

Definition of whole grain – background information

Introduction

Increased consumption of wholegrain is recommended in nutrition guidelines in many countries as part of a healthy diet, due to the content of dietary fibre and nutrients. The accumulating evidence for additional benefits of whole grain have resulted in approval of health claims on wholegrain and heart health in the USA and within the voluntary Codes for Health Claims operated in Sweden and UK. In the past decade consumption of wholegrain products is growing, also in countries without a whole grain tradition. Therefore the HEALTHGRAIN consortium has developed a comprehensive definition of whole grain, that may serve as a uniform definition for Europe and abroad.

The AACC Intl. Definition and subsequent developments in the USA

The AACC Intl. definition published 29 December 1999 reads as follows:

"Whole grains shall consist of the intact, ground, 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."

On 17 February 2006 FDA published Draft Guidance on Whole Grain Label Statements in which the AACC Intl. definition was adopted. The following cereal grains were included: Amaranth, barley, buckwheat, bulgur, corn (including popcorn), millet, quinoa, rice, rye, oats, sorghum, teff, triticale, wheat, and wild rice. Soybeans and chickpeas were explicitly excluded. Pearled barley was also excluded since the process involves removal of some of the bran layer. AACC Intl. responded to the FDA Draft Guidance (April 17, 2006) and argued that the wholegrain definition should make allowance for small losses of components that occur through traditional processing methods (www.aaccnet.org/definitions/pdfs/AACCIntlWholeGrainComments.pdf). Thus AACC Intl. suggested that minimally-processed bulgur wheat and nixtimalized corn, as well as lightly pearled barley and grano (lightly pearled wheat) should be included, and some additional cereals were put on the list.

Definitions in the UK and Swedish Codes

In connection with introduction of the wholegrain/heart health claim in 2002, the UK Joint Health Claims Initiative defined whole grain as containing bran, germ and endosperm in the same relative proportion as the naturally occurring grain. "The major cereal grains" wheat, rice, maize and oats were included. In 2003/2004, the Swedish Code introduced its wholegrain/risk of (coronary) heart disease claim and defined wholegrain as cereals where all components contained in the grain seed, along with the seed shell, of wheat, oats, barley and rye are included.

Other relevant background statements

In November 2004, the New Zealand Food Safety Authority expressed the view that milled grain should be excluded and supported the following definition: "Wholegrain means the intact grain or the dehulled, ground, cracked or flaked grain where the constituents – endosperm, germ and bran – are present in such proportions that represent the typical ratio of those fractions occurring in the whole cereal". However, the following "Editorial note" was added: "The term wholegrain does not allow for milling, and does not include wholemeal. The term "wholegrain" may only be used when the wholegrain particles are discernable/visible. When wholegrain is ground, the ingredient should be described as ground wholegrain or wholegrain flour or a similar qualifying term".

Analytical methods - compliance markers

In the abovementioned comments to the FDA (April 17, 2006) "AACC Intl. supports the use of dietary fibre as a marker for wholegrain content as this is the only practical compliance marker available at this time". However, the limitations of this marker were highlighted, due to variability of the dietary fibre content between and within cereals, and the fact that dietary fibre can easily be added to foods.

Alkylresorcinols (AR), compounds present in the intermediate testa bran layer in cereal grains are suitable markers of whole grain, notwithstanding varying levels in different varieties (see below). Some parties consider AR analysis is as too complicated for a routine analysis. This may change, due to the development in HEALTHGRAIN of NIR analysis of a number of whole grain compounds, including AR.

Chen Y, Ross AB, Aman P, Kamal-Eldin A. Alkylresorcinols as markers of whole grain wheat and rye in cereal products. J Agric Food Chem. 2004 Dec 29;52(26):8242-6. (...) The AR content in cereal foods commonly consumed in Sweden varied widely, from non-detectable levels in white wheat flour and products not containing the outer parts of wheat and/or rye to >900 microg/g in some whole grain rye products. AR content in cereal foods was calculated from their recipes using average AR values for the cereal ingredients determined in this study. As there was a good correlation between calculated and analyzed AR levels in cereal foods ($R^2 = 0.91$), it is possible to estimate the proportion of whole grain wheat and/or rye in a given cereal product on the basis of AR content and C17:0/C21:0 ratio. ARs appear to be good markers of whole grain wheat and rye in foods, and their analysis may be an objective way to identify foods rich in whole grain wheat and/or rye or bran thereof.