



Understanding Wholemeal and Wholegrain

There tends to be confusion surrounding 'wholemeal' and 'wholegrain' products, which have often been referred to as one in the same.

The Australia New Zealand Food Standards Code [Standard 2.1.1](#) - Cereals and Cereal Products provides the following relevant definitions:

- **Flours or meals** means the products of grinding or milling of cereals, legumes or other seeds.
- **Wholegrain** means the intact grain or the dehulled, ground, milled, 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, and includes wholemeal.
- **Wholemeal** means the product containing all the milled constituents of the grain in such proportions that it represents the typical ratio of those fractions occurring in the whole cereal.

In short, both wholemeal and wholegrain products contain all the constituents of the whole grain, but these particles can be presented in varying sizes and forms.

Bioavailability of nutrients

While wholemeal/wholegrain breads contain more fibre than traditional white bread, some nutritional tables will have you believe they also contain more vitamins and minerals. But what may be found consequent to chemical analysis, and therefore be represented on packaging, can be very different to what is able to be absorbed by the human body.

Interestingly, when bio-availability is taken into account, the outcomes are counter-intuitive: White breads typically contain more available protein, more available energy and more available nutrients than their wholemeal or wholegrain counterparts.

This is because 12-15% of wholemeal and wholegrain flour is **bran**, which is mostly indigestible fibre. Much of this fibre is tested as being high in protein, but this protein is not nutritionally available to us. When indigestible fibre is included as part of wholemeal and wholegrain products, it effectively 'dilutes' the available amount of protein, carbohydrates, vitamins and minerals. Of interest, when bran is fermented in our gut, some compounds form that actually restrict the availability of key nutrients contained in the grain such as iron and calcium, but this is partially offset by the beneficial effects of a healthier biome.

Also within wholemeal and wholegrain flour is the embryo of the seed. Thus circa 2% of the grain is **wheat germ**. Nutritionally, this is both healthy and able to be digested.

The rest of the flour – 82-85% – is made up of the seed's **endosperm** and the **aleurone layer**, both of which serve as the natural food store for the next generation of the plant.

The **endosperm** contains a wide variety of storage proteins and carbohydrates, most of which are digestible.

The **aleurone** layer, which is located between the branny outer layers of the grain and the endosperm, contains a spread of essential vitamins and minerals.

Wholemeal and wholegrain flours contain the entire aleurone layer, and well-milled white flours contain a high proportion of it.

The nutrients contained in the aleurone layer can only become biologically available to us as humans after the fibrous cell walls have been digested. This process, called enzymic digestion, takes time, and takes longer than the human digestive system allows. As a result, these vitamins and minerals are biologically unavailable to us and mostly pass through the body. For these nutrients to be available or capable of being absorbed by the human gut, the fibrous cell walls need to be pre-digested before we consume it as food, using 'extended fermentation.'

What it means

1. Well-milled white bread contains more bioavailable protein, energy and nutrients than wholemeal and wholegrain varieties.

In my experience, having worked in the Flour industry for over 50 years, white bread is better for growing children, adults working intensively, and nutritionally deprived persons.

2. Wholemeal and wholegrain breads contain more fibre for faecal bulk, the absorption of water, and to support our gut microflora. This fibre assists our gut with mechanistic movement and fermentation and supports our digestive processes for health related outcomes.

I'd recommend wholemeal/wholegrain bread for people who do not need to build and replace tissue or do not use a lot of energy, such as more mature, sedentary and aged persons, and those who are seeking a biome-based health benefit.

3. Breads should also be compared by the production method employed. Methods of production of all types of bread can vary markedly when it comes to fermentation time. Longer fermentation is the key to better health and enjoyment outcomes. Longer fermentation reduces simple sugars (reducing the Glycaemic Index), creates beneficial soluble carbohydrates and fibre in forms that promote a healthy bowel, detoxes the proteins that can cause or exacerbate Coeliac Disease, and reduces the effects of FODMAPs that cause IBS. And longer fermentation typically also provides better flavour and aroma.

The key to understanding the benefits of bread is by not focussing too much on the *ingredients* as listed, but to also understand the benefits of provided by the *method* by which the bread is produced.

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