



## DEFINITIONS FOR WHOLE GRAIN AND WHOLE GRAIN FOODS PERSPECTIVES FOR GLOBAL HARMONISATION

Jan Willem van der Kamp  
Healthgrain Forum Association

[jan-willem.vanderkamp@tno.nl](mailto:jan-willem.vanderkamp@tno.nl)

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- The HEALTHGRAIN Whole Grain definition (as raw material) and issues raised in discussions
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- Final remarks and **SOME TIME FOR DISCUSSIONS!**

# Healthgrain Forum ([www.healthgrain.org](http://www.healthgrain.org))

Founded 2010

## ➤ Aim

Promotion of science and communication for production and consumption of healthy cereal foods, as a follow-up of the EU HEALTHGRAIN project (2005-2010).

## ➤ Acting as the Nutrition and Health Task Force associated with ICC

Supported (e.g. administration, website) by ICC Office

## ➤ Based in Europe - with members and links worldwide

48 Members from 19 countries; 29 academia/institutes, 19 companies

## ➤ HEALTHGRAIN Definition of 'whole grain' (2010)– increasingly accepted

## ➤ Healthgrain Forum definition of whole grain foods, published June 2017

## ➤ Membership

Academia/ institutes and small companies: modest fees

Major industries – larger fees

Members include Barilla, Kellogg's, Mondelez, Nestlé, Quaker

# Wholegrain and health - state of affairs

## Dietary guidelines for grain products - worldwide:

- Based on many observational nutrition-health studies (> 100.000 consumers; followed > 20 years – diet can be correlated with health, disease and death)
- Wholegrain consumption widely recommended

## However:

- Negative news about grains and health in social media
- Decreasing sales of grain-based products in 'western' world

## What can help to reverse this trend?

- Inform and mobilize: policy makers, nutritionists, dietitians, communication experts
- Approval of Health claims– e.g. for (products with) wholegrain wheat flour
- INTERNATIONAL HARMONISATION OF DEFINITIONS OF WHOLE GRAIN CONTRIBUTES TO A STRONGER MESSAGE, LESS CONFUSION AND WILL FACILITATE THE APPROVAL OF HEALTH CLAIMS

# Whole grain definitions and discussions

**2008 – 2010** HEALTHGRAIN EU Project (with global involvement) :

- Need for comprehensive European (possibly global) definition for whole grain as raw material
- Where possible the same as other major definition(s) (e.g. AACCI)
- Including issues relevant for current practices

**2010** HEALTHGRAIN Definition. Published (**2014**) in peer-reviewed journal

**2017** Healthgrain Forum Recommendations for defining Whole grain Foods  
(Going beyond the AACCI Characterization of a WG Food (2013))

**2017** Many discussions (Europe, Brazil, ..) mostly on WG as raw material  
Culminating in the Whole Grain Summit (Vienna – November 2017)

# Global Definitions of whole grain – why?

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- Equal playing field for industry
- Unambiguous information for consumers
- Important for dietary recommendations
- Important for nutrition studies



## **VIENNA WHOLE GRAIN DECLARATION**

### **- A Call to Action for Increasing Whole Grain Intake**

from the participants of the 6<sup>th</sup> International Whole Grain Summit in Vienna 2017

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#### **KEY GOALS**

##### **1. Definitions**

Reach consensus on a global definition of a whole grain (raw materials) and on the definition of a whole grain food.

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#### **ACTION POINTS**

- Convene a global working group including key grain science groups and experts from diverse regions, to finalize a definition of whole grain (raw materials) using the Healthgrain Forum definition as a starting point.
- Follow a similar process for defining a whole grain food, once a global intake recommendation has been agreed (see below).

# HEALTHGRAIN Whole Grain Definition

Full definition, [https://www.healthgrain.org/activities/whole\\_grain](https://www.healthgrain.org/activities/whole_grain) (2010, minor update 2013)

Publication peer-reviewed journal: Food & Nutrition Research 2014, 58: 22100

## Key statements

- 1) 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. [same as AACCFDA definition, 1999. Also: same grains, incl. pseudo-cereals, listed]
- 2) 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  
[included: German and Swiss definitions (long ago), Denmark (recently).]

**Very widely accepted world-wide! Applied by flour millers**



# HEALTHGRAIN definition - Grains Included

## AACCI and Healthgrain definitions: 'closed' list

- Specified cereals (Gramineae/ Poaceae) – long list of “all” cereal grains
- 3 well-known pseudo-cereals: buckwheat, amaranth, quinoa

## UK IGD Guidance note: 'open list'

- *Cereals and related Gramineae, used for similar purposes in foods*
- *Other generally accepted pseudocereals such as amaranth, quinoa, buckwheat*

## **Proposal: 'Open'+ closed list**

- All cereals (i.e. Gramineae/Poaceae)
  - Also new ones (e.g. Tritordeum). May promote breeding innovation
- Closed list of pseudocereals: buckwheat, amaranth, quinoa
- **Anyway: no extension to pulses and other 'grains' (e.g. mustard seeds)**

# Processes allowed - 1

## AACCI and HEALTHGRAIN Definitions

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.*

## Proposal

Whole grains shall consist of the intact, ground, cracked flaked or otherwise processed kernel (....)

*Why? Creates options for more attractive whole grain products*

## Possible concerns

Processes substantially reducing levels of beneficial compounds (e.g. fibre)

(Very) long term fermentations or heat treatments?

## Processes allowed - 2

Alastair B Ross, Jan-Willem van der Kamp, Roberto King, Kim-Anne Lê, Heddie Mejbourn, Chris J Seal and Frank B. Thielecke on behalf of the Healthgrain Forum.

Perspective: A definition for whole-grain food - recommendations from the Healthgrain Forum. Adv. Nut. 2017 Jul 14;8(4):525-531

*“Based on available data, we do not see any need for restriction on the type of processing for whole grains,*

*unless the processing leads to a >10 % reduction in the dietary fiber content (as an indicator of the amount of beneficial components within the whole grain).”*

# HEALTHGRAIN Definition

## Recombination after separation (as occurs in flour milling)

- Recombination of germ, bran and white flour: allowed in- and outside flour mill

*“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 in Europe and the USA”*

### Terminology used

- Recombination – in flour mills
- Reconstitution – at final stages (e.g. bakeries, biscuit manufacturers)

Note: HEALTHGRAIN Definition aims at

- Covering all current industrial processing practices, modern and traditional  
Major observational studies (>> 100.000 consumers) associate wholegrain products convincingly with health benefits

# Recombination / Reconstitution other batches – other varieties?

## Flour millers

- Modern flour mills: **milling streams** with wide variety of batches of wheat
- Recombined whole grain originates of different batches  
due to process dynamics  
Example: germ fraction stabilized (by heat) before recombination

Bakeries doing reconstitution: whole grain always made with different varieties

Different varieties: how far can we go with reconstitution?

- Fractions of various aestivum wheat varieties (common practice – OK?)
- Reconstituting with fractions from Aestivum and Durum wheat??
- fractions from Aestivum and Spelt???

# ‘Standard ratios of bran, germ, starchy endosperm?’

“Starchy endosperm, germ and bran - are present in the same relative proportions as they exist in the intact kernel”.

Major natural variations in ratios and in levels of nutrients – example:

Fibre % in whole grain wheat cultivars - 9 – 15%

Smaller variations in practice – mixed batches of wheat

Often applied standard ratios (wheat): 82% endosperm, 15% bran, 3% germ

Example: included in Dutch certification system for whole grain wheat flour

Risks for getting whole grain flour with low levels of beneficial compounds:

- Artisan millers – milling of single cultivars
- Recombination and reconstitution – using (too) low levels of bran and germ

Should standard ratio (for each grain) be included in definition for recombined and reconstituted whole grain flours?

The HEALTHGRAIN diversity screen shows large variation in bioactive components which can be exploited by breeders

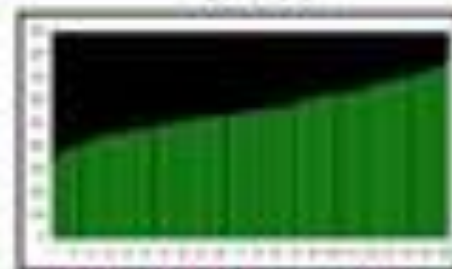
Sterols



670-959 µg/g dm

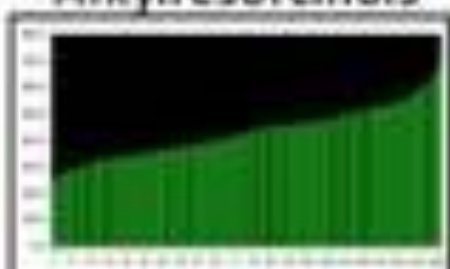
Concentration ranges of bioactive components across 150 bread wheats grown on one site

Folate



325-774 ng/g dm

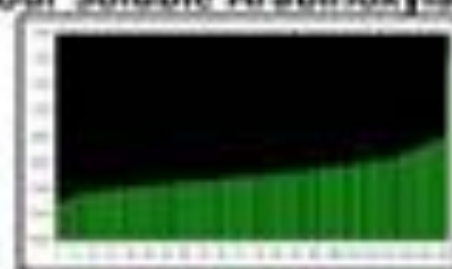
Alkylresorcinols



241-677 µg/g dm

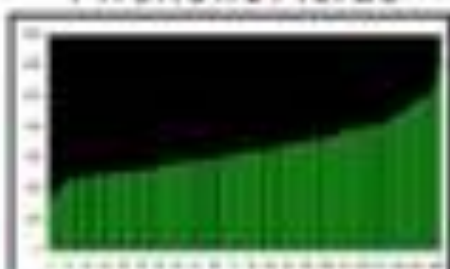


Flour Soluble Arabinoxylan



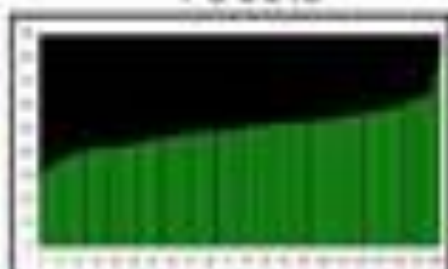
0.29-1.38%

Phenolic Acids



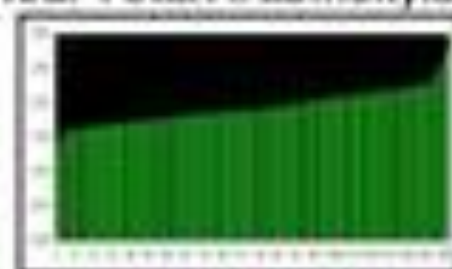
2.26-3.74%

Tocols



27-80 µg/g dm

Flour Total Arabinoxylan



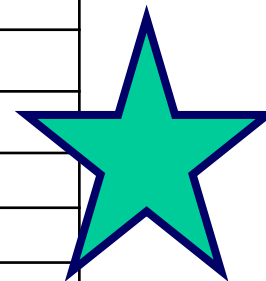
1.26-3.74%



# Quality Requirements of Whole Wheat Flour

## China standard LST 3244-2015

Content	Parameters
Exterior	Normal color, without impurity
Odors	Normal, No rancid smell, no mildew smell
Water content, %	≤13.5
Ash content (Dry basis) %	≤2.2
<b>Total dietary fiber (Dry basis) %</b>	<b>≥9.0</b>
<b>Alkylresorcinol (Dry basis) µg/g</b>	<b>≥200</b>
Fatty acid value (Dry basis	≤116), KOH mg/100g
Sand content, %	≤0.02
Magnetic metal content, g/kg	≤0.003



The aim to include whole grain flour of all individual cultivars results in **standards with low minimum levels of nutrients**

Much lower than average levels – as presented in food composition databases



# Consumer expectations

## 2 consumer-types

### Consumer a) Key issue - Levels of nutrients + naturalness

- Will be happy with HEALTHGRAIN Definition
  - Will accept recombination, reconstitution and variations in processing, since these may deliver more attractive products, provided that levels of key nutrients remain high
  - Will be happy with improved nutritional value realised by processing (e.g. long fermentations contributing to higher mineral bioavailability)

### Consumer b) Key issue - The natural concept of “*the whole grain*”

- May be most more happy with
  - Artisan milled flour, made of one batch
  - Recombined at the flour mill
    - Preferably not with too widely different varieties
- May rather accept classical processes (e.g. sourdough) than new ones

# Global working group on whole grain definitions

## **Aims:**

- Reach consensus on a global definition of a whole grain (raw materials) and on the definition of a whole grain food.

## **Deliverables:**

- Finalise in a global working group including key grain science groups and experts from diverse regions:
  - A global definition of whole grain (raw materials) using the Healthgrain definition as a starting point
  - Recommendations about the relationships between the global definition and regional/ national definition(s)
- Follow a similar process for defining a whole grain food, once a global intake recommendation for whole grain has been agreed.

# Global working group on whole grain definitions

**Next steps** - restricted to deliverable 1, (whole grain as raw material)

:

- Establish a small (< ~10) global working group of experts and a range of supporting regional groups (before April 2018)
- Collect input from all involved experts and discuss outcomes and possible changes in the global group and regional working groups (March – September 2018)
- Launch and discuss a proposal for a global definition at the AACCI 2018 Annual Meeting, London, UK (21-23 October 2018)

## Definitions – global and regional groups

Global core group	Core group and national groups
Jan Willem van der Kamp, TNO and Wageningen, Netherlands	Chair. Global and Europe group
2nd European member to be defined	Members to be selected 20 march
Laura Hansen president AACCI; General Mills	Member, global and North American Group
2nd North Am. member to be defined	Members to be selected
Dr Hayfa Salman AEGIC Grain laboratories	Member - Chair Australia group
Vucky Solah,	Member – member Australian Group all 11 members selected
Prof Fengcheng Wang Henan University of Technology	Member, Chair China group
Prof Bin Tan Academy of State Administration of Grain	Member, member China group all 7 members selected

# International harmonization of definitions – how?

- a) As EU Regulations. To be adopted as such by all member states
- b) As EU Directives. Member states can adopt Directive as such or can apply more strict conditions
- a) Other options ??

Example – the EU Directive model

Recombination / reconstitution in and outside flour mills

Global definition	National definition
Reconstitution outside flour mill Allowed	Can choose for 2 options Allowed/ not allowed
Reconstitution outside flour mill Not allowed	Cannot accept reconstitution outside the flour mill



# Final Remarks and questions

## Do we agree with

- Grains included: “all cereals + amaranth, buckwheat, quinoa
- Removal of max. 2% of the grain for quality and safety reasons

## What about

- Flexibility in processing – is “*no more loss then 10% of fibre level*” OK?
- Recombination / reconstitution in- and outside flour mills?
- Does ‘the same grain’ includes for wheat: aestivum durum and spelt?
  - Or only recombine aestivum with aestivum – or more restrictions?
- Recombination processes -recommended ratio's? (In global or national def?)
  - E.g. for wheat 82% endosperm, 15% bran, 3% germ?

## Your views about

- Structuring of the discussions
- Relationships global – national definitions; EU Directive model?
- Should global definition be very detailed? Or: details in national definitions?