



Effects of lupin kernel flour on satiety and appetite: results of human trials



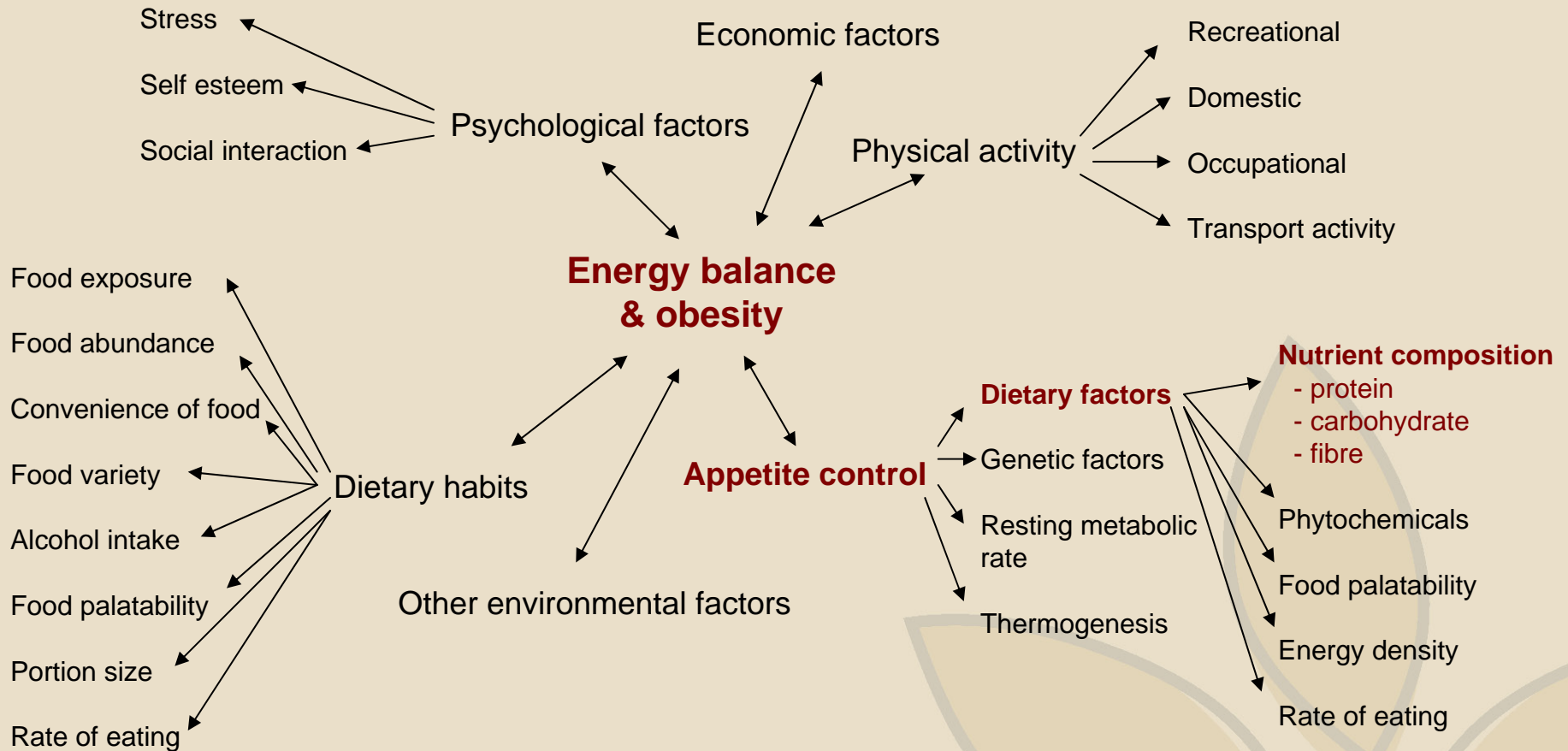
Centre for Food & Genomic Medicine



Obesity: a cause of heart disease

- Major public health problem
- More than half the Australian population are now overweight
- Obesity – increases the risk of:
 - diabetes
 - hypertension (high blood pressure)
 - high blood cholesterol
 - ➔ **heart disease**

Obesity



The role of nutrients in appetite control

- Protein is the most satiating nutrient
- Protein compared to carbohydrate results in reduced hunger and reduced energy intake acutely
- Fibre-rich diets can also reduce appetite acutely
- Some evidence for longer-term benefits of protein or fibre-rich diets in weight management

Why Lupin ?

- Lupin kernel flour (LKF) is a novel food ingredient with a unique macronutrient composition
 - **45% protein, 30% dietary fibre**, negligible available carbohydrate
- Increased intake of plant proteins and dietary fibre may benefit obesity via effects on appetite and improve risk factors for heart disease
- LKF can be substituted for wheat flour in baked foods such as breads to increase protein and fibre, and reduce refined carbohydrate content

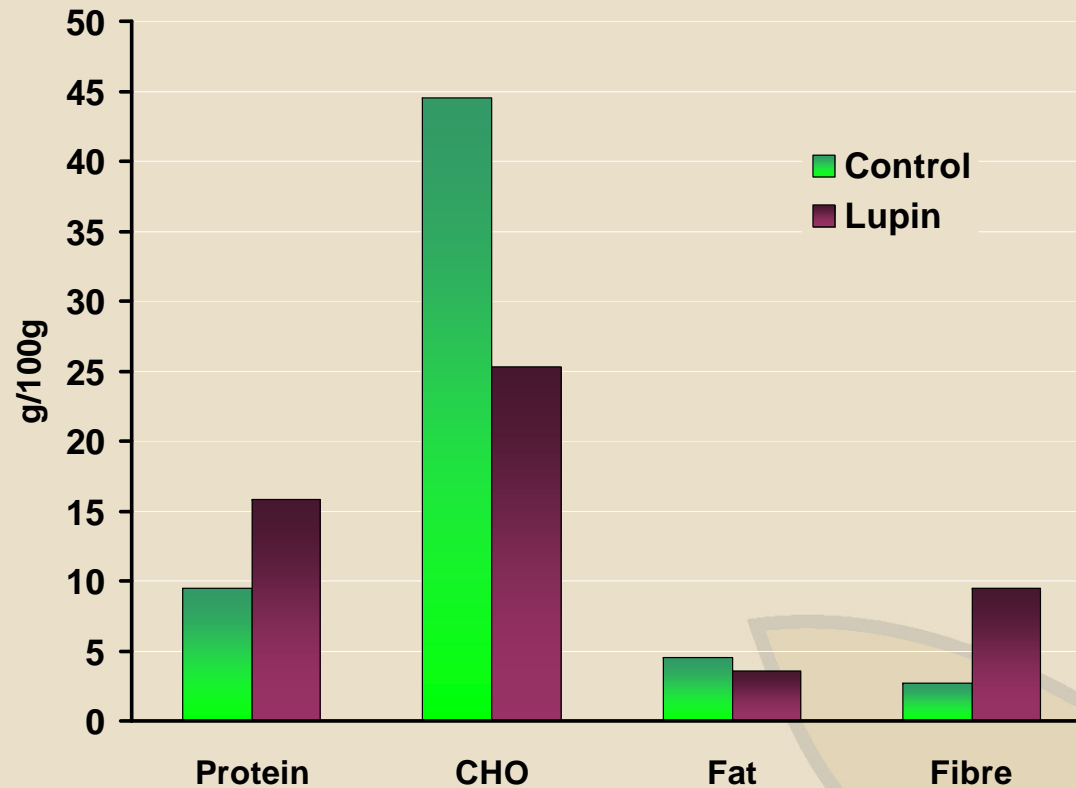
Acute effects on appetite



Aim: To explore the effect of lupin kernel flour-enriched bread, in comparison to white bread, on satiety and energy intake (appetite) in humans

Lupin kernel flour enriched bread where 40% of the wheat flour present in white bread was substituted with lupin kernel flour

Macronutrient composition of bread



Macronutrient composition of bread

- For 1400 kJ of lupin kernel flour-enriched bread
 - 13g higher in protein
 - 12g higher in dietary fibre
 - 16g lower in carbohydrate
- Matched for fat and energy content (based on a 1400kJ serve)

Participants and design

- 16 participants (8 men and 8 women)
- Age: 59 ± 7.17 y & BMI: 31.27 ± 4.50 kg/m²

Treatment	Breakfast (fixed energy 1400kJ)	Lunch (<i>ad libitum</i>)
1	Control	Control
2	Control	Lupin
3	Lupin	Control
4	Lupin	Lupin

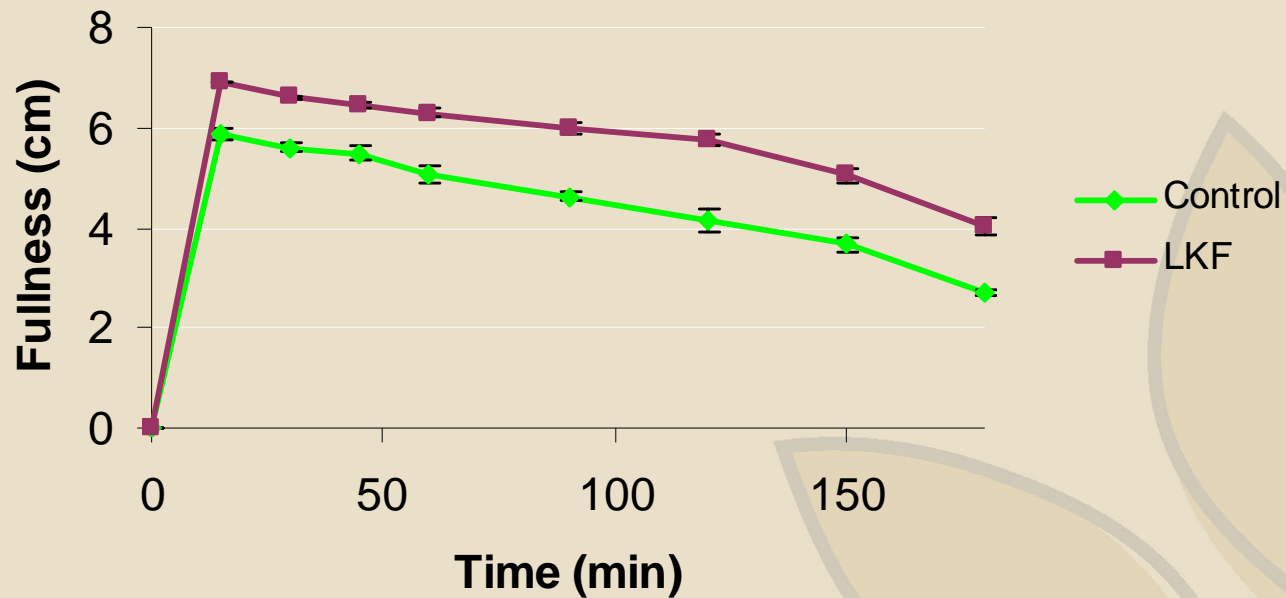
← Time (3 hours) →

Self reported satiety: Fullness

How full do you feel?

not full
at all

extremely
full

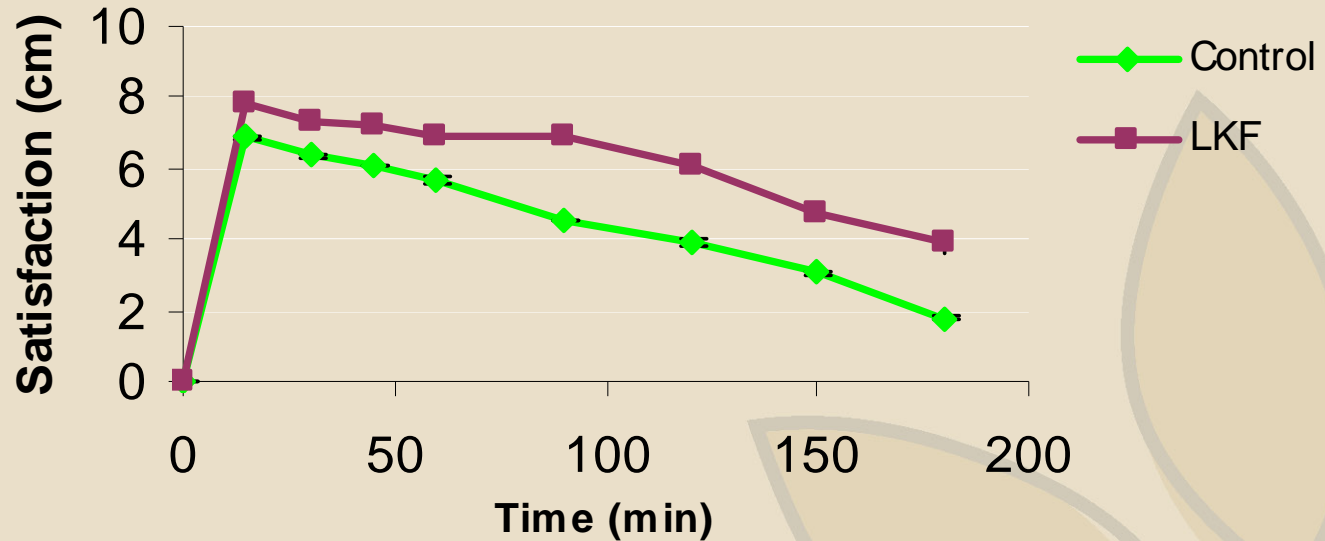


Self reported satiety: Satisfaction

How hungry/satisfied do you feel?

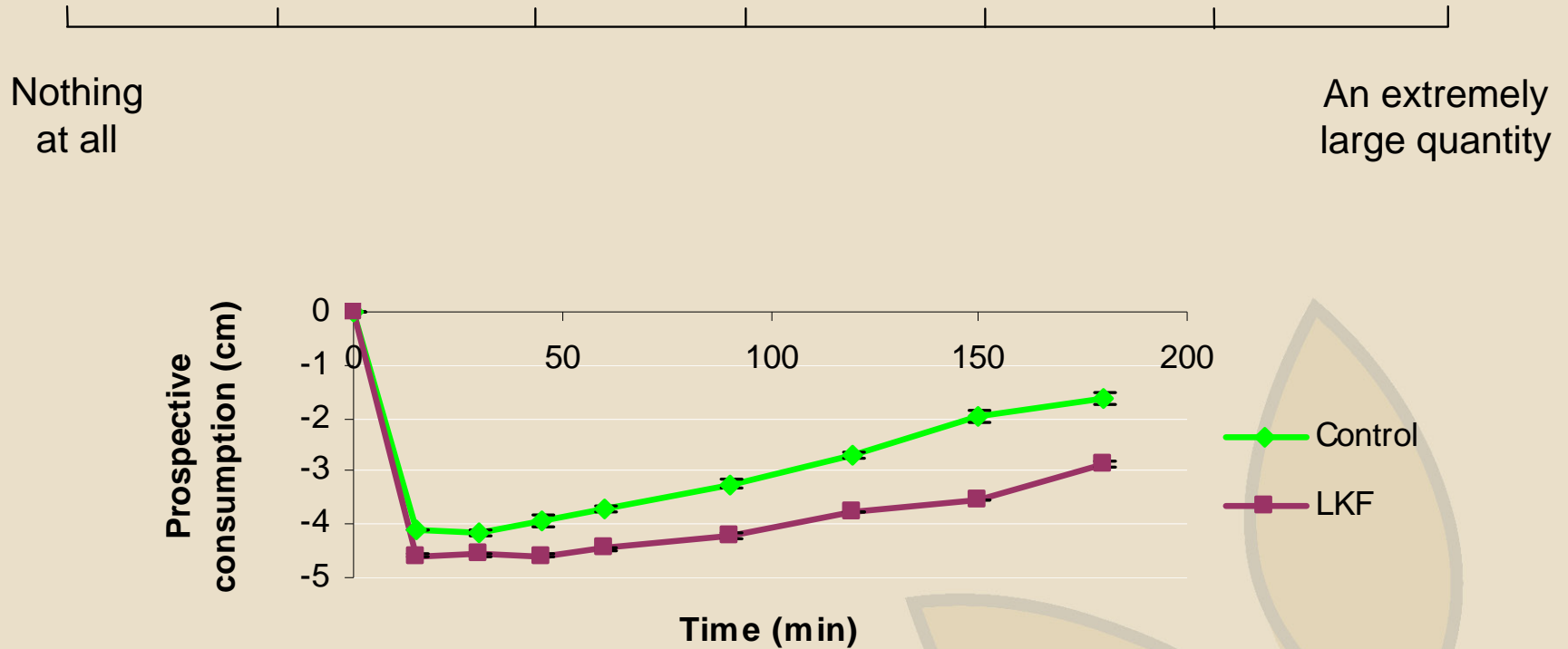
extremely
hungry

extremely
satisfied

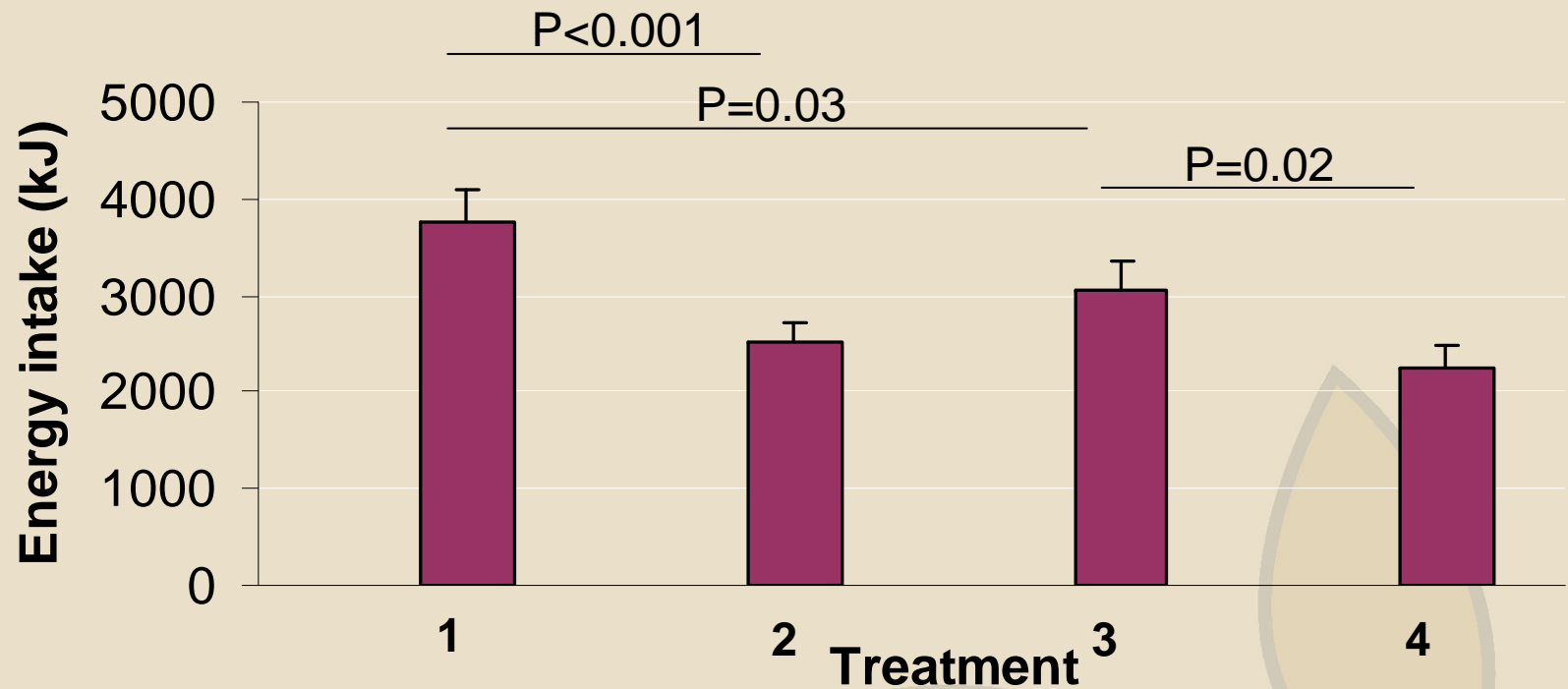


Self reported satiety: Prospective

How much food do you think you could eat?



Energy intake at lunch



Breakfast

Control

Control

Lupin

Lupin

Lunch

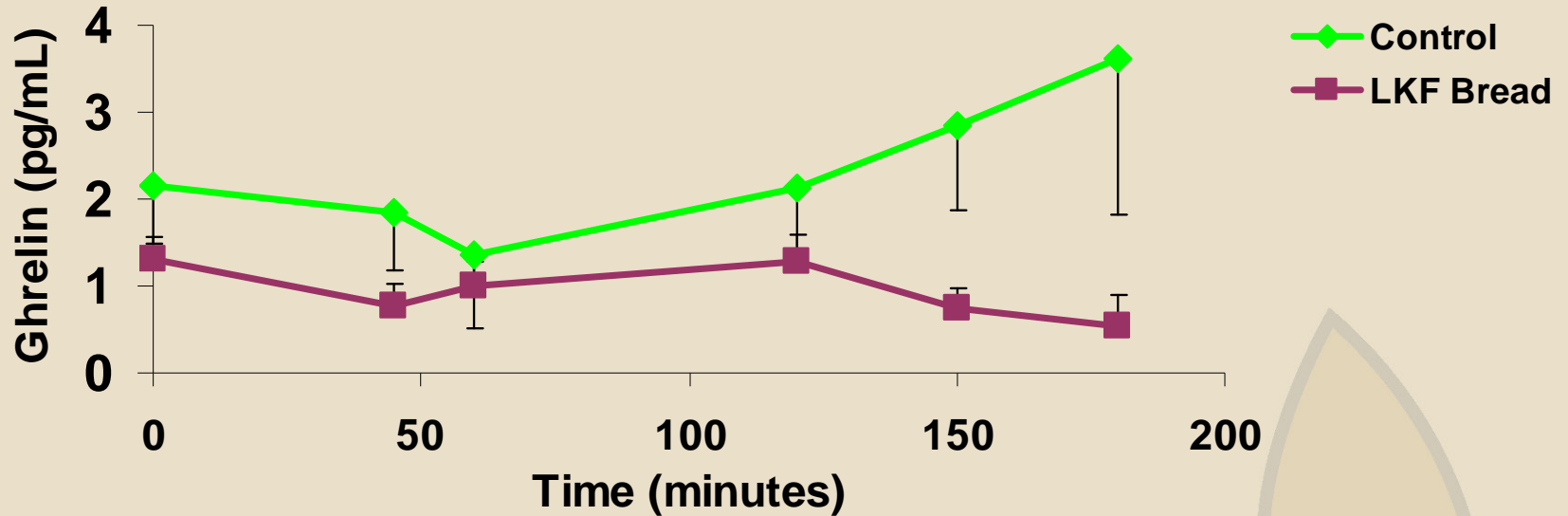
Control

Lupin

Control

Lupin

Plasma ghrelin



P=0.04 for time * treatment (baseline adjusted)

P=0.009 for mean plasma ghrelin (baseline adjusted)

Results summary

The lupin bread in comparison to the white bread resulted in:

1. increased self reported fullness and reduced hunger for 3 hours after a meal
2. Reduced energy intake by:
 - 25% within a meal
 - 10% at the next meal

Conclusion

Lupin kernel flour can reduce appetite acutely



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