Digestible and net energy contents of two types of extruded rice for weaner and grower pigs

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Published data regarding the energy content of rice for pigs are scarce, apart from the NRC's (1998) estimate of 14.9 MJ of digestible energy (DE)/kg for white rice. Extruded rice most likely has a higher energy value for pigs than white rice because of its high digestible starch content. Establishing the energy content of extruded rice is needed so diets can be formulated accurately for pigs of different weights. The purpose of this study was to examine the DE and calculated net energy (NE) contents of two types of extruded rice in weaner and grower pigs. The hypotheses tested were 1) rice with a lower amylose-to-amylopectin ratio will have a higher DE and NE content than a variety with a higher amylose-to-amylopectin ratio, and 2) heavier pigs will extract more energy from rice than lighter pigs.

Thirty-two male pigs (Large White x Landrace, 16 pigs per body weight group) were used in a 2 x 2 factorial arrangement of treatments, with the respective factors being a) two rice types (Amaroo medium-grain, lower amylose-to-amylopectin ratio *vs.* Doongara long-grain, higher amylose-to-amylopectin ratio) and b) two body weight groups (weaner and grower). The average body weights for each group were (mean ±SEM) 7.9 (±0.16) kg and 55.4 (±3.10) kg, respectively. The pigs were offered their respective experimental diet at a rate of 5% and 3.75% of body weight for weaner and grower pigs (about 90% of *ad libitum*), respectively. The diet was formulated to contain 859 g rice/kg, 15.3 MJ DE/kg and 0.6 g lysine/MJ DE. Other ingredients used were meat and bone meal, canola meal, canola oil and vitamin/mineral supplements. Titanium dioxide (TiO_2) was added as an inert marker for apparent digestibility estimation. Pigs were adapted to their experimental diets for seven days. Faecal grab samples were then collected at 0800, 1000, 1200, 1400, 1600 h for the next three days, dried and sub-sampled for subsequent analyses. The NE contents of rice were determined using published equations from the Dutch CVB tables and from INRA (Sauvant *et al.*, 2004). The ANOVA analysis of Statview 5.0 for Windows (SAS Inc.) was used for statistical analysis.

Table 1. Main effects of types of extruded rice and body weight of pigs on the digestible energy (DE MJ/kg as is) and net energy (NE MJ/kg as is) contents.

Treatment	Energy digestibility (%)	DE	NE-CVB[1]	NE-INRA[2]
Medium grain rice	91.7[b]	15.1[b]	11.1	11.9
Long grain rice	91.5[b]	15.1[b]	11.2	11.8
Weaner pigs	90.2[a]	14.8[a]	-	11.8[§]
Grower pigs	92.9[c]	15.4[c]	-	12.1[§]
s.e.m.	0.30	0.06		

[1,2]Calculated from CVB and INRA formulae (Sauvant *et al.*, 2004);
[abc]Values within a column without a common superscript are significantly different (P<0.05);
[§]Calculated using determined DE value and INRA equation.

The mean (±SEM) gross energy digestibility and DE content (MJ/kg air-dry basis) of rice were 91.6% (0.30) and 15.1 (0.06), respectively. Variety had no influence on the DE content. Weaner pigs extracted less energy from a given rice than grower pigs (0.6 MJ, P<0.001). The interaction between variety and body weight was not significant. Estimation of the NE content of the two rice types using CVB and INRA formulae showed a mean NE content of 11.5 MJ/kg, although this differed according to whether CVB or INRA equations were used. This study suggests that the DE and NE content of rice might be higher than originally thought (compared to 14.9 MJ and 9.60 MJ/kg, respectively; NRC, 1998), and weaner pigs extract 0.6 MJ/kg less DE from a given rice type than grower pigs.

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References

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