

Table of Contents

In Press

Article Archive

[CJAS \(63\) 2018](#)
[CJAS \(62\) 2017](#)
[CJAS \(61\) 2016](#)
[CJAS \(60\) 2015](#)
[CJAS \(59\) 2014](#)
[CJAS \(58\) 2013](#)
[CJAS \(57\) 2012](#)
[CJAS \(56\) 2011](#)
[Issue No. 1 \(1-45\)](#)
[Issue No. 2 \(47-94\)](#)
[Issue No. 3 \(99-149\)](#)
[Issue No. 4 \(151-203\)](#)
[Issue No. 5 \(205-249\)](#)
[Issue No. 6 \(251-291\)](#)
[Issue No. 7 \(293-335\)](#)
[Issue No. 8 \(337-380\)](#)
[Issue No. 9 \(381-426\)](#)
[Issue No. 10 \(427-474\)](#)
[Issue No. 11 \(475-520\)](#)
[Issue No. 12 \(521-550\)](#)
[CJAS \(55\) 2010](#)
[CJAS \(54\) 2009](#)
[CJAS \(53\) 2008](#)
[CJAS \(52\) 2007](#)
[CJAS \(51\) 2006](#)
[CJAS \(50\) 2005](#)
[CJAS \(49\) 2004](#)

Editorial Board

Ethical Standards

Reviewers 2017

For Authors

Author Declaration

Copyright Statement

Instruction for Authors

Submission Templates

Fees

New Submissions/Login

Subscription

Use of the mobile nylon bag technique for determination of apparent ileal digestibilities of crude protein and amino acids in feedstuffs for pigs

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Three digestibility experiments (AID) of crude protein (CP) and amino acids (AA) by the mobile nylon bag technique (MNBT) using 21 feedstuffs and three mixed diets. In two conventional digestibility experiments (Exp. 1 and 2), AID were determined using in total 10 barrows (BW 35 kg) fitted with simple T-cannulas at the terminal ileum. For the MNBT studies, four pigs were fitted with a simple T-cannula at the proximal duodenum and a Post-Valve T-Caecum (PVTc) cannula at the terminal ileum. The MNBT studies included the feedstuffs ($n = 10$) from Exp. 1 and 2 as well as 14 further feedstuffs and mixed diets in which AID coefficients had been determined in previous trials. For each feedstuff 60 nylon bags were used. *In vitro* digestion of the bags was carried out in pepsin-HCl solution with 450 IU pepsin/l at pH 2.0 and 37°C for 4 h. In the 28-day *in vivo* experiment, 15 nylon bags per pig and day were inserted through the duodenal cannula and collected through the PVTc cannula after passage through the small intestine. Coefficients of AID were calculated based on the disappearance of CP and AA from the nylon bags during the *in vitro* and *in vivo* phase. In comparison with AID determined by the conventional method, AID of CP was on average 2.4% lower, whereas AID of lysine was on average 8.5% higher when determined by the MNBT. There was no significant ($P > 0.05$) correlation between AID coefficients of CP and AA determined by the conventional method and the MNBT, when all feedstuffs were taken into account. However, in cereals ($n = 11$), the correlation between AID coefficients determined by both methods was significant ($P < 0.05$) for CP ($r = 0.61$) and some AA (r ranging between 0.62 and 0.72). In conclusion, the potential of the MNBT to determine AID of CP and AA is rather limited. Differences in coefficients of AID of CP and AA were attributed to several factors such as diffusion of sample particles or endogenous protein through the nylon bags as well as to the presence of anti-nutritional factors (e.g. in legume seeds and oilseed meals).

Keywords:

mobile nylon bag technique (MNBT); ileal digestibility; crude protein; amino acids; pigs

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