



HAL
open science

True ileal protein digestibility of zein and whey protein isolate in healthy humans (OR27-06-19)

Juliane Calvez, Simon Benoit, Léa Fleury, Nadezda N. Khodorova, Julien Piedcoq, Daniel D. Tomé, Gheorghe Airinei, Robert R. Benamouzig, Claire Gaudichon

► To cite this version:

Juliane Calvez, Simon Benoit, Léa Fleury, Nadezda N. Khodorova, Julien Piedcoq, et al.. True ileal protein digestibility of zein and whey protein isolate in healthy humans (OR27-06-19). *Current Developments in Nutrition*, 2019, 3 (Supplement_1), 10.1093/cdn/nzz046.OR27-06-19 . hal-02619149

HAL Id: hal-02619149

<https://hal.inrae.fr/hal-02619149>

Submitted on 25 May 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - NonCommercial 4.0 International License

True Ileal Protein Digestibility of Zein and Whey Protein Isolate in Healthy Humans (OR27-06-19)

Juliane Calvez, Simon Benoit, Léa Fleury, Nadezda Khodorova, Julien Piedcoq, Daniel Tomé, Gheorghe Airinei, Robert Benamouzig, and Claire Gaudichon

AgroParisTech-INRA

Objectives: There are limited data available on true ileal nitrogen and amino acid digestibility of protein sources.

The goal of this study was thus to determine for the first time in healthy volunteers the ileal digestibility of zein and whey proteins.

Methods: Twenty-two volunteers (10 women and 12 men; aged 37 ± 12 y) were equipped with a double lumen intestinal tube positioned at the ileal level. They received a single meal of protein-free biscuits and a drink containing zein ($n = 8$), whey protein isolate (WPI, $n = 7$) or no protein (protein-free, $n = 7$). ^{13}C -inuline was added to the drink as a non-absorbable marker. Ileal effluents were collected over a 9-h period after meal ingestion. Total nitrogen content was measured in effluents and correction for endogenous losses evaluated with the protein-free group was used to determine true digestibility of zein and WPI proteins.

Results: The mean ileal endogenous nitrogen flow was 3.89 ± 1.41 mmol/h (mean \pm SD). For zein, mean dietary nitrogen flow rate was 12.1 ± 6.9 mmol/h, reaching 23.6 ± 13.5 mmol/h 4h after the meal. In comparison, mean dietary nitrogen flow rate for WPI was significantly lower (1.6 ± 1.2 mmol/h, $P < 0.0001$). Ileal apparent and true nitrogen digestibility of zein was markedly lower than WPI ($11.7 \pm 11.4\%$ and $63.9 \pm 5.9\%$ for apparent digestibility of zein and WPI respectively, $P < 0.0001$; $32.2 \pm 11.0\%$ and $89.0 \pm 5.8\%$ for true digestibility of zein and WPI respectively, $P < 0.0001$).

Conclusions: In conclusion, we showed that zein is a poorly digestible protein. Among all the dietary proteins evaluated in humans, it presents the lowest value. Such a poor digestibility might be explained by the very low solubility of zein. On the contrary, the ileal digestibility of WPI is relatively high but lower than total milk proteins or casein measured in humans (around 95%). To further examine the digestibility of these 2 protein sources, amino acids bioavailability will be next evaluated.

Funding Sources: This study is funded by the Global Dairy Platform Incorporated.

Supporting Tables, Images and/or Graphs

