Quantifying the effects of dietary fibres on protein digestibility in pigs

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Background

Dietary fibres may negatively affect apparent ileal digestibility of crude protein (AID CP) in different ways. Insoluble fibres (IDF) typically limit AID CP through physical hindrance of hydrolysing enzymes, whereas soluble fibres (SDF) may alter digesta viscosity to reduce hydrolysis and absorption.

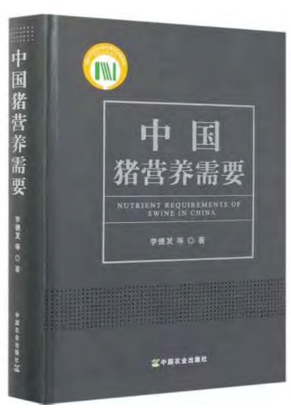
Objectives

To quantify the relationship between protein digestibility and total dietary fibre (TDF), soluble dietary fibre (SDF) or insoluble dietary fibre (IDF) content based on literature values for further prediction, thereby facilitating optimal use of resources.

Methods

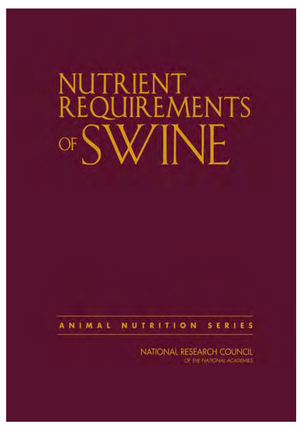
An analysis was performed to quantify the relation between total dietary fibre (TDF), SDF or IDF and AID CP. Data were collected from four databases, and analysed by ordinary least squares (OLS) with R.

Peer-reviewed publications (PRP)
n=58



China Feed Data (MAFIC)
n=33

Centraal Veevoeder Bureau (CVB)
n=40



National Research council (NRC)
n=18

Results

Table 1 The effect of total dietary fibres (TDF) (%, DM basis) on the apparent ileal digestibility (AID) of crude protein (CP) (%) in cereals in growing pigs as estimated using linear regression, in complete diets reported in peer-reviewed publications, and in ingredients reported in various databases

	PRP	MAFIC	CVB	NRC
Slope (% per % TDF)	-0.6	-0.7	-0.8	-0.2
r	-0.70	-0.81	-0.79	-0.6
P	<0.01	<0.01	<0.01	0.05

Table 2 The effect of total dietary fibres (TDF) (%, DM basis) on the apparent ileal digestibility (AID) of crude protein (CP) (%) in noncereals in growing pigs as estimated using linear regression, in complete diets reported in peer-reviewed publications, and in ingredients reported in various databases

	PRP	MAFIC	CVB	NRC
Slope (% per % TDF)	-0.9	-0.8	-0.5	-0.5
r	-0.59	-0.75	-0.59	-0.53
P	<0.01	<0.01	<0.01	0.22

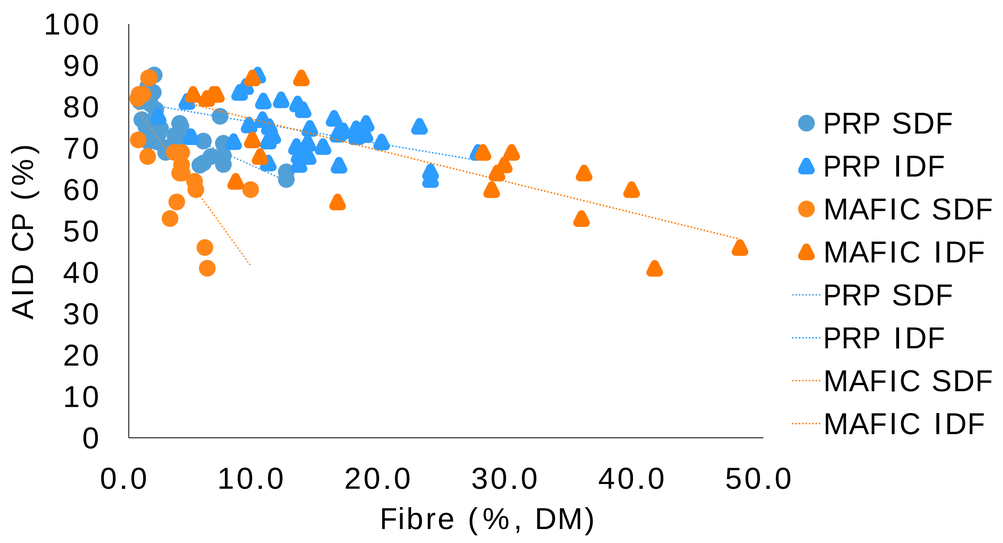


Figure 1 Relation between soluble dietary fibre (SDF), or insoluble dietary fibre (IDF) (g/100g DM) in cereals and apparent ileal digestibility of crude protein (AID CP)

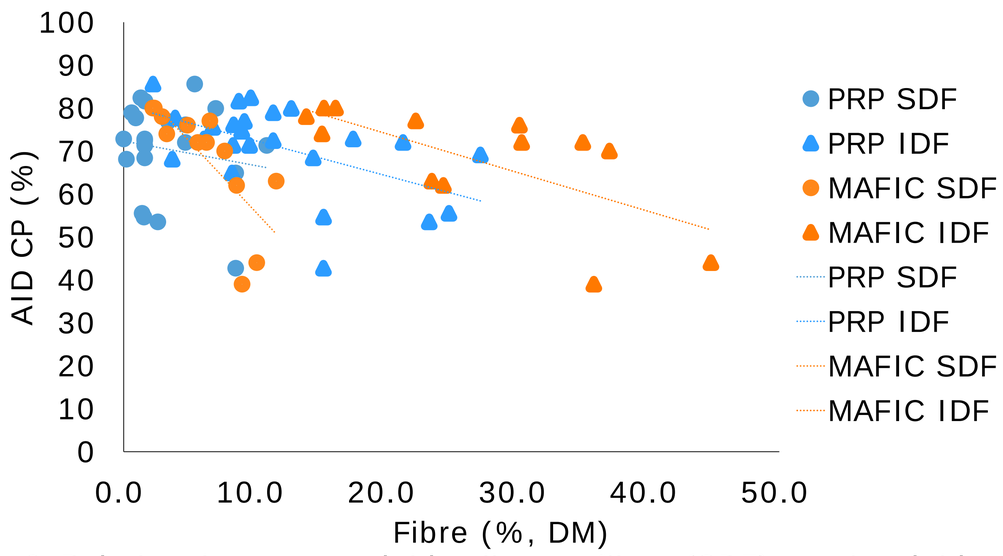


Figure 2 Relation between soluble dietary fibre (SDF), or insoluble dietary fibre (IDF) (g/100g DM) in non-cereals and apparent ileal digestibility of crude protein (AID CP)

Conclusions

- Apparent ileal digestibility of crude protein decreased by 0.5-0.9%-units per %-unit increase in TDF;
- In cereal ingredients the negative relation was more pronounced for SDF, but not for non-cereal ingredients, as expected based on the type of fibers present.

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