



Department of
Agriculture and Food



GRDC Grains Research &
Development Corporation
Your GRDC working with you

A Comprehensive Nutrient Content Database of Grains and Legumes Produced in Australia

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Grains &
Legumes
Nutrition
Council

Cultivating Good Health



The background of the slide is a solid orange color. Overlaid on this are several large, overlapping circles in various shades of orange, creating a layered, abstract effect. The text 'GLNC Overview' is centered in the middle of the slide in a white, sans-serif font.

GLNC Overview

GLNC Overview

Authority on the nutrition and health benefits of grains and legumes

Health Promotion Charity and independent non-profit organisation



GLNC Overview

GLNC promotes grains and legumes nutrition as part of a balanced diet through evidence-based information cultivating good health.



Influencing the grains & legumes chain

We link the entire grains
and legumes industry
value chain

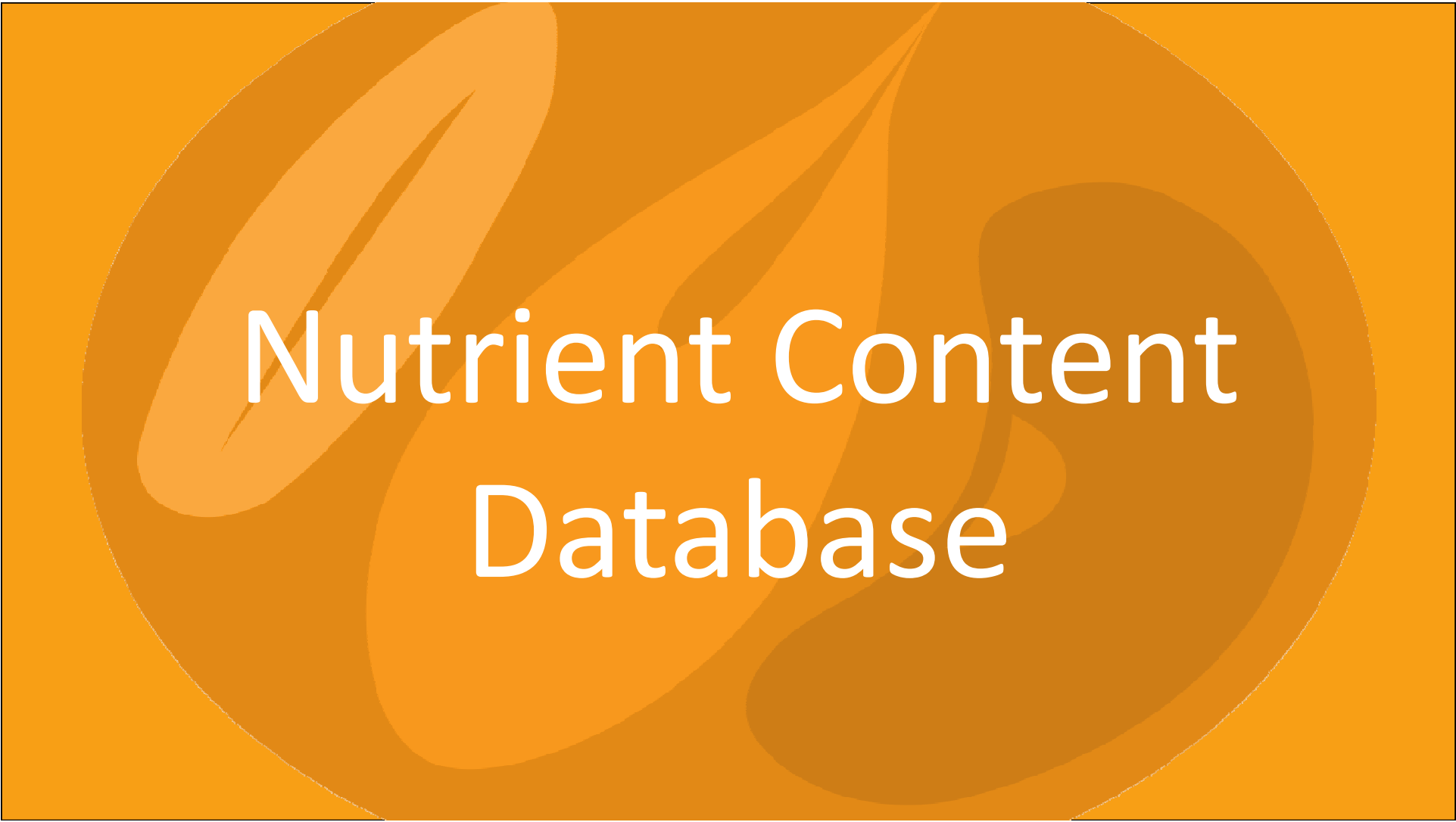
from grain growers...

... to consumers



GLNC Contributors



The background of the slide is a solid orange color. Overlaid on this are several large, overlapping, semi-transparent shapes in various shades of orange and brown, creating a layered, organic effect. The text "Nutrient Content Database" is centered in a white, sans-serif font.

Nutrient Content Database

Nutrient Content Database

Aims

- First ever comprehensive nutrient content analysis of Australian grown grains and legumes
- 2013 Pilot Project: 30 intact grains and legumes; 26 nutrients
- Showcase Australian grains and legumes, improve accuracy of dietary analyses and assist new product development
- Compare Australian nutrient profile against Canada & US – send signals to breeders and trade – market differentiation



Nutrient Content Database

Method



30 single samples intact grains and legumes harvested in Australia in 2012



Analysed/calculated by NATA accredited laboratory - standardised techniques for nutrients important for human health



10 intact grains, four main wheat grades (APH, AH, APW, ASW), Six grains commonly processed for food ingredients, 10 intact legumes



Samples were taken from the GRDC classified Northern and Southern Regions



Compared to nutrient content data for grains and legumes produced in the US using the USDA National Nutrient Database for Standard Reference

Nutrient Content Database

Samples Analysed

Intact Grains	Wheat Grades	Processed grains	Intact legumes
Barley, pearled	Wheat, APH	Maize, grits	Chickpeas, desi
Buckwheat, whole	Wheat, AH	Oats, rolled	Chickpeas, kabuli
Maize, whole	Wheat, APW	Rye, rolled	Beans, faba
Millet, hulled	Wheat, ASW	Sorghum, kibbled, red	Peas, green, whole
Oats, whole, hulled		Triticale, kibbled	Lentils, French
Rice, brown		Rice, white	Lentils, green
Rye, whole			Lentils, red
Sorghum, whole, red			Lupins, whole
Spelt, whole			Mung beans, whole
Triticale, whole			Peas, yellow, whole

Nutrient Content Database

Nutrients Analysed

Macronutrients	Micronutrients	Fibres
Energy	Minerals	Dietary Fibre
Carbohydrate	Calcium	Total Dietary Fibre
Resistant Starch	Iron	Insoluble Dietary Fibre
Total Starch	Magnesium	Soluble Dietary Fibre
Sugars	Sodium	Beta-Glucan
Protein	Phosphorus	Inulin
Fat	Selenium	
Total fat	Zinc	
Saturated	Vitamins	
Trans	Vitamin B1 (Thiamine)	
Poly-unsaturated	Vitamin B2 (Riboflavin)	
Mono-unsaturated	Vitamin B6 (Pyridoxine)	
Omega 3	Vitamin E	
Omega 6	Vitamin B3 (Niacin)	
Omega 9		

Nutrient Content Database - Results

Nutrient	Wheat APH	Barley	Oats	Lupins	Field Pea	Spelt	Triticale	Buck- wheat	Chick pea kabuli	Recommended Daily Intake for Adults
Protein (%) [#]	13.8	9.9	11.1	31	22	11.7	10.6	12.2	18.2	N/A
Total Fibre (%)	11.6	13.1	8.6	43.1	16.8	8.8	14	5.0	13.5	25 – 30 g
Soluble fibre (%)	2.4	5.2	4	1.8	1.2	1.0	1.5	0.9	1.2	N/A
Insoluble fibre (%)	9.2	7.9	4.6	41.3	15.6	7.8	12.5	4.1	12.3	N/A
Iron (mg/100g)	4.2	2.2	3.9	4.0	5.9	2.8	3.1	3.0	4.1	8 – 18 g
Magnesium (mg/100g)	125.0	95.0	117.0	165.0	121	122.0	102.0	199.0	123.0	310 – 400 mg
Zinc (mg/100g)	2.1	1.2	2.3	2.8	3.6	1.9	1.3	2.9	2.2	8 – 14 g
Vitamin B1 (Thiamine) (mg/100g)	0.5	0.2	0.31	0.58	0.92	0.4	0.37	0.57	0.6	1.1 – 1.2 mg
Vitamin B2 (Riboflavin) (mg/100g)	0.1	0.0	0.01	0.02	0.02	0.03	0.03	0.03	0.02	1.1 – 1.3 mg
Vitamin B3 (Niacin) (mg/100g)	4.4	6.6	1.2	1.6	2.3	7.3	1.7	4.4	1.2	14 – 16 mg

[#]Protein calculated as N x 5.7 (wheat), N x 6.25 (all), N/A not available

Data comparison: key nutrients vs. US

Nutrient	Wheat – APH	US wheat **	Australian barley	US barley**	Australian oats	US oats**	Lupins	Field Pea	Recommended Daily Intake for Adults
Protein (%)#	13.8	9.6	9.9	9.9	11.1	16.89	31.0	22	N/A
Total Fibre (%)	11.6	13.1	13.1	15.6	8.6	10.6	43.1	16.8	25 – 30 g
Iron (mg/100g)	4.2	3.7	2.2	2.5	3.9	4.72	4.0	5.9	8 – 18 g
Magnesium (mg/100g)	125	117	95	79	117	177	165	121	310 – 400 mg
Phosphorus (mg/100g)	313	323	192	221	305	523	249	3.6	1000 mg
Zinc (mg/100g)	2.1	2.9	1.2	2.13	2.3	3.97	2.8	0.92	8 – 14 g
Vitamin B1 (Thiamine) (mg/100g)	0.5	0.3	0.17	0.191	0.31	N/A	0.58	0.02	1.1 – 1.2 mg
Vitamin B2 (Riboflavin) (mg/100g)	0.1	0.2	0.02*	0.114*	0.01	N/A	0.02	2.3	1.1 – 1.3 mg
Vitamin B3 (Niacin) (mg/100g)	4.4	5.3	6.6	4.6	1.2	N/A	1.6	5.9	14 – 16 mg

#Protein calculated as N x 5.7 (wheat), N x 6.25 (all), *Flour, wholegrain soft wheat **Data sourced from USDA National Nutrient Database for Standard Reference6

Nutrient Content Database

Conclusion

- Nutrient content varies by grain type and between Australian grown vs US
- Differences in nutrients important for human health an opportunity
- Australian grain lower in Vitamin B2, some low in fibre
- Australian variety improvement – target nutrients ie Vitamin B2
- Limitations – single sample



Nutrient Content Database

Next Steps

- Developing industry agreed representative sample
- Whole of supply chain Roundtable – breeders, domestic trade, food manufacturers, FSANZ, academics and CSIRO
- Representative sample testing - 2014/15 harvest
- Report to industry
- Establish minimally processed, processed ingredients and foods nutrient testing
- Ongoing international market data comparisons



Take Home Messages

Summary

- First ever comprehensive nutrient analysis of Australian grown grains and legumes
- Pilot program in 2013
- Showcase Australian grains and legumes, improve accuracy of dietary analyses and assist new food product development
- Provide signals around nutrition targets for the plant breeding industry and producers





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Questions?



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