

National and international definitions of “wholemeal”

WHAT DOES THE USE OF THE TERM “WHOLEMEAL”¹ REALLY MEAN? OPINIONS ABOUT IT CAN DIFFER CONSIDERABLY



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+ In the USA it is permissible to advertise “whole grain”¹ if the product contains its equivalent. Currently there is no definition valid in the EU, although a few countries, e.g. Germany, are guided by a DIN standard. In view of the increasing importance of health and wellness when advertising products, it is high time for the situation to be clarified.

Consumers of cereals and cereal products have long been familiar with the particular health value of the whole grain. Wholemeal products are generally more highly esteemed in this respect, and the term “wholemeal” has a positive connotation among consumers.

Although for a long time this point of view had an empirical basis and relied on knowledge from traditional nutritional lore, a very large number of reliable results from modern dietary science and nutritional medicine back up the importance of cereals and cereal constituents in preserving the well-being and health of the human

body and in avoiding various diseases, e.g. certain types of cancer and the consequences of the so-called metabolic syndrome (obesity, hyperlipidaemia [= excessive fat in the blood], high blood pressure and illnesses resulting from these conditions).

It is well-known that the majority of the substances in cereal grain with a beneficial health activity are located in the outer layers, especially in the aleuron (seed protein) and testa (seed coat). Thus only the whole grain and whole-grain products (wholemeal) can contain the whole of the substances reputed to have health benefits, e.g. roughage, vitamins, etc.

In this sense the “full grain principle” is synonymous with complete, which in principle means

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¹ Translator’s note: The British English word “wholemeal” is almost synonymous with the US-American English term “whole grain”, the latter being a more literal translation of the German word “Vollkorn”.

that everything contained in the grain before milling must also be contained in the whole grain (wholemeal) end product, regardless of the value to be attributed to the product. Thus “wholemeal” is a description of manufacture. Only completeness constitutes the value of “wholemeal”.

At this point it should be noted that all of the following descriptions relate to whole grain product as the result of processing in the flour mill and not to wholemeal products as produced by the bakery trades or other cereal-processing trades. In the latter case the definition can be more complex because recipes etc. are involved.

As a consequence of this research project, the major EU-sponsored HEALTHGRAIN project “Exploiting bioactivity of European cereal grains for improved nutrition and health benefits”, lasting 5 years and completed at the end of May 2010, also dealt with a definition of the term “whole grain” (wholemeal). A consortium with an international membership proposed the following suggestion: “Whole grains shall consist of the intact, ground, cracked or flaked kernel after the removal of inedible parts such as the full 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.”

It must be remembered that this is a suggested definition without any obligatory force, still less any legally binding character. However, the fact that this is the aim is apparent from a corresponding press announcement by the Healthgrain project on 5th May 2010, worded as follows: “The Healthgrain consortium of the European Union felt the need to develop a European definition of whole grain with the following scope:

- + More comprehensive than current definitions in most EU countries.
- + One definition for Europe – when possible equal to definitions outside Europe.
- + Reflecting current industrial practices.
- + Useful in the context of nutritional guidelines and nutrition claims.”

Potential beneficiaries are also mentioned: “Such definition could be used by industry, by EFSA and food inspection agencies and by organisations involved in nutritional guidelines and communication to consumers.”

This proposal, developed as an outcome of the Healthgrain project, is very similar to the definition prepared by the AACC, the American Association of Cereal Chemists: “Whole grains shall consist of the intact grain, cracked or flaked caryopsis, whose principal anatomical components – the starchy endosperm, germ and bran – are present in the same relative proportions as they exist in the intact caryopsis.”

The comments accompanying this say that: “The benefit of keeping the whole grain components in proportion is that it provides a balance of nutrients and non-nutrients (such as phytochemicals) that may work together to reduce the risk of chronic disease” (Len Marquart, AACC member, General Mills, Minneapolis).

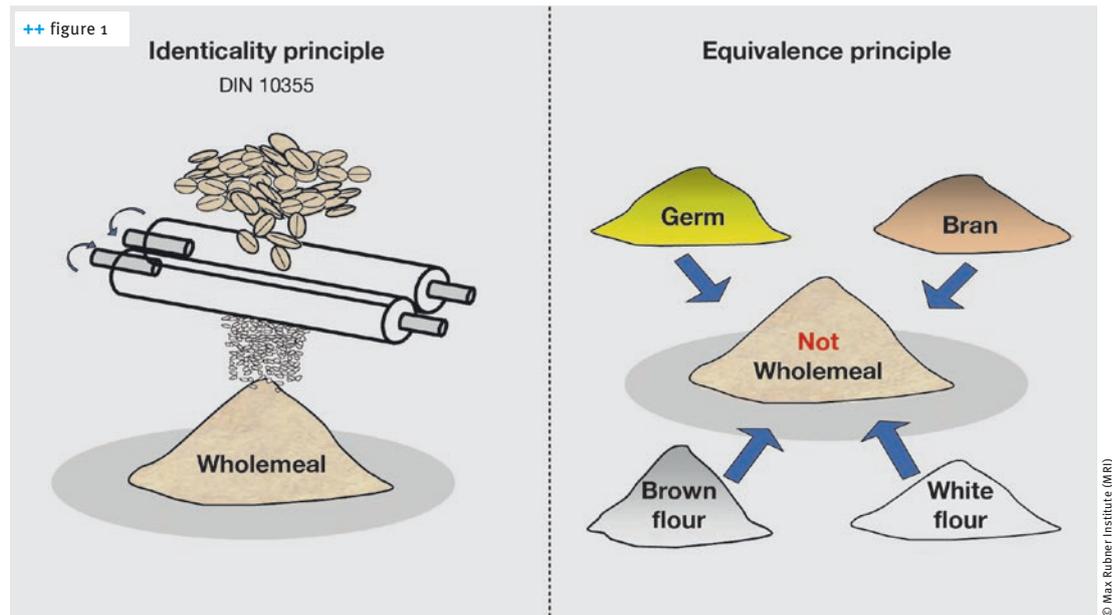
It is not difficult to infer from this comment that the constituents of the grain must be present completely and that these constituents must be present in their balanced ratios as defined by nature.

Whereas the USA and many western European countries whose representatives collaborated on the Healthgrain suggestion are not exactly well-known for wholemeal products in their diet, and have only very recently discovered the blessings of whole grain, Germany and other countries in the German-speaking regions and in Central, Eastern and Northern Europe look back on a centuries-old wholemeal tradition.

In the spirit of this tradition, Max Rubner, who could be called one of the first German nutritional scientists and who gave his name to the present-day Max Rubner Institute, published as early as 1917 the fact that “Wholemeal flour can only be flour of the kind that comprises without exception all the parts of the cleaned grain, subject only to the unavoidable losses during cleaning and milling, which will be of the order of 4 to 5 percent.” (Max Rubner: *Studies of Whole Grain 1915; Supplement to the Archiv f. Anat. u. Physiol. 1917, Physiol. Abtlg., Verlag Veit & Comp., Leipzig*, pp. 342-343).

This description already contains all the essential features of the definition of whole grain as specified in the DIN Standard 10355 currently in force in Germany for the manufacture of milled products: “Whole grain flour and whole grain meal must contain the entire constituents of the cleaned grain, including the germ. It is permissible for the outer pericarp (grain shell) to be removed from the grain before processing.”

++ figure 1
Diagrammatic representation to explain the manufacture of wholemeal products according to the identity principle and of products according to the equivalence principle



The wording in the Bread and Buns Guidelines (in the latest revised version of 19.09.2005), which are based on this DIN Standard, says that: “Wholemeal cereal products such as wholemeal flour and whole grain meal contain the entire constituents of the cleaned grains, including the germ. However, the outer pericarp (grain shell) can be removed from the grains before processing.”

Because of its importance in the area of the quality testing of bakery products, the opinion of the German Agricultural Society (DLG) will be stated at this point. According to the DLG Test Specifications 2009 (DLG-Verlag, Frankfurt, 1st Edition, July 2008), “Whole grain is faultless, sound, properly cleaned cereal grain; it contains the entire constituents of the cleaned grains including the germ. The pericarp can be removed from the grain before processing. Peeled (deglumed) barley and oat kernels also count as whole grain”.

All these German definitions of the “whole grain principle” have in common the idea of completeness, according to which the final wholemeal product must also contain everything that was contained in the grain before milling, regardless of the value attributed to the product. Thus “whole grain” (wholemeal) is a description of manufacture based on the principle of batch

identity and sameness as explained diagrammatically in figure 1.

A basic total cereal entity fed into the milling process after the so-called black and white cleaning produces various ground fractions that are recombined after the grinding process, thus yielding the wholemeal product. This method of manufacture is what is meant by DIN 10355, and it corresponds exactly to the consumer’s concept, according to which whole grain and wholemeal products enjoy the highest reputation, which should not be exposed to any doubt whatsoever either.

However, one exception to this idea of completeness should be mentioned: for reasons of food safety and consumer protection, outer layers of the pericarp are unavoidably removed during the essential cleaning steps, which should be permissible to the extent of 2-3.5% of the entire grain. A very large proportion of the impurities and unwanted substances, (e.g. dust, certain heavy metals, etc.) adhering to or contained in the outer husk layers of the cereal grain can be removed in this way. The whole grain product becomes decisively safer. However, the 2% grain fraction or 10% bran fraction losses tolerated in the EU Healthgrain proposal are not regarded as sufficient in the sense of food safety. Some German products manufactured by particular mill-

ing processes could no longer be described as whole grain (wholemeal) products at this limiting value.

The components whose loss is permissible (cf. the Health-grain proposal) also refer to fractions from the exterior of the pericarp, not any of the other components from the remainder of the grain.

If one looks at Austria and Switzerland, one finds here again the concept of batch identity and sameness. Thus the Ordinance by the Swiss Federal Department of the Interior (EDI) concerning Cereals, Legumes/Pulses, Vegetable Proteins and their Products of 23.11.2005 contains the wording: "Wholemeal flour: Flour obtained from the whole cereal grain with or without the outermost portion of the pericarp; the total yield must amount to at least 98 percent by mass of the entire cereal grain."

This description contains the narrow interpretation of the allowed loss, which is not specified exactly in the Austrian definition: "Milling products manufactured by crushing (bruising) the input to the grinding process and which accordingly have a substance composition identical to or approximately identical to the unprocessed input to the grinding process are described as wholemeals (whole grain meals)." (Austrian Foodstuffs Manual, IVth Edition, Codex Chapter B 20/Milling and Husking Products; published together with Decree BMG-75210/0013-III/B7/2009 of 18.02.2010).

The Identity Principle (see figure 1) presupposes that a whole grain milling batch enters at the start of the comminution process and leaves again in a recombined form at the end of this process. Of course the initial batch can consist of various different sub-fractions in order to satisfy the requirements for the processing quality of a flour. This is normal flourmill practice, e.g. by intentionally blending wheat fractions with distinct levels of baking quality. Of course the required duty of care regarding the demands of foodstuffs law in the selection of the individual fractions to manufacture the wholemeal product is necessary at this point.

The Equivalence Principle (see figure 1) starts from the idea that various selected ground fractions milled from different initial batches can be combined together in relative amounts such that the product ultimately formed contains morphological and constituent components in similar proportions that would occur naturally in the intact grain in a way that is typical of the cereal species.

Thus this procedure involves combining wholemeal products. This option has its convinced proponents, who put forward both commercial and qualitative viewpoints as arguments. At the same time, however, various factual circumstances are suppressed: the intact cereal grain possesses a natural profile of metabolites in which the inter-relationship of the entirety of the constituents that impart nutritional physiological value, and not the concentration of individual metabolites, is the real decisive factor. This viewpoint is gaining increasing importance against the background of dietary physiological and nutritional medical knowledge, which shows that the totality of the constituents, not the individual components on their own, is what makes up the health value of whole grain (products) (keyword: Metabolom). The admixture or blending of the constituent components of the cereal grain in accordance with relative proportions cannot satisfy these demands, especially as it would also be necessary to define the boundary ranges within which particular grain fractions would need to vary in order still to be able to give the whole product the name "whole grain". In fact the constituent substances and morphological components vary depending on the cereal species, variety, cultivation conditions or grain form. With hundreds of varieties in Germany, not to mention Europe or the whole world, it is simply impossible to define limits from this value to that within which the segment is allowed to vary. This calamity does not arise of the identity principle if adhered to. It is to be recommended in the context of the clarity and truthfulness of labelling, so as to prevent from the outset any suggestion of the impression of non-transparency arising among consumers or consumer protectionists. The consequence of the latter would be an even greater reduction in the consumption of whole grain products, which it is essential to avoid in the context of public health.

If adherence to the principle of milling based on identity can be relied on, regulatory definitions (see above) and national analytical monitoring are rendered largely superfluous. The equivalence principle is really what invites monitoring analyses, which are entirely possible with modern methods to detect specific constituents of the individual grain constituents, but will be time-intensive and above all cost-intensive.

To avoid giving the impression that products based on the equivalence principle are not marketable: that is obviously not true. They merely need a correct trade description, and one cannot claim that they have been manufactured as wholemeal in accordance with DIN 10355. +++