

Development and Quality Evaluation of Lupin-Fortified Instant Noodles

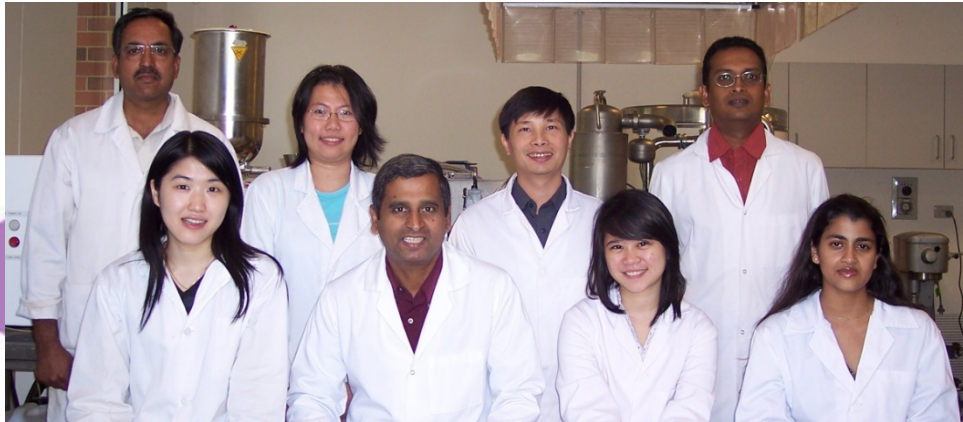
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2. Centre for Food and Genomic Medicine
3. Grain Food CRC

12th International Lupin Conference, 14-18 September 2008,
Fremantle, Western Australia

Lupin Research

A large team behind us



Expertise in

- Food Science & Technology
- Nutrition
- Dietetics
- Food safety
- Food Micro-biology
- Public Health

Lupin Research Collaborations – National

- Centre for Food and Genomic Medicine
- Grain Foods CRC
- UWA
- Department of Agriculture and Food
- Midwest Development commission
- Murdoch University
- Corporate Bulk Handling
- Belmar Foods



Lupin Research Collaborations – International

- Indonesian Institute of Sciences (LIPI)
- University of Mumbai in India
- KMUTT in Thailand

Patent on lupin tempe production
(Curtin university, GFCRC, LIPI)

World Health Challenges

Developed Countries

- More than half of the population is overweight (Around 60% of Australians are overweight)
- Around 20% children are overweight
- Increased risk of CVD, type 2 diabetes, *etc.*

Why Obesity

In addition to lack of physical activities

- **Low dietary fibre intake**
- **High sugar/carbohydrate & fat intake**
- **Excess food (energy) consumption**

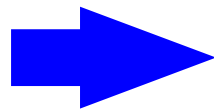
Food in Developing Countries

- **Malnutrition (mainly protein) especially among children and women**
- **Hunger and starvation not uncommon**
- **Limited availability of food**
- **High cost**
- **Most population depends on cereals**

Many Problems Simple Solution

<i>Developed Countries</i>	<i>Developing countries</i>
<ul style="list-style-type: none">• Overweight and Obesity• Increased risk of CVD, type 2 diabetes, etc	<ul style="list-style-type: none">• Malnutrition• Limited food availability

Solution



Lupin based, low cost, novel healthy foods?

Why Lupin

- **Low cost**
- **High dietary fibre**
- **High protein**
- **Low GI**
- **Low fat**

- **Can be grown under marginal conditions**

Immediate Reactions to Healthy Foods

- Tasteless
- Not appealing
- Expensive

**Healthy
Foods**

Can we produce healthy foods with similar attractiveness of popular food?

We have developed a range of lupin based foods

Lupin Based Snacks



Lupin Flour ~ 30%



Lupin Based Snacks



Lupin flour ~70%



Lupin Based Pasta



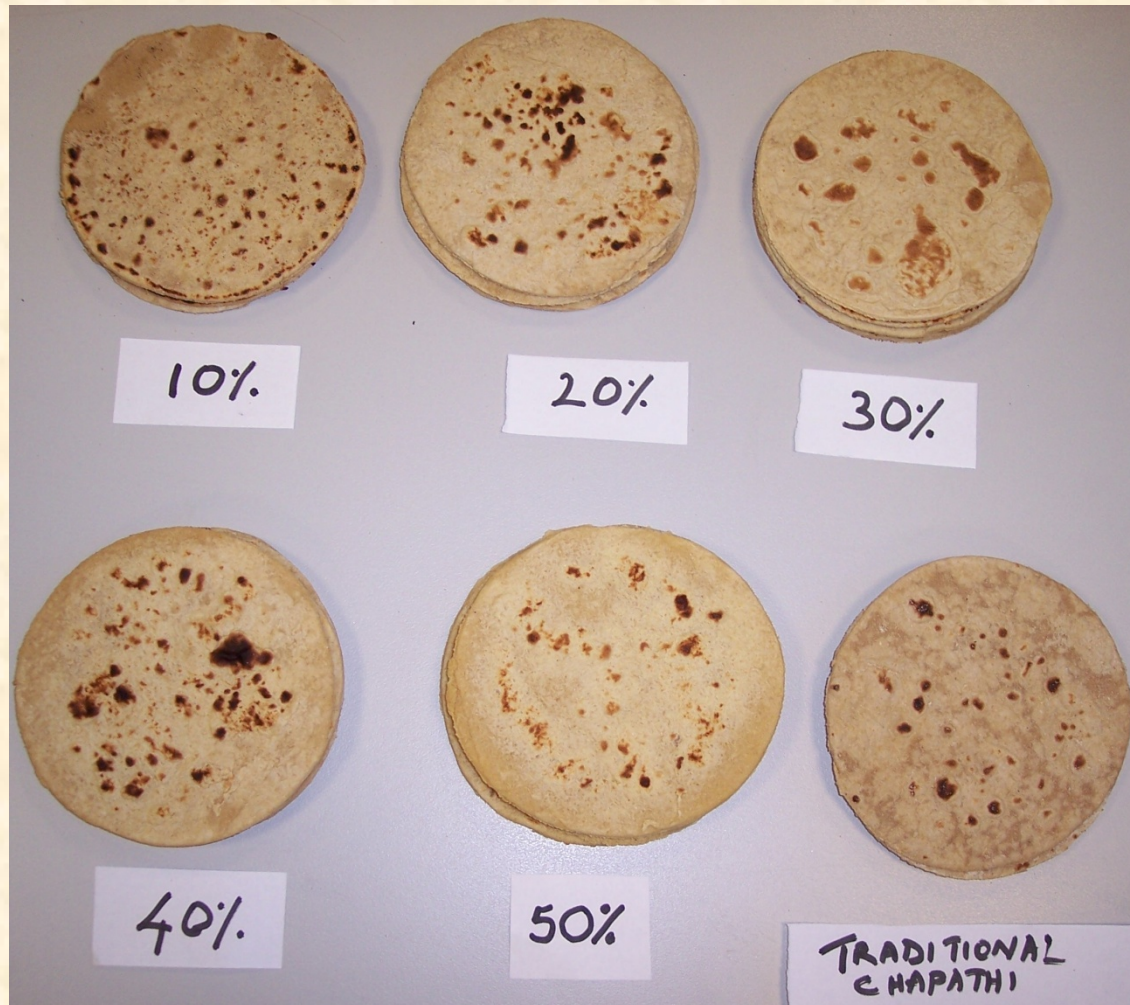
Lupin Muffins



Lupin Tempe



Lupin Chapatti



Innovation Display – Curtin Open Day

“Healthy Junk Foods”



Innovation Display – Curtin Open Day



Innovation Display – Curtin Open Day



Instant Noodles

- Widely consumed throughout the world
- Rapidly growing market
- Around 40 billion servings in 1997 and expected to reach 160 billion by 2010
- Very popular especially among kids and teenagers
- Easy to prepare
- **Nutritional value?**

Preparation of Lupin-based Instant Noodles

- **Samples were prepared by incorporating 10-50% lupin flour**
- **Analysed for chemical composition and sensory acceptability**

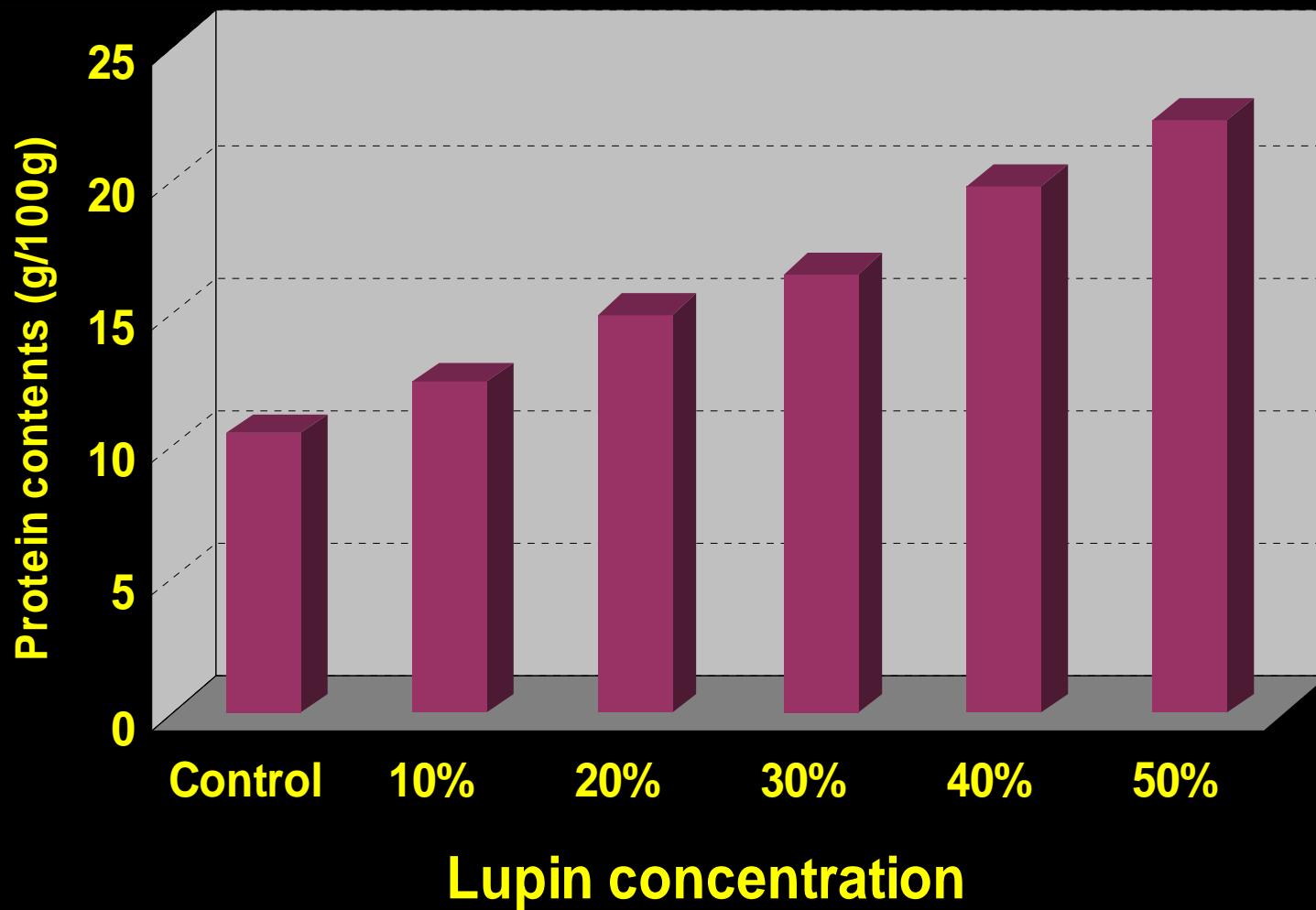
Lupin Noodles



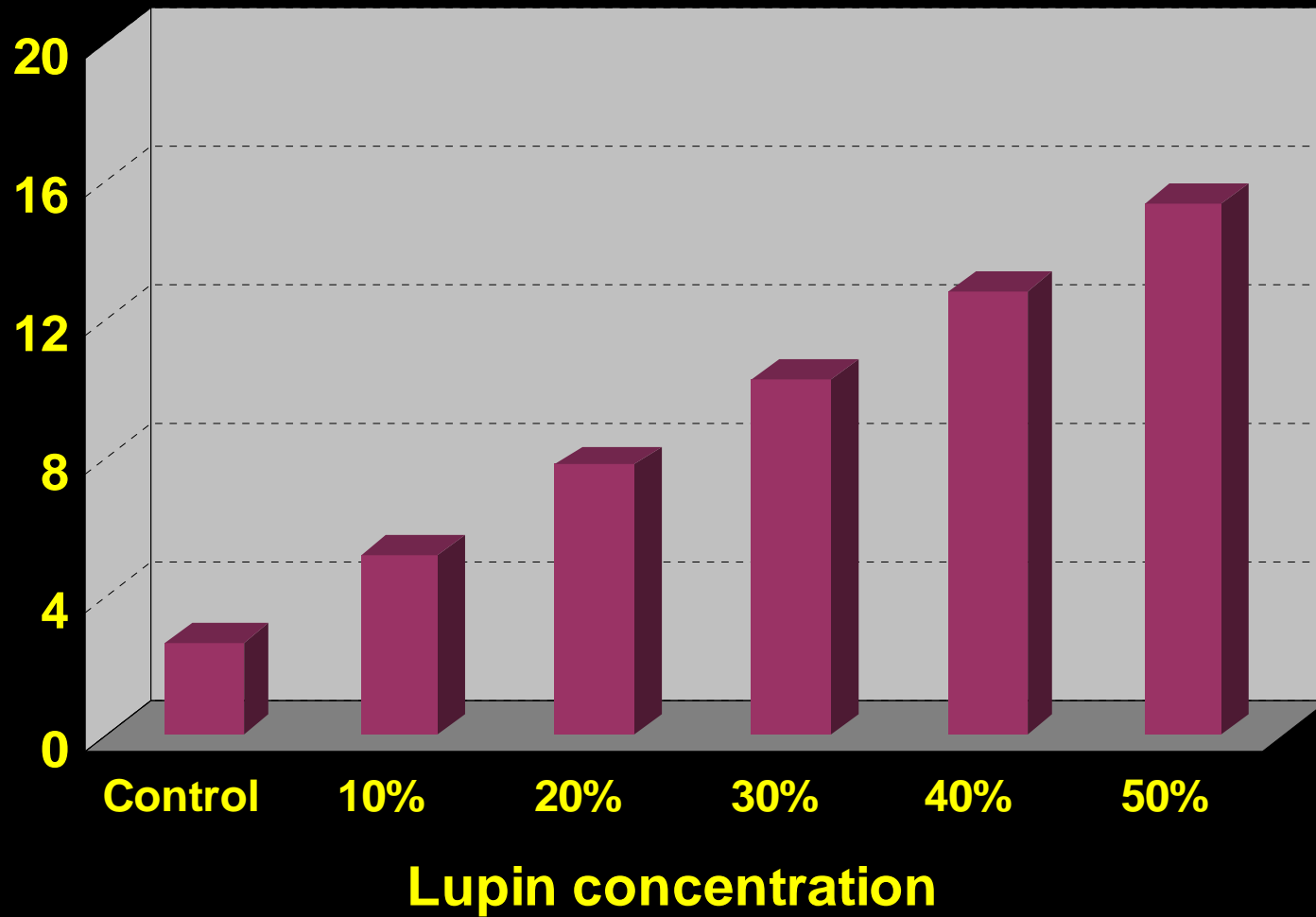
Lupin Noodles



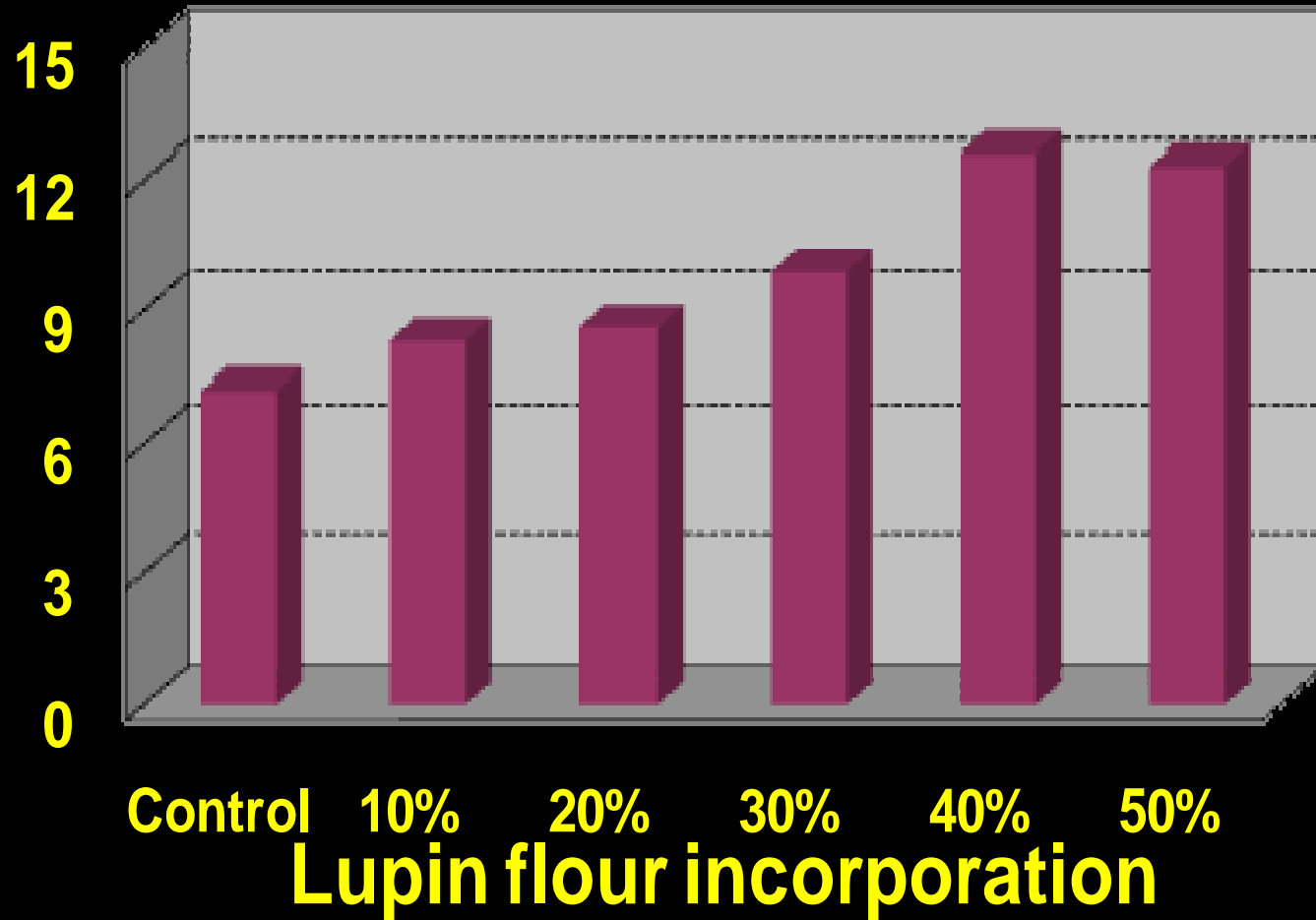
Protein content (g/100g) of instant noodles



Dietary fibre content (g/100g) of instant noodles



Fat contents (g/100g) of instant noodles



Sensory Quality of Lupin Based Instant Noodles (cooked)

Sample (% of lupin)	Colour	Texture	Taste	Overall acceptability
0	4.7^b	6.4^a	6.0^a	6.0^a
10	5.7^a	5.9^{ab}	5.9^a	6.0^a
20	6.2^a	5.6^{abc}	5.7^a	5.7^a
30	6.2^a	5.3^{bc}	5.3^a	5.3^{ab}
40	6.4^a	5.2^{bc}	5.1^{ab}	5.3^{ab}
50	6.4^a	4.7^c	4.2^b	4.5^b

Lupin Food Samples

Biscuits

- 20% lupin flour

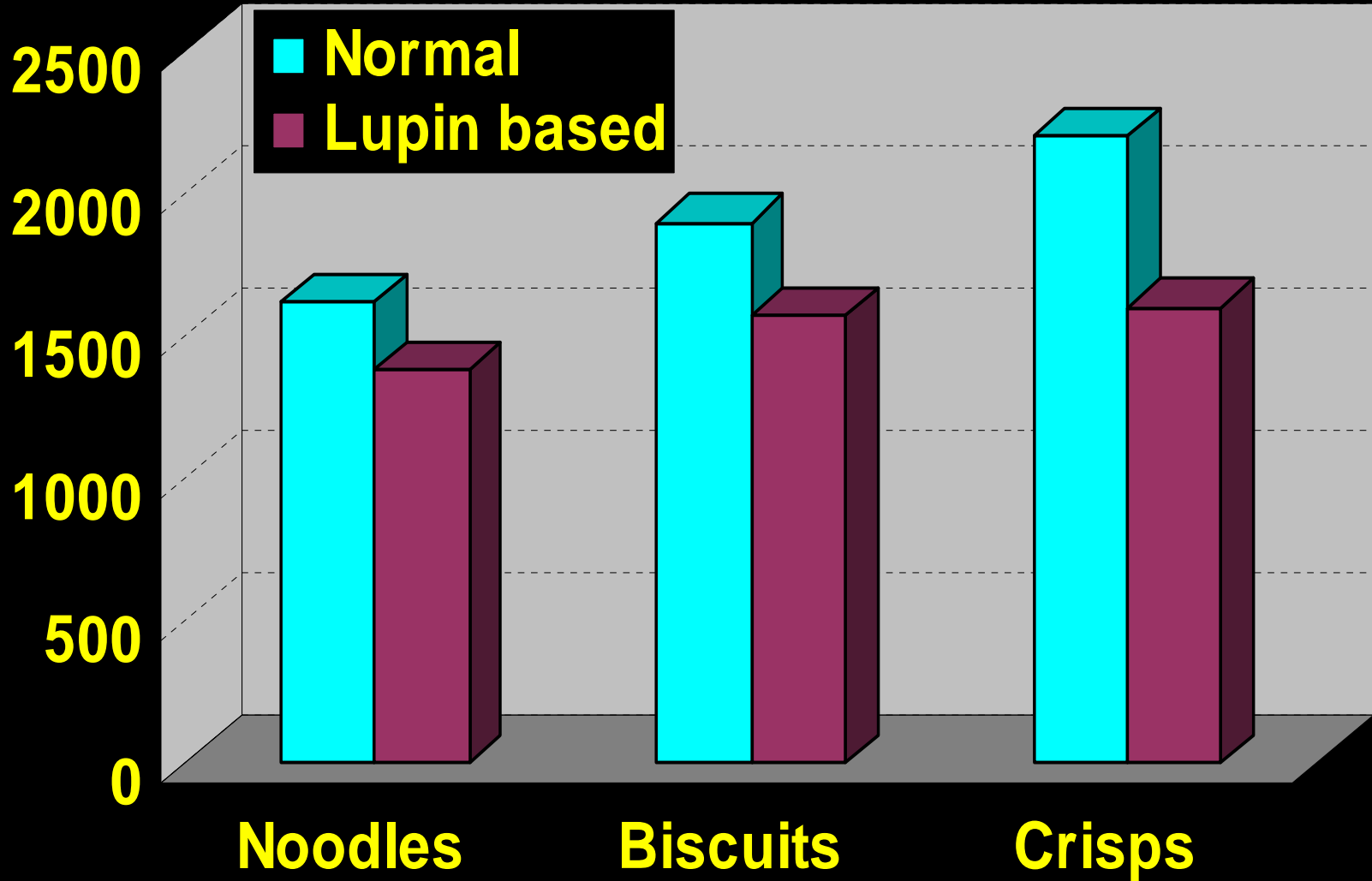


Lupin Crisps

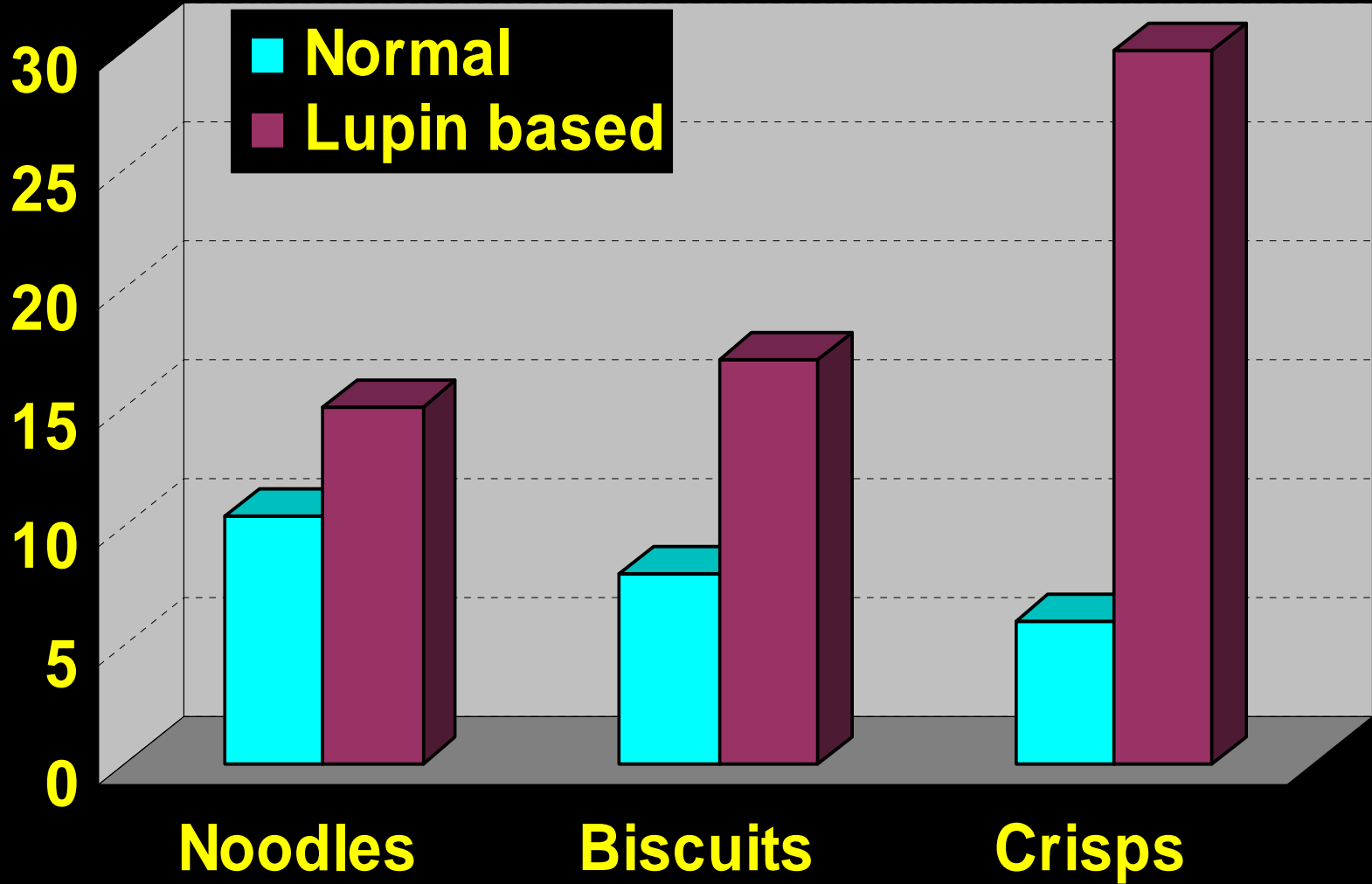
- 70% lupin flour



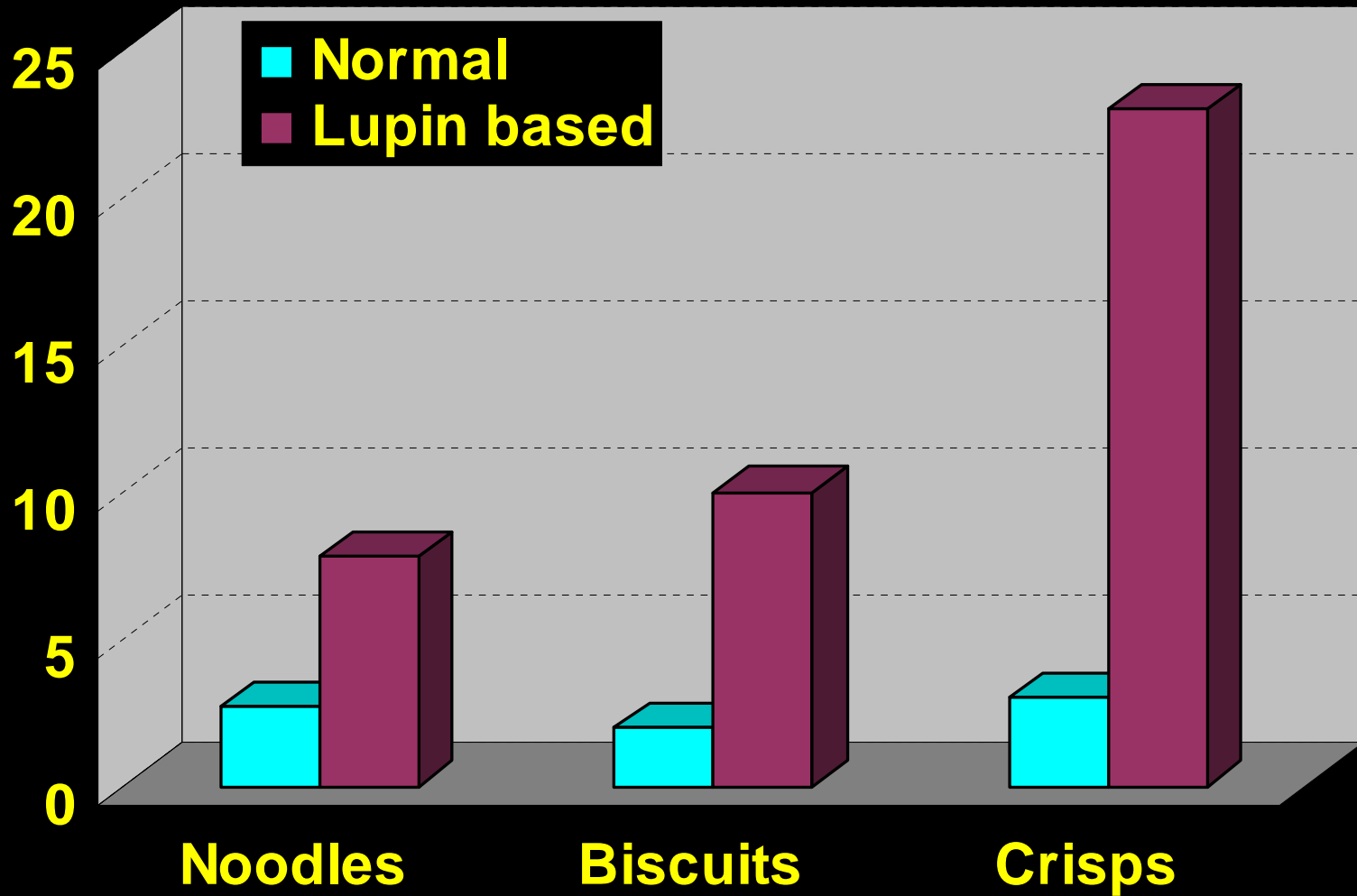
Energy (kj/100g)



Protein (g/100g)



Dietary Fibre (g/100)



Conclusions - Noodles

- **No significant change in sensory quality of instant noodles up to 20% lupin incorporation**
- **Significant increase in protein and dietary fibre contents**
- **Lupin improve the colour**

Conclusions - Noodles

- **Lupin can be added up to 20% in instant noodles without any significant change in sensory quality.**
- **Addition of 20% lupin results in**
 - **~40% increase in protein**
 - **~200% increased in dietary fibre**
 - **~100% increase in micronutrients including K, Mg, Ca and P**

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• Acknowledgement

- Centre for Food and Genomic Medicine
- Grain Foods CRC
- Curtin University lupin research team
- Department of Agriculture and Food
- Midwest Development Commission



Lupin – Not a new legume

- **“Knowledge of Lupin as a nutritious food dates back to the healer and physician Hippocrates, in ancient Greece who, as early as 400 BC compared the Lupin bean favorably to peas, beans and lentils, as they were not gassy and did not cause bloating. Lupin's use was widespread throughout the Mediterranean region as human food, animal food, and as a green and natural fertilizer. Lupins were also found among, the food stores in the ruins of Pompeii and Herculenium (79 AD)”**
- **“The Roman author Varro (11-27 BC) reported that every Roman inn had a "labrum Jupinarum," a basin for Lupin preparation”**

(Good Grains International)