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# Optimum Trp/Lys ratio in nursery pig diets (6-20 kg)

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**SUMMARY** – Tryptophan is an essential amino acid that belongs to the neutral aminoacids group. It is the fourth-limiting AA in growth and finishing diets, but in corn-soybean meal based diets it is the second-limiting AA after lysine. Besides being a factor in protein synthesis in the muscle, tryptophan is a precursor of serotonin, which is a part of the voluntary feed intake control system. There are several recommendations about the inclusion levels of tryptophan in nursery diets. For this reason, we have developed two experimental trials to analyse the response of nursery pigs (6 to 20 kg of BW) to diets supplemented with synthetic L-tryptophan. We tested responses to two different Trp/Lys ratios, two different NE levels and different crude protein concentrations.

**Key words:** Tryptophan, piglets, Trp/Lys ratio.

**RESUME** – "Proportion optimale Trp/Lys dans les régimes des porcelets (6-20 kg)". Le tryptophane est un acide aminé essentiel appartenant au groupe des acides aminés neutres. Il est le quatrième AA limitant dans et les régimes de croissance et finition, mais dans les régimes à base de farine de maïs-soja il est le deuxième AA limitant après la lysine. A part d'être un facteur dans la synthèse protéique chez le muscle, le tryptophane est un précurseur de la sérotonine qui est une partie du système de contrôle de l'ingestion volontaire des aliments. Il y a plusieurs recommandations sur les niveaux d'inclusion du tryptophane dans les régimes premiers âges. Pour cette raison, on a développé deux essais expérimentaux afin d'analyser la réponse des porcelets (6 à 20 kg de PC) à des régimes supplémentés avec du L-tryptophane synthétique. On a testé les réponses à deux proportions Trp/Lys différentes, deux niveaux de EN différents et des concentrations de protéine brute différentes.

**Mots-clés :** Tryptophane, porcelets, proportion Trp/Lys.

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## Introduction

In swine diet formulation, the concept of ideal protein is being applied worldwide. Due to the relative importance of maintenance requirements when compared to those of production, it seems appropriate to think that composition of ideal protein will vary with age of the pig. Several recent studies appear to show that the ratio 18% Trp/Lys should be incremented to 22 % for weaning pigs in order to optimise their production performance (Séve *et al.*, 1991; Castaign and Cambeilh, 1998; Séve and Le Floch, 1998; Warnants *et al.*, 1998; Castaign, 1999).

## Material and methods

Two trials were performed with weaned pigs (6-7 kg BW), controlling their growth rate and feed efficiency until they reached 20 kg BW. In each trial, ninety-six Daland x Pietrain pigs were assigned to one of two treatments (Control and Tryptophan). Pigs were allotted in 8 groups (replicates) of 6 pigs each (3 males and 3 females).

In the first trial (Table 1), diets were formulated with 2580 kcal NE, 23% crude protein and 1.29% digestible Lys. The two Trp/Lys ratios (Control and Tryptophan) tested were 17.6% and 20.5% respectively. In the second trial (Table 1), diets were formulated with 2440 kcal NE, 17.5% crude protein (based on recommendations to avoid nitrogen pollution) and 1.05% digestible Lys. The two Trp/Lys ratios tested were 17.1% and 21% respectively.

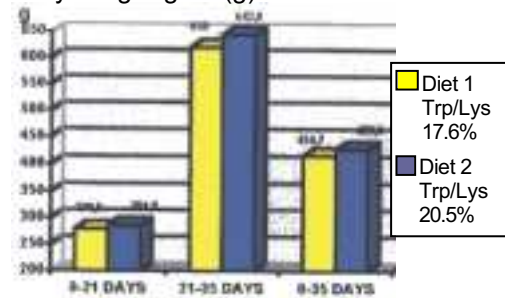
## Results and discussion

Results from the trials are summarised in Fig. 1.  
Table 1. Trials in the experiment

	1st Experimental trial		2nd Experimental trial	
	Diet 1	Diet 2	Diet 1	Diet 2
NE	2580	2580	2440	2440
CP	23	23	17.5	18
Lys <sub>0</sub>	1.29	1.29	1.05	1.05
Trp/Lys	17.6	20.5	17.1	21
Met/Lys	30	30	30	30
Thr/Lys	65	65	65	65

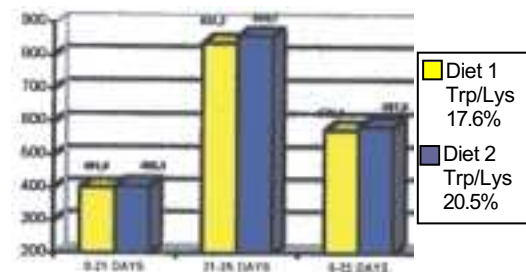
TRIAL 1:

Daily weight gain (g)



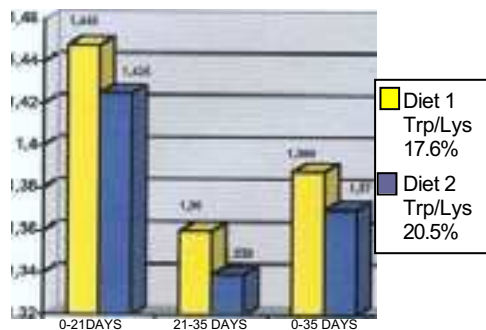
Improvement  
2.29%      4%      3.3%

Feedintake (g)



Improvement  
4.3%      3.3%      3.9%

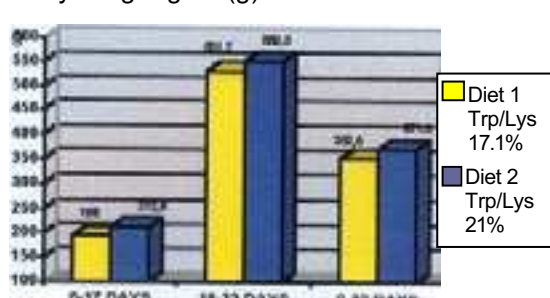
Feed conversion



Improvement  
1.6%      1.57%      1.31%

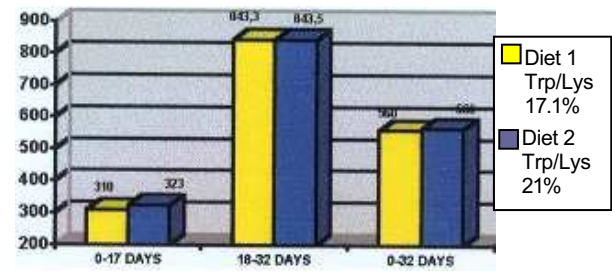
TRIAL 2:

Daily weight gain (g)



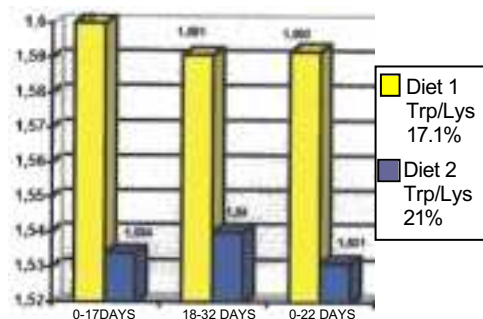
Improvement  
1.6%      1.57%      1.31%

Feedintake (g)



Improvement  
9%      4%      5.4%

Feed conversion



Improvement  
4.3%      3.3%      3.9%

Fig. 1. Results from the trials.

## Conclusions

Even though the statistical significance value was small ( $P < 0.25$ ), in both trials there was an improvement in growth rate between 3.5 and 5.4%, which can be credited to a larger voluntary feed intake (between 2 and 4%). Feed efficiency was improved between 1.1% and 1.3%.

These results are in concordance to those obtained in trials in other countries mentioned previously. Based on these results the optimum Trp/Lys ratio should be established around 22% for weaning pig diets.

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