



HEALTHGRAIN
- FORUM

Whole grain, definition
and recommendations for consumption

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Content

Introduction

HEALTHGRAIN Whole Grain Definition

Dietary recommendations

- ❑ For whole grain - based on food epidemiology studies
- ❑ For whole grain – including its contribution to fibre intake

Whole grain foods - intake in practice

Conclusions

Whole grain: endosperm+bran+germ

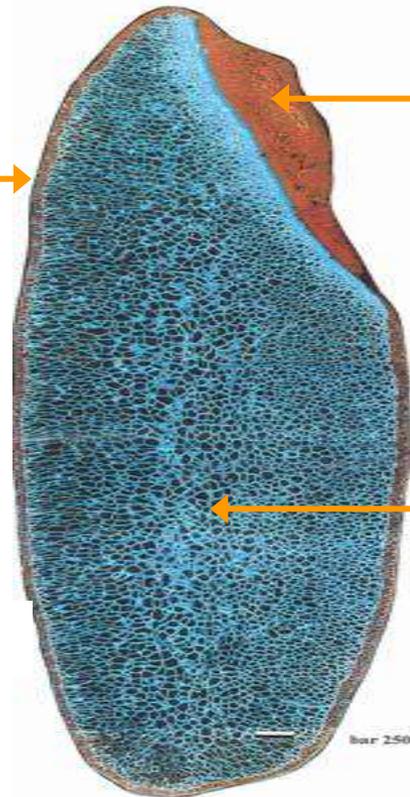
- White bread/ yellow pasta – flour mainly from endosperm
- Wholemeal (or wholegrain) bread/pasta – flour from entire kernel
- Wholemeal vs. white flour. Fibre/other bioactive compounds - levels 2.5 - 5

Bran

(12-17%)

- Dietary fibre,
- B vitamins,
- trace minerals,
- phytochemicals (e,g anti-oxidants)

The wheat kernel



Germ (~ 3%)

- Germ oil
- Antioxidants,
- vitamin E,
- B vitamins

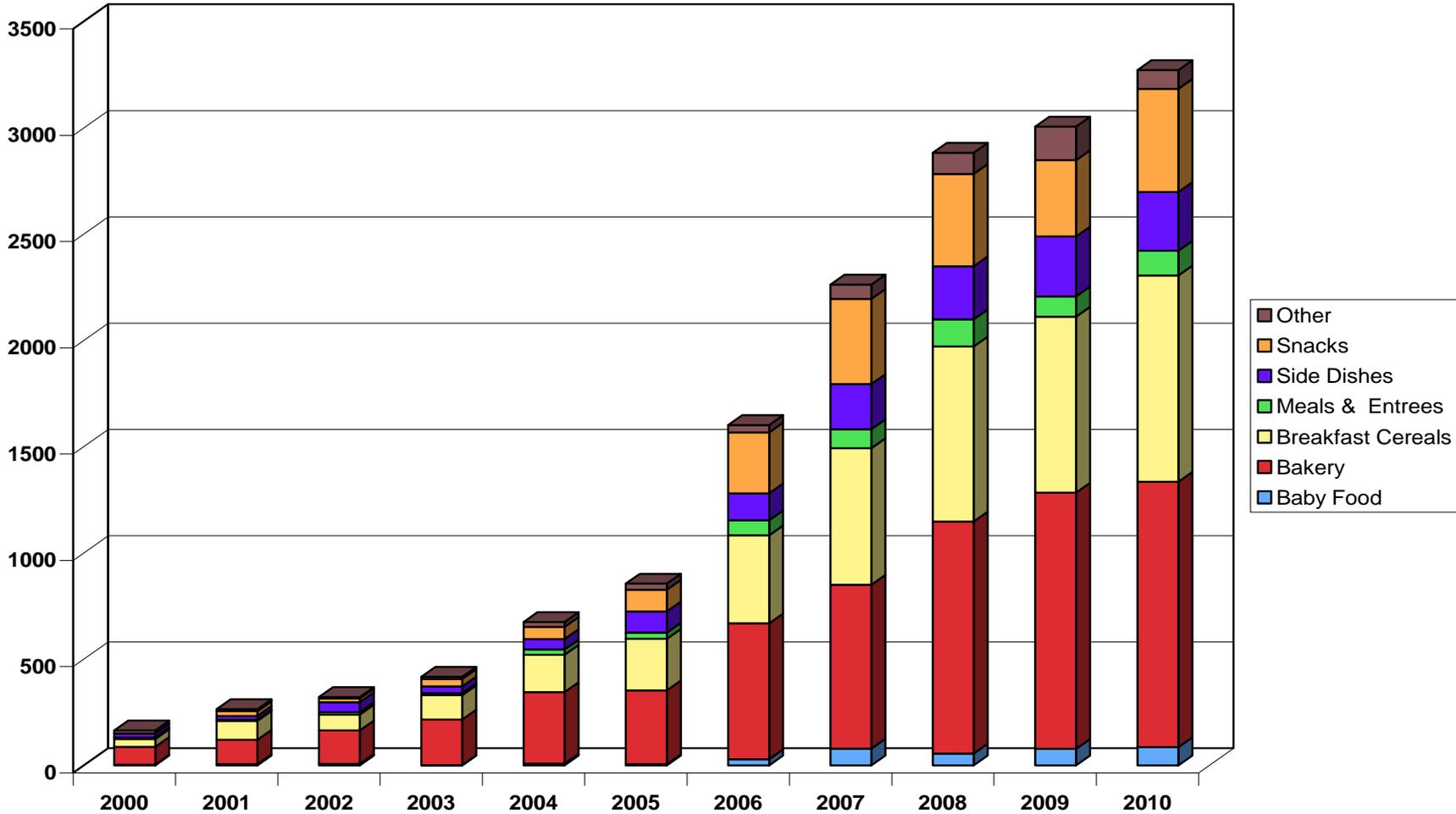
Endosperm (80-85%)

- Starch,
- Protein
- (dietary fibre, vitamins)



Global new food & drink launches with “whole grain” claim by product category (from 2000 to 2010)

Launches



The need for a Whole Grain Definition

- ❑ Growing consumption of whole grain foods, also in countries without whole grain tradition. Next to bread also pasta, biscuits, breakfast cereals
- ❑ Whole grain / whole meal not defined in most countries – or short definition:
”Whole grain foods include the entire germ, endosperm and bran. Grains subjected to processing such as milling are also included.”
- ❑ Actions at national levels for more complete definitions (e.g. UK, Denmark) **including list of grains included and processes allowed.**
- ❑ **HEALTHGRAIN Consortium (2008) : Need for one definition in Europe**
- ❑ Expected to be useful in the context of **nutrition guidelines, recommendations and nutrition claims**

Whole Grain Definition

Developed by the HEALTHGRAIN Consortium

- ❑ *Whole grains shall consist of the intact, ground, cracked or flaked kernel after the removal of inedible parts such as the hull and husk. The principal anatomical components - the starchy endosperm, germ and bran - are present in the same relative proportions as they exist in the intact kernel.*
- ❑ *Small losses of components - i.e. less than 2% of the grain/10% of the bran - that occur through processing methods consistent with safety and quality are allowed.*

The definition is

- ❑ covering current industrial practices – modern and traditional
- ❑ Text similar to USA/FDA definition (USA does not include 2nd part)

The definition document describes:

- List of cereal grains included in the definition
- Milling and processing aspects

See also www.healthgrain.org/regulatory_issues/whole_grain

Production of whole meal (= whole grain) flour

Current industrial practices

- ❑ > 90% of flour are produced by 'modern milling':
Breaking of kernels → separation into **milling streams**:
white flour, germ, (various fractions) bran
- ❑ **Recombination**: fixed ratio's of **milling streams**:
 - **germ** (*often after heat treatment/ inactivation of 'rancidity promoting enzymes'*),
 - **white flour** and
 - **bran**
- ❑ Germ, bran and white flour may originate from different batches (and cultivars), but should be of one species (e.g. wheat, or rye).
- ❑ **Modern milling contributes to constant quality at low costs**
(composition, processability)

Notes:

- ❑ **Health benefits shown in food epidemiology research of whole grain foods = whole grain foods produced by modern milling**



HEALTHGRAIN < 10% of flour made by stone grinding: no separation of fractions
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Whole Grain Definition

Milling and processing

- ❑ The adding together, after temporary separation, of the three whole grain constituents as separate ingredients, in the correct proportion at both the milling and baking stages, is consistent with longstanding food industry technological and safety practices
- ❑ *Production of those flours and products must follow appropriate quality systems (e.g. Good Manufacturing Processes, GMP etc.) in compliance with food safety regulations in the European Union.*

Whole grain intake – National recommendations

Approximate range: 3 - 7 servings (serving~slice of bread)

Countries	National recommendations for the “bread, cereals, starchy food” category	National recommendations for whole grains and whole grain foods
France [www.mangerbouger.fr/]	3 portions /day (one at each meal)	Prefer cereals in whole grain form
Great Britain [www.eatwell.gov.uk]	3 portions /day (one at each meal)	Prefer cereals in whole grain form
Switzerland [www.sge-ssn.ch]	3 portions /day (one at each meal)	When possible 2 of which in whole grain form
The Netherlands [www.voedingscentrum.nl]	For bread: 5-7 slices	Preferably whole grain
Denmark, Sweden [www.food.dtu.dk] [www.slv.se]		The equivalent of 75g whole grains per 10MJ (2,400 kcal) equivalent to 62g for a reference 2,000 kcal diet
The United States [www.health.gov/dietaryguidelines/] [www.mypyramid.gov]	6 ounce-equivalent serving of cereals for a 2,000kcal diet per day	At least half of cereal intake to be consumed in whole grain form, equivalent to at least 3 ounce-equivalent servings of whole grain foods per day for individuals over 9 years. <i>“Make half your grains whole”</i>
Australia [www.nhmrc.gov.au]	<i>“Eat plenty of cereals”</i> , For women 4-9 servings For men 6-12 servings	Prefer cereals in whole grain form
Canada [www.hc-sc.gc.ca]	6 to 8 servings per day	Of which half in whole grain form



Non-western recommendations

- Chinese Dietary Guidelines and Pagoda
“Consume a diversified range of foods, with grains - both coarse and fine - as the base. Daily consumption of total grains, cereals, legume around 250 - 400 gram, among them around 50-100g are coarse and wholegrain”
Chinese Nutrition Society 2005
- The Healthy Diet Pyramid for Adults - Singapore
“You should consume 2-3 servings of whole grain foods daily (equivalent to about 50g of whole grains)”.
National Dietary Guidelines for Singapore 2009
- Nutrition recommendations for the general population - Mexico
*“Consumption of cereals should be recommended, **preferably whole grains** or their derivatives and starchy roots. Their fibre and energy content should be highlighted”*.
Mexican Health Ministry 2004



Recommendations by disease associations

- ❑ American Diabetes Association (ADA) - 2008
The ADA Nutrition Recommendations and Interventions for Diabetes recommend an increase in whole grain intakes as a strategy to both prevent and manage diabetes
- ❑ American Cancer Society (ACS) - Kushi et al 2006
*The ACS Nutrition and Physical Activity Guidelines for both primary prevention and tertiary treatment of cancer include “**choose whole grains in preference to refined grains**, and choose whole grain rice, bread, pasta, and cereals*
- ❑ American Heart Association (AHA) – Lichtenstein 2006
Choose Whole-Grain, High-Fiber Foods
Dietary patterns that are high in whole-grain products and fiber have been associated with increased diet quality. (...) The AHA recommends that at least half of grain intake come from whole grains



Danish Whole Grain Campaign

many recommendations

25 partners so far...



Recommendations - overview

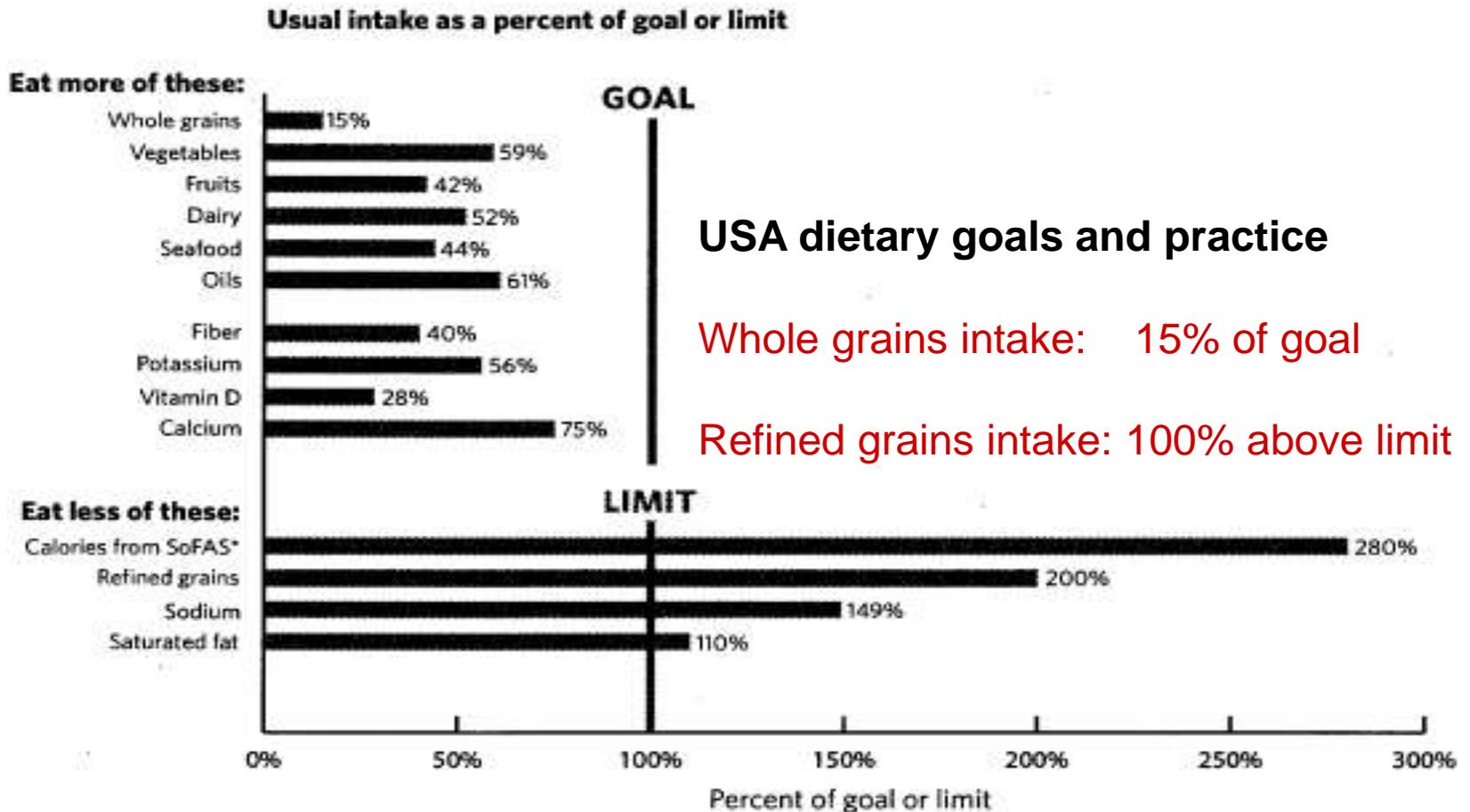
48 g whole grain /day correspond with 3 servings of whole grain foods

- ❑ 3 servings show consistently beneficial effects in food epidemiology studies (Seal and Brownlee, 2010, de Munter et al., 2007)
- ❑ 3 servings – **3 ~ 30g slices of bread with ~55 – 60 % whole grain**
→ 48g whole grain

Denmark: 62 - 75 g WG/day (Fuldkorn report 2008)

Netherlands: ~ 120 g WG/day (5 – 7 slices of whole grain bread)
Linked to national recommendation for fibre intake
www.voedingscentrum.nl

FIGURE 5-1. How Do Typical American Diets Compare to Recommended Intake Levels or Limits?



USA dietary goals and practice

Whole grains intake: 15% of goal

Refined grains intake: 100% above limit

*SoFAS = solid fats and added sugars.

Note: Bars show average intakes for all individuals (ages 1 or 2 years or older, depending on the data source) as a percent of the recommended intake level or limit. Recommended intakes for food groups and limits for refined grains and solid fats and added sugars are based on amounts in the USDA 2000-calorie food pattern. Recommended intakes for fiber, potassium, vitamin D, and calcium are based on the highest AI or RDA for ages 14 to 70 years. Limits for sodium are based on the UL and for

saturated fat on 10% of calories. The protein foods group is not shown here because, on average, intake is close to recommended levels.

Based on data from: U.S. Department of Agriculture, Agricultural Research Service and U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. What We Eat in America, NHANES 2001-2004 or 2005-2006.



Whole grain (WG) - actual intake information

Intake far below recommendations

Country	Actual whole grain intake vs. national recommendations
Denmark	6% consume the recommended 75g/day (Fuldkorn report 2008) Average WG intake 32g/day - mainly rye bread
Finland	Bread consumption 42 kg p.p.p.year Average WG bread intake 33g/ day 45% WGbread 55 % white bread
Netherlands	Bread consumption ~58 kg p.p.p.year → WGbread intake ~45 - 50g (NBC, 2010) (~30% white incl. small breads; ~20% WG, 50% mixed)
Germany	Kids (2 -18): 20 – 33 g/day WG – Downward trend (Alexy et al. 2010) Wholemeal bread: 10% of bread market (GfK consumer panel)
Great Britain	1/3 of adults never eat whole grain (Thane et al. 2007)
USA	95% below national recommendation (USDA, 2010) However, the situation is improving (whole grain campaign) (Lipson, 2009)
Southern Europe	Low WG intake WG pasta and bread introduced Breakfast cereals and biscuits with more WG introduced



Recommended dietary fibre intakes for adults linked to whole grain foods

Body	Intake g/day g/MJ		Dietary Fibre Intake – and conditions
WHO 2003	> 25		Total dietary fibre from wholegrain cereals, fruit and vegetables,
Health Council (NL) 2006	32-45	3.4	DF via a mixed diet: products not enriched with isolated and purified DF. There is evidence to suggest that the use of whole-grain products and fibre from fruit, in particular, leads to a lower risk of coronary heart disease.
EFSA (2010)	25g or more		<p>- 25 g DF: adequate for normal laxation</p> <p>➤ 25g: Evidence of benefit to health: diets rich in fibre-containing foods at DF intakes >25 g per day. e.g. reduced risk of coronary heart disease and T-2 diabetes and improved weight maintenance.</p> <p><i>Such evidence should be considered when developing food-based dietary guidelines</i></p>



Required intake of whole grain foods resulting from guidelines for fibre

- ❑ Recommended fibre intake 35 g/day
- ❑ % fibre intake from whole grain: 33%
- ❑ Fibre content of 1 whole grain serving (= 1 30g slice bread = **2 g DF**)
- ❑ 1/3 of 35g fibre requires 6slices of whole grain bread = 6 WG servings

CONCLUSION:

WITH A CONTRIBUTION OF 1/3 OF TOTAL FIBRE INTAKE FROM WHOLE GRAINS:

6 SERVINGS OF WHOLE GRAIN FOODS REQUIRED FOR CONTRIBUTING TO RECOMMENDED INTAKE OF DIETARY FIBRE

The currently often recommended 3 servings (48g) whole grain foods is in fact too modest

Recommendations vs actual intake of whole grain

Factors influencing the gap

1. Tradition of 'white' products
2. ****Taste and texture***
3. Costs (wholemeal flour more expensive than white)
4. ****Nutrition and health Information***
5. ****Mindset (how to change?)***
6. ****Availability (more products, higher levels in products)***

****HEALTHGRAIN Forum activities and their spin-off***

The HEALTHGRAIN Forum From science to action!



Summary – take home messages

HEALTHGRAIN whole grain definition:

- ❑ Whole grain defined including traditional and current modern production practices
- ❑ Describing WG as it is in the great majority of products (with health benefits indicated in observational studies)

Nutrition recommendations for whole grain foods.

- ❑ Qualitative recommendations: *prefer cereals in whole grain form*
- ❑ Quantitative: range 3 - 7 servings/day (~ 50 -120 g WG raw ingredients).
- ❑ Past decade: non-western countries and disease associations started with WGF recommendations
- ❑ WG included in recommendations for fibre intake as one of the preferred foods
- ❑ 6 WGF servings required for contribution (33%) to a recommended intake of dietary fibre of 35g/ day

Actual WGF intake:

- ❑ most parts of the world << recommended intake (USA: ~1/2 serving/day)
- ❑ MULTIPLE ACTIONS REQUIRED!!

