Nutrient content in three common types of Norwegian bread – a comparison between analysed and calculated food composition data

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Background

Bread is an important part of the Norwegian diet, supplying about 20 % of the energy intake among adults 16-79 years old, about 20 % of the dietary folate intake, 30 % of iron and thiamine and about 40 % of the intake of dietary fibre (Norkost II 1997). There are no standard recipes or names for bread, each bakery makes and quite often changes their own varieties. Thus it is a great challenge to have updated analytical nutrient values for bread in the Norwegian Food Composition Table.

Aim

To compare values for macronutrients, dietary fibre, iron, thiamine and folate obtained by laboratory analysis and recipe calculation for three common types of Norwegian bread (types A-C).

Methods

Eighteen loaves of bread of each type (Table 1) were sampled from a commercial bakery and combined into six composite samples of either type to be analysed for contents of macronutrients, vitamins and minerals. All ingredients were sampled at the same time and analysed. The analytical work was performed according to standard procedures at the Institute of Nutrition under the Directorate of Fisheries in Bergen. Weight of all ingredients was obtained for each batch, and each loaf of bread was weighed before and after baking and cooling to room temperature. The recipe calculations were based on the mean weight loss for each type of bread and the analysed values for all ingredients.

Table 1: Types of flour used for baking

Bread type	Sifted wheat[1]	Wholemeal wheat[1]	Sifted rye[1]	Wholemeal rye[1]
A	100	0	0	0
B	50	33	17	0
C	52	13	10	25

[1]Percentage of total flour

Results

During baking 11-14 % of the dough weight evaporated. The coefficient of variation (CV) was within 15 % for the nutrient content of the analysed loaves, except for iron in bread A and C (CV 19 %) and fat in bread B and C (16-18 %).

The calculated values for protein, fat, available carbohydrates, dietary fibre and iron were within or close to the range of analytical values in most instances. However, for bread type B the calculated value for iron was 25 % lower than the lowest analytical value, whereas the calculated value for fat was 18 % higher than the highest analytical value (Table 2). We have no explanation for these discrepancies other than by chance. The calculated values for thiamine and folate were higher than the analytical ranges, but when an estimated loss of 20 % during baking was deducted for these heat labile vitamins, all calculated values were within or close to the analytical ranges (Table 2).

Table 2: Calculated and analysed contents of fat, iron, thiamine and folate in 100g of three different types of bread

Bread type	Fat g	Iron mg	Thiamine mg	Folate µg
A				
Analysed, mean	2.3	1.4	0.23	23
Range	2.0-2.5	1.1-1.8	0.19-0.25	21-26
Calculated, 14% WL	2.6	1.1	0.29 (0.23)[1]	24 (20)[1]
B				
Analysed, mean	1.8	2.3	0.29	24
Range	1.3-2.2	2.1-2.5	0.26-0.31	22-28
Calculated, 12% WL	2.6	1.6	0.33 (0.26)[1]	41 (33)[1]
C				
Analysed, mean	2.6	2.0	0.27	25
Range	1.9-3.1	1.6-2.6	0.23-0.34	25-27
Calculated, 11% WL	2.8	1.5	0.31 (0.25)[1]	33 (26)[1]

WL, water loss
[1]Deducted 20% loss during baking

Conclusion

The nutrient content of bread may be calculated from ingredients provided the recipe and nutrient value of all ingredients are known, and appropriate vitamin losses are deducted. More studies are needed to establish the loss of folate during baking.

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