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Florence Guillin, Juliane Calvez, Laetitia Guérin-Deremaux, Catherine Lefranc-Millot, Nadezda Khodorova, et al.. Nutritional Quality Evaluation of a Pea Protein Isolate in Rats with or Without Amino Acid Supplementation (P08-064-19). Nutrition 2019, Jun 2019, Baltimore, United States. Current Developments in Nutrition, 3 (Supplement\_1), 2019, 10.1093/cdn/nzz044.P08-064-19 . hal-03296218

**HAL Id: hal-03296218**

**<https://hal.inrae.fr/hal-03296218>**

Submitted on 28 Jul 2021

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### Nutritional Quality Evaluation of a Pea Protein Isolate in Rats with or Without Amino Acid Supplementation (P08-064-19)

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**Objectives:** The global demand for protein is growing and it seems necessary to find new alternatives for animal proteins. Legumes are good candidates, as their indispensable amino acid (IAA) profile is relatively balanced. The aim of the study is to evaluate the nutritional quality of a pea protein isolate (NUTRALYS® pea protein), with or without methionine (Met) supplementation, using various indexes. We measured the Protein Efficiency Ratio (PER), the Digestible Indispensable Amino Acid Score (DIAAS) and the nitrogen balance in rats.

**Methods:** Study 1: 40 Wistar male rats weighing ~50 g were fed *ad libitum* for 28 days with a diet containing 10% protein with variation in protein sources only. 5 groups ( $n = 8$ ) were included: pea, casein, wheat gluten, pea-gluten combination, pea supplemented with Met. PER is obtained by the ratio between weight gain and protein intake throughout the experimental period.

Study 2: 45 Wistar male rats weighing ~250 g were housed in metabolic cages for 2 days and fed with a diet containing 14% protein of different sources. 5 groups ( $n = 9$ ) were included: pea, casein, gluten,

pea supplemented with Met, and protein-free diet for endogenous losses. Nitrogen content of diets, feces and urines was measured with an elementary analyzer for nitrogen balance (N ingested – N excreted). Then, rats were given a calibrated meal containing an indigestible marker and were euthanized 6 h later. Stomach, intestine, ileum, cecum, and colon contents were collected. DIAAS was calculated as follows: mg digestible IAA in 1 g of test protein\*100/mg of IAA in 1 g of reference protein. IAA in ileum contents and diets were assayed by UPLC.

**Results:** Values are means  $\pm$  SD.

Protein	PER (g/g)	Nitrogen balance 2 days (mg)	True fecal digestibility (%)
Pea	1.14 $\pm$ 0.27 a	458.4 $\pm$ 84.6 a	96.0 $\pm$ 1.0 a
Casein	2.55 $\pm$ 0.27 b	606.6 $\pm$ 68.1 b	93.7 $\pm$ 1.1 b
Gluten	0.47 $\pm$ 0.19 c	467.4 $\pm$ 172.1 a	95.6 $\pm$ 0.6 a
Pea + gluten	1.60 $\pm$ 0.16 d	/	/
Pea + Met	2.52 $\pm$ 0.33 b	640.9 $\pm$ 100.4 b	95.3 $\pm$ 1.2 a

Met supplementation allows pea protein to reach the PER of casein, but association with gluten is not sufficient. Nitrogen balance values are higher for casein and pea + Met. Fecal digestibility of pea protein is higher than casein in our conditions. Analysis for DIAAS calculation are ongoing.

**Conclusions:** Pea protein is highly digestible in our conditions and Met supplementation can improve its capacity to insure growth.

**Funding Sources:** Roquette.