A pilot study on the acute effect of orange juice with oat β -glucan on blood glucose and insulin responses in healthy overweight humans

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Background

- Orange juice is rich in polyphenols which have been extensively studied for their health benefits ⁽¹⁾.
- Regular orange juice consumption has been advised against due to its high sugar content and poor satiating properties ⁽²⁾.
- Adding viscous fibre such as β -glucan to orange juice might improve glycaemic responses ⁽³⁾..

Fig 1. An illustrative diagram of the combined effect of orange juice and β -glucan.

Objective

To determine the acute effect of combining orange juice with oat β -glucan on glycaemic responses in overweight subjects.

Methods

- Randomized, cross-over design
- 8 healthy subjects
 - 4 females: $BMI = 29.5 \pm 4.4 \text{ kg/m}^2$
 - 4 males: $BMI = 28.4 \pm 2.4 \text{ kg/m}^2$

Fig 2. Timeline of the study design.

- control: 500ml orange juice (~300mg polyphenols)
- test: 500ml orange juice with 3g β -glucan
- ❖ glucose via Hexokinase method
- ❖ Insulin via ELISA kits

Fig 3. Timeline of blood sampling procedure on the day of each trial.

Results

Figure 3A. Plasma glucose responses over time.

Figure 3B. Overall AUC glucose responses.

Figure 4A. Plasma insulin responses over time.

Figure 3B. Overall AUC glucose responses.

- Glucose and insulin levels lower in the OJ+OB condition at peak concentrations, 30 minutes after administration of the test drinks.
- Following peak concentrations, glucose and insulin levels remained elevated in OJ+OB compared to OJ until ingestion of next meal.
- Time averaged AUC for overall effect showed lower glucose but higher insulin levels for OJ+OB compared to OJ.

Conclusion

Results point towards a blunted acute glycaemic response when oat β -glucan is added to orange juice. However, a bigger sample size is required before conclusive remarks can be made.

References

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