#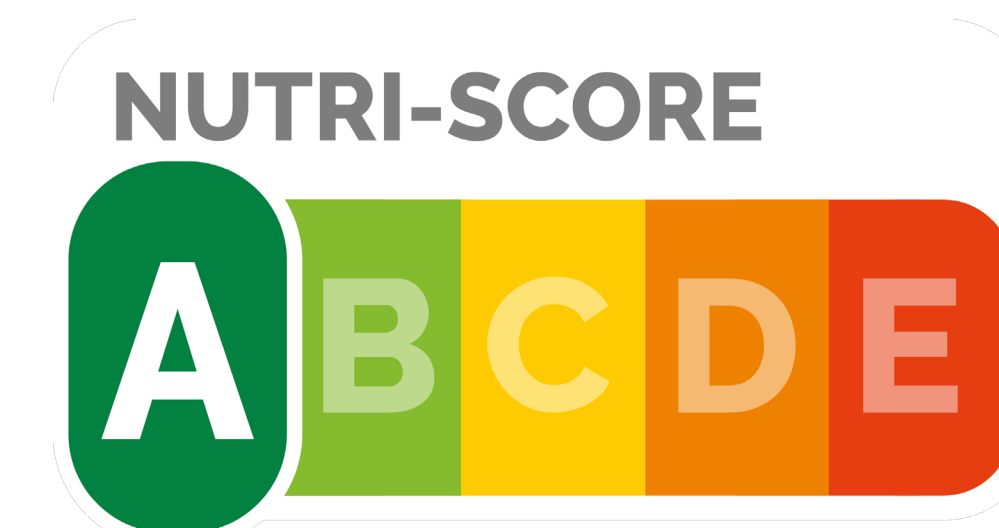 Enhancing Nutri-Score's discrimination between whole grain and refined grain products – insights from the NewTools project

NUTRI-SCORE
A B C D E

ANNA AMBERNTSSON[1], MARI MOHN PAULSEN[1], MARTA ANGELA BIANCHI[2], BRYNDÍS EVA BIRGISDÓTTIR[3], ANJA PIA BILTOFT-JENSEN[4], DINA MOXNESS KONGLEVOLL[5], ANNE LISE BRANTSÆTER[1], KAJA LUND-IVERSEN[1], LENE FROST ANDERSEN[5], MARIANNE HOPE ABEL[1]

[1] Norwegian Institute of Public Health, [2] RISE Research Institutes of Sweden, [3] University of Iceland, [4] Technical University of Denmark, [5] University of Oslo

Objective

The nutrient profiling system Nutri-Score does not perform well in discriminating between whole grain and refined grain products. This study aimed to propose and evaluate revisions to the Nutri-Score algorithm to improve its ability to discriminate between whole grain and refined grain rice, pasta, and flour, and thereby improve its alignment with the Nordic Nutrition Recommendations.

Methods

Food items in the Norwegian database Tradesolution (n=26,610) were classified using the Nutri-Score 2022 algorithm for general foods. A penalty for low fibre content in high carbohydrate foods was tested. A cut-off to define high carbohydrate foods was determined using histograms, and the penalty was calibrated to shift refined grain products to a less favourable Nutri-Score.

Figure 1. Total carbohydrate content (including fibre) in rice (N=90), pasta (N=375), flour (N=269) and bread (N=1,200). Dotted red line indicate 40 g total carbohydrates per 100 g.

Results

Most rice, pasta, flour, and bread had a total carbohydrate content (including fibre) ≥40 g per 100 g (Figure 1), making it a suitable threshold for defining high carbohydrate foods. In total, 4,110 products in the database met this criterion, of which 1,655 were rice, pasta, flour, and bread.

When integrating the revised fibre scale for high carbohydrate foods, 669 (3%) of all products obtained a new and less favourable (higher) Nutri-Score, of which 388 were rice, pasta, flour, and bread (Table 1). While most whole grain products remained at Nutri-Score A, refined grain products were reclassified from Nutri-Score A to B or C.
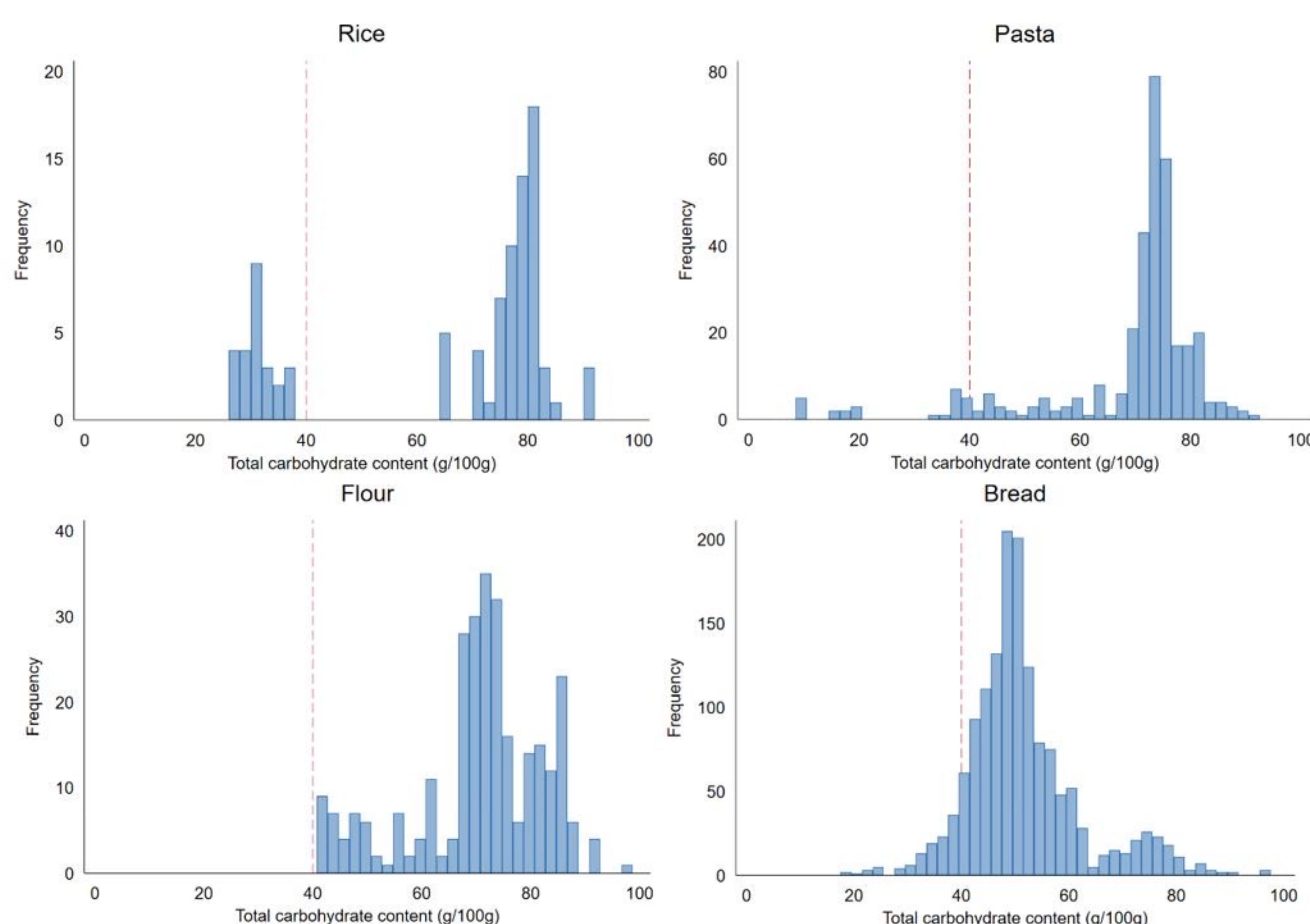
Other food categories obtaining a new and less favourable Nutri-Score were snacks and desserts (N=122), biscuits and cakes (N=35), and jam (N=51). Fresh fruits, vegetables, and potatoes have a carbohydrate content <40 g per 100 g and remained unaffected by the proposed revision.

Conclusion

The proposed revision significantly improved Nutri-Score's ability to discriminate between whole grain and refined grain products, thereby aligning more closely with the Nordic Nutrition Recommendations.

Food group	N	Nutri-Score (%) Current algorithm						Nutri-Score (%) Proposed revision					
		NS	A	B	C	D	E	NS	A	B	C	D	E
Refined pasta	284	1.9	50	29	11	6	4	2.6	8	41	40	7	4
Whole grain pasta	40	1.1	92	8	0	0	0	1.3	85	5	10	0	0
Refined flour	179	2.2	51	10	18	15	6	2.6	27	22	29	12	10
Whole grain flour	87	1.1	95	2	3	0	0	1.1	93	2	5	0	0
Refined rice	54	2.3	0	80	4	16	0	3.2	0	0	84	16	0
Whole grain rice	5	1.6	40	60	0	0	0	2.6	20	0	80	0	0
Refined bread	806	2.7	11	19	59	10	1	2.8	10	16	62	11	1
Whole grain bread	200	1.5	63	26	7	4	0	1.5	63	26	7	4	0

Table 1. Distribution (%) of the target food groups with ≥40 g total carbohydrates per 100 g (N=1,655) in the current and proposed revision for fibres and mean current and modified Nutri-Score.

NS, Mean Nutri-Score (A=1, B=2, C=3, D=4, and E=5)

NewTools
For sustainable food systems

NIPH

Corresponding author:
Anna.Amberntsson@fhi.no