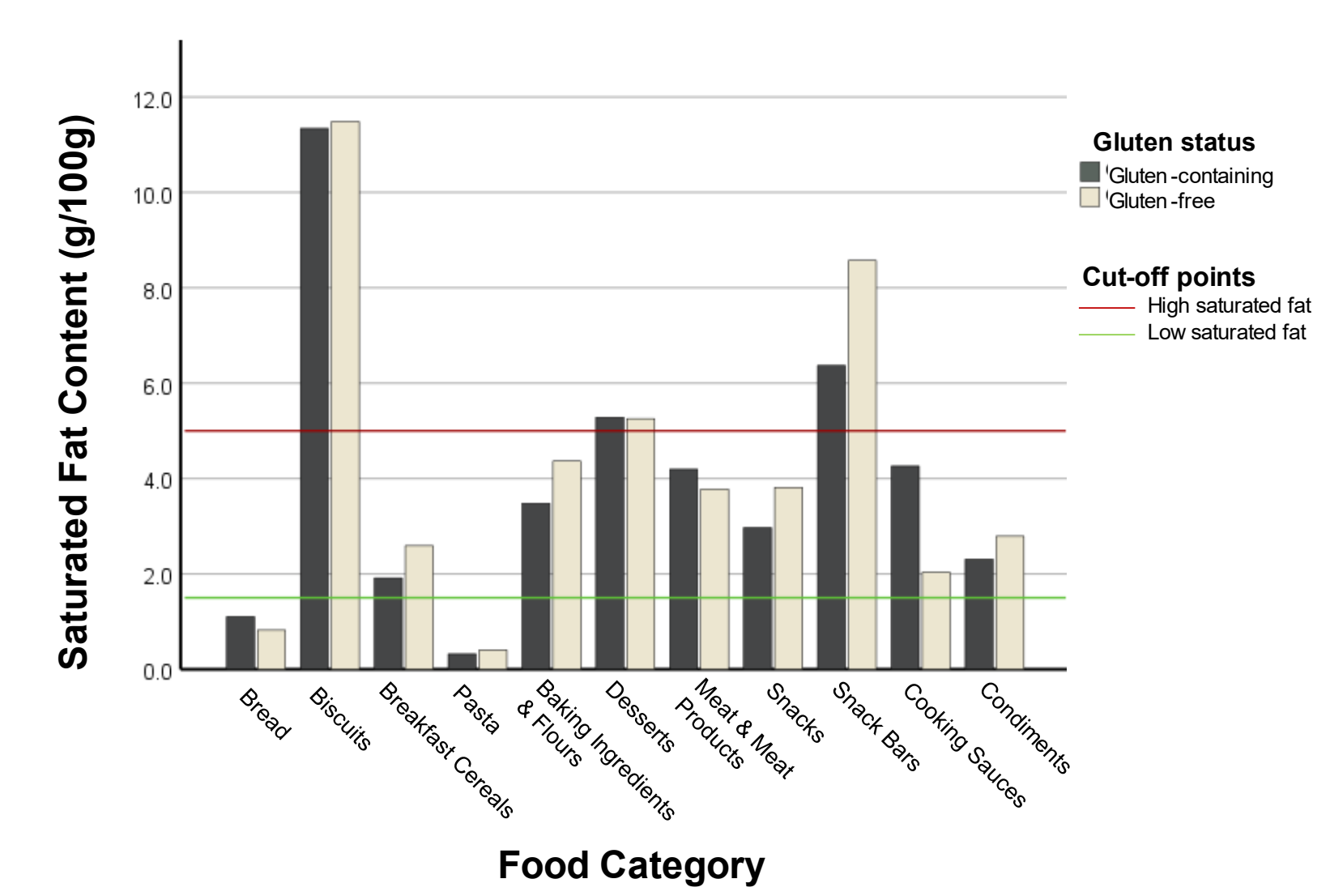


Figure 4: Comparison of mean GF and mean GC saturated fat content per category with the national labelling cut-offs for 'High saturated fat' ($>5\text{g}/100\text{g}$) and 'Low saturated fat' ($\leq 1.5\text{g}/100\text{g}$)⁷⁻⁸.

Conclusion

GF food is more expensive than GC food, largely attributed to manufacturing costs. In Ireland, there is little financial support for those who must follow a GF diet for medical reasons. There is nutritional variety between GF and GC products across food categories. Typically, little fortification of GF products takes place. Overall, nutritional content and fortification are influenced by manufacturer decisions on product ingredients. For people who must follow a GF diet, the cost is a significant drawback. Nutritionally, those who follow a GF diet are only at a disadvantage regarding iron and B vitamin fortification. Government or manufacturing strategies could alleviate these difficulties for those who must follow a GF diet.

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