

WGIN STAKEHOLDERS' MEETING

Rothamsted Research

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WHEAT GRAIN QUALITY

Determined by the three major components: -

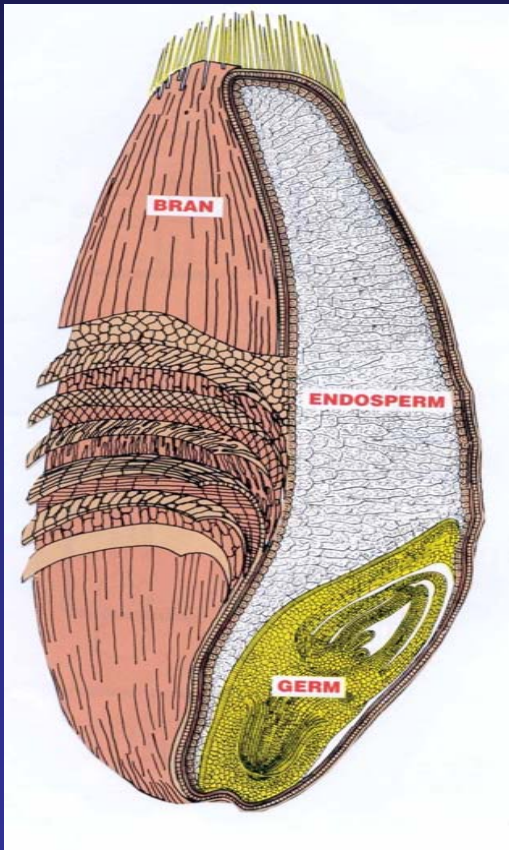
- Starch
- Protein (gluten)
- Fibre (arabinoxylans)

and

Phytochemicals/vitamins/minerals

These are concentrated in different parts of the grain.

WHEAT GRAIN QUALITY



* also includes pericarp, testa and nucellar layer

FRACTION	% TOTAL GRAIN	CONTAINS
BRAN *	14 - 20	Protein (20%), lipids (3%), fibre* (5-6%), minerals (K, Mg, Ca, Fe, Mn, Ze, mainly as phytate), vitamins (inc folate, tocols) and other phytochemicals
Includes ALEURONE LAYER	7-10	
GERM (embryo)	2.5-3.5	Proteins (20-25%), lipids (15-20%), vitamins and minerals
STARCHY ENDOSPERM = white flour	75-85	Proteins ** (10-12%), starch (65-75%), fibre * (2-3%)

** approx half is gluten protein

*** Fibre comprises approximately 65-70% arabinoxylan, 20-25% (1-3,1-4)- β -glucan, 2-4% cellulose

DIFFERENT END USES REQUIRE DIFFERENT COMPOSITIONS

High starch

Distilling
Bioethanol
Livestock feed

High protein

Breadmaking

High soluble fibre
(high phytochemicals,
vitamins and minerals)

Human nutrition

WHAT ARE THE CHALLENGES?

1. Can we increase the variation in grain composition eg below 8% protein, above 3% AX?
2. Can we break the link between the impact of N fertilisation on yield and the associated increase in grain protein?
3. Can we manipulate fibre and phytochemical composition for improved human nutrition?

These require:-

- New sources of variation, eg GM, mutagenesis
- More basic understanding of biosynthesis and partitioning
- New tools to assist breeders