



This project has joint investment from Grains Australia and AEGIC

Maximising value of Australian feed grains in Chinese swine rations

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Defining the value of raw materials when feeding opportunistic omnivores

Nutritional value

Economic Value

Functional Value

Feed barley



Faba beans



Sorghum



Sweet lupins



Starch sources available in Asia

	Corn 玉米	Sorghum 高粱	Wheat 小麦	Barley 大麦	Cassava 木薯	Broken rice 碎米
Protein %	7.6	9.3	11.0	9.9	2.5	8.1
Starch %	63.8	64.4	60.0	52.3	71.9	75.4
Sugar %	1.7	1.1	2.6	2.2	2.4	0.4
Fat %	3.6	2.9	1.4	1.6	0.6	1.1
Ash 灰 %	1.2	1.9	1.5	2.2	2.7	0.8
Crude fibre %	2.3	2.4	2.4	4.7	3.0	0.6
Calcium %	0.04	0.03	0.06	0.07	0.13	0.04
Phosphorous %	0.25	0.30	0.31	0.34	0.09	0.21
Phytate Phos %	0.19	0.21	0.20	0.19	0.02	0.11
ME Pig Grower, Kcal	3290	3340	3190	2970	3220	3460
NE Pig Sow, Kcal	2710	2640	2520	2320	2620	2810
Xanthophylls	23					

Cost of starch sources relative to corn

Simple **example** to evaluate the value of alternatives relative to corn @ \$360USD in a growing pig diet formulated on ME basis.

Corn 7.5%	Wheat 9%	Wheat 11%	Barley 10%	Cassava meal	Broken Rice	Sorghum 8%
\$360	\$352	\$359	\$324	\$265	\$372	\$352
Discount needed	-8	-1	-36	-95	+12	-8

Each % of protein is worth \$4-5

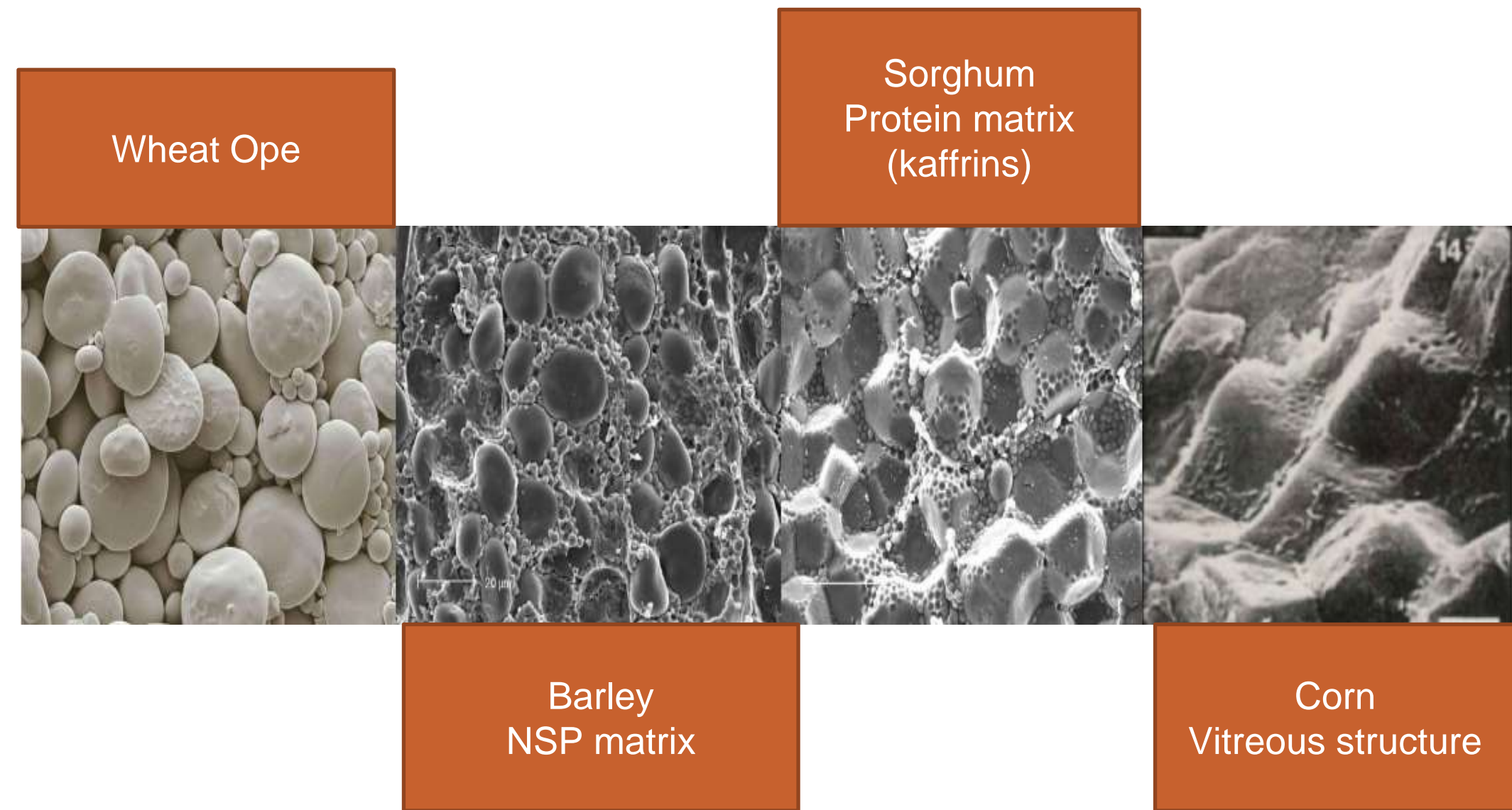
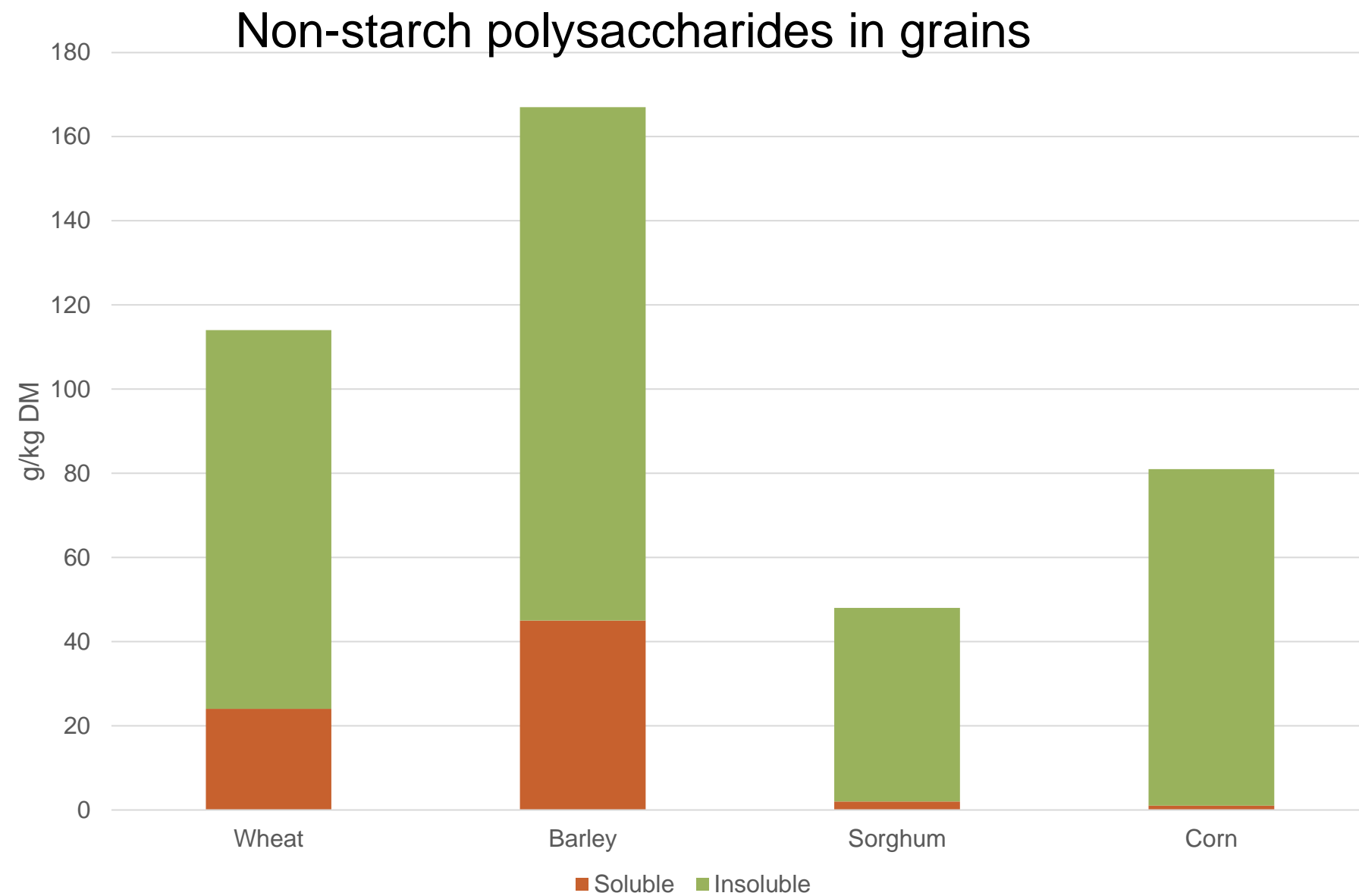
Differential is often about \$25/T

Considerations

- Pigmentation
- Cost of mycotoxin mitigation
 - Animal sensitivity, binder type, risk x moisture content
- Pellet quality
- Ease of milling and acceptable by animals
 - Dustiness, palatability, particle size
- Storage
- Functional value



Understanding starch and NSP to make best use of Australian grains

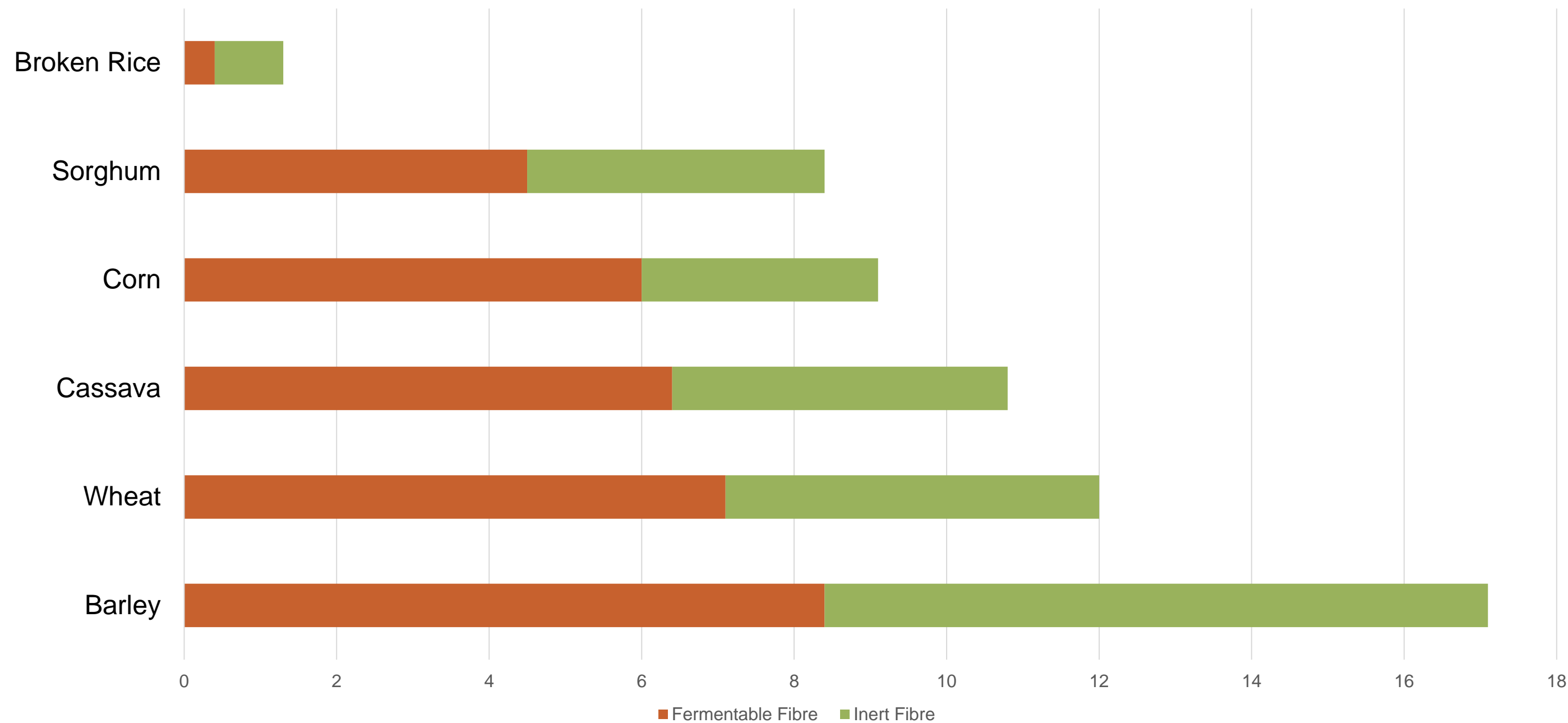


*NSP content can be variable between varieties

Enzyme selection needs to consider type and level of NSP within the diet.

Australian grains bring functional value to support gut health and efficiency

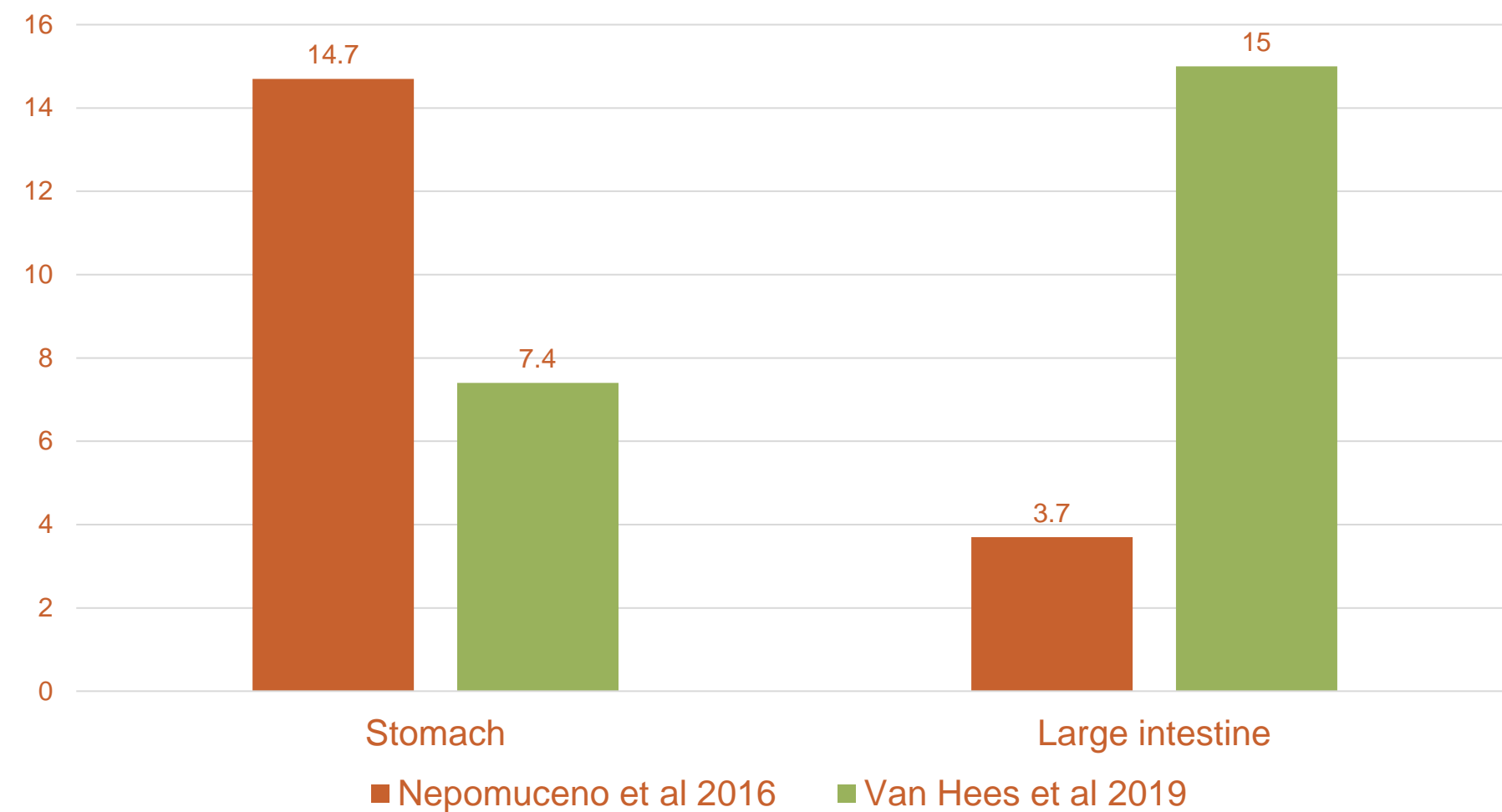
Total dietary fibre, fermentable fibre and inert fibre of RM in pigs



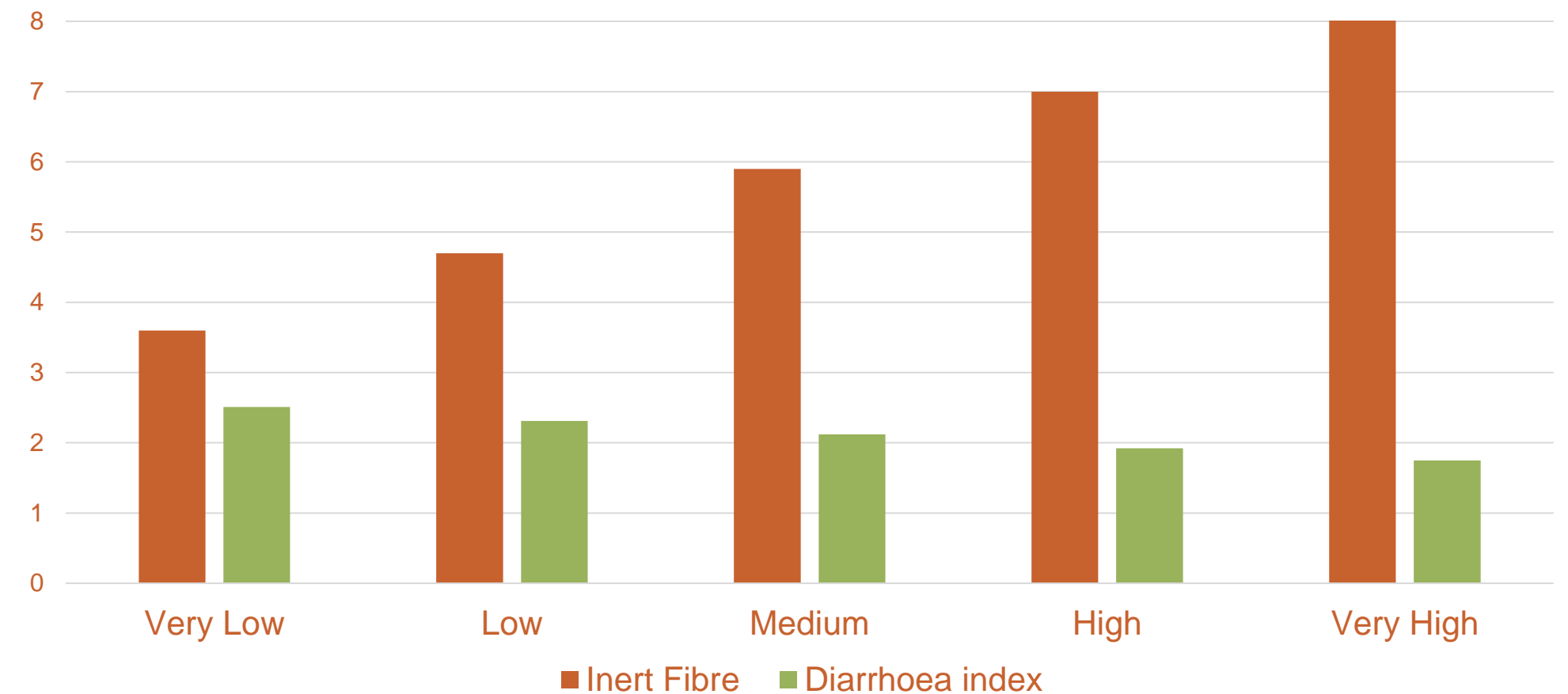
- Enhance stomach development and capacity
- Stimulate health mucin layer
- Provide prebiotic substrate for microbiome
- Positive effects on animal behaviour and welfare

Barley (and wheat) offer good sources of inert fibre to enhance gut development and reduce diarrhoea in piglets

Increase capacity relative to body weight in pigs fed inert fibre



Relationship between inert fibre and diarrhoea incidence in weaned pigs



Nepomuceno et al., 2016

Sorghum feed value

- Similar nutritional value to corn
- Similar fatty acid profile = similar carcass firmness
- Little to no carotenoids = whiter carcass fat
- Palatability considerations (tannins, texture)
- Milling considerations (small, hard grain)

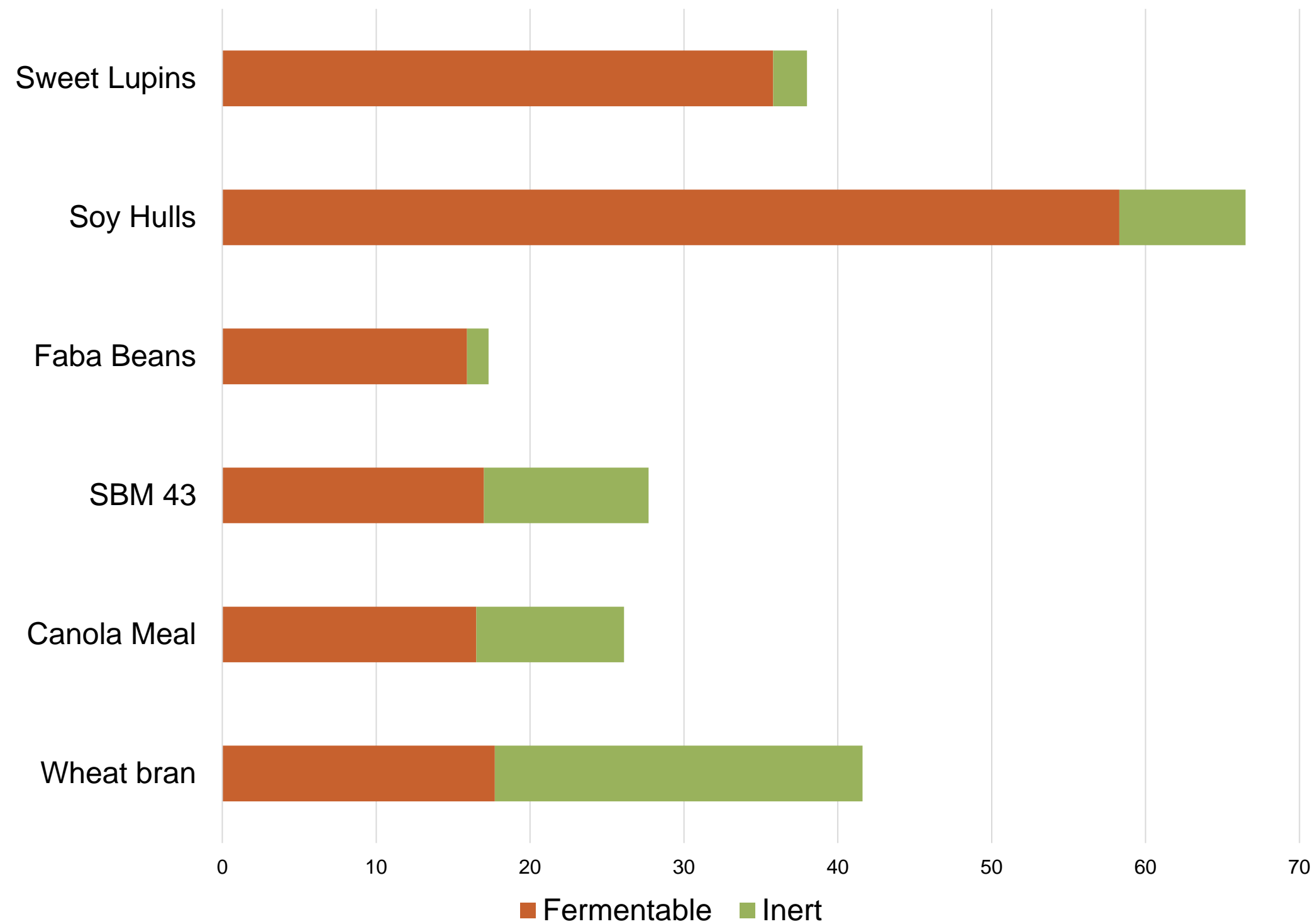


Lupins & faba beans: valuable protein and fibre

	Sweet Lupins 甜羽扇豆	Canola meal 菜籽粕	Faba beans 蚕豆	Soy bean meal 43% 大豆粕	Soy bean meal 46% 大豆粕
Dry Matter %	90	89	88	88	88
Crude Protein %	30	34	27	43.5	46.2
Protein Digestibility %	87	79	84	87	87.5
Crude Fibre %	14.3	12.7	7.4	6.3	6.0
Fat %	5.4	2.2	1.0	1.7	1.5
Starch %	4.2	6.8	37	6.0	5.0
Ash %	3.2	6.8	3.5	6.5	6.2
Calcium %	0.25	0.77	0.13	0.34	0.34
Phosphorous %	0.34	1.13	0.48	0.62	0.62
Available Phos. %	0.14	0.45	0.19	0.25	0.25
NE Kcal/kg Pig	2000	1600	2210	1970	1980
NE Kcal/kg Sow	2160	1710	2240	2110	2120
Total Lysine %	1.52	1.81	1.72	2.7	2.88
Total Threonine %	1.18	1.46	0.95	1.68	1.77

Lupins bring fermentable fibre

Fibre profile (TDF %) of raw materials



Clean fibre source which can

- Maintain microbiome
- Avoid constipation
- Improve reproductive performance



Take home message

Australia can offer Chinese feed producers:

- Clean, nutritious alternative starch and protein sources
 - Growing conditions,
 - Receiving QA
- Australian barley, lupins and faba beans bring additional functional value to assist Chinese producers to produce healthier more productive pigs.
- Pigs are opportunistic omnivores
- Understanding alternative raw materials allows feed and livestock producers to be reactive in challenging times.



Grains Australia is an initiative of the Grains Research and Development Corporation

grainsaustralia.com.au

Thank you for listening

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