
THE THREONINE REQUIREMENT OF THE SOW IN LACTATION

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Summary

Threonine is often the second limiting amino acid in most practical swine diets. Therefore, the threonine requirement of the high producing sow in lactation was determined in this study.

Using a total of 419 C-15 PIC sows, the threonine requirement to minimize sow tissue breakdown was found to be 37.3, 40.0 and 38.9 g total threonine/d (28.7, 30.8 and 30.0 g digestible threonine/d) for parity 1, 2 and 3+ sows, respectively. To maximize litter growth, the threonine requirement was found to be 36.6, 39.2 and 38.2 g total threonine/d (28.2, 30.2 and 29.5 g digestible threonine/d) for parity 1, 2 and 3+ sows, respectively.

Introduction

Threonine is often the second limiting amino acid in swine diets; however, limited research has been conducted on the threonine requirement of the sow. Our objective was to determine the threonine requirement for the high-producing sow in lactation.



Materials and Methods

Lactation diets were formulated to contain 0.80 or 1.06 per cent total lysine with threonine set at 37.5 per cent of lysine and added in increments of 0.05 per cent to maximum total threonine levels of 0.65 and 0.70 per cent for the 0.80 and 1.06 per cent lysine diets, respectively. Sow body weight was measured at days 1, 10, 18 and weaning (mean lactation length = 20.1 days). Average daily feed intake (ADFI) was measured for days 0-7, 8-11, 12-15, 16-19 and 20-weaning. Litter size was adjusted to a minimum of 11 piglets and the litters were weighed at birth, days 7, 11, 15, 19 and weaning. Blood was collected on days 10 and 18 of lactation for plasma urea nitrogen analysis. The weaning to estrus interval and subsequent litter size were recorded.

Results and Discussion

Sow ADFI exceeded expectations, averaging 6.9, 7.4 and 7.2 kg/d for parity 1, 2 and 3+ sows, respectively. Sows gained an average of 4.8 kg in lactation and body weight gain was maximized at 0.54 per cent total threonine (Figure 1; $P < 0.05$). Plasma urea nitrogen levels were minimized at 0.54 per cent total threonine (Figure 2; $P < 0.05$).

Average piglet weight at weaning (5.6, 6.2 and 5.8 kg for parity 1, 2 and 3+, respectively) and litter weight gain (2.49, 2.53 and 2.44 kg/d for parity 1, 2 and 3+, respectively) were maximized at 0.53 per cent total threonine (Figure 3; $P < 0.05$). The subsequent total number of piglets born (mean = 11.3) was not affected by threonine ($P > 0.10$).

Implications

The maintenance requirement for threonine in the sow is 41 mg total threonine/kg BW^{0.75}. The threonine requirement for litter growth is 14.3 g total threonine/kg litter growth. From these requirements, pork producers can calculate the threonine requirement of lactating sows on their farms.

Acknowledgements

Strategic funding provided by Sask Pork, Alberta Pork, Manitoba Pork and Saskatchewan Agriculture and Food Development Fund.

The authors gratefully acknowledge Degussa-Huels AG for project funding, donation of amino acids and amino acid assays.

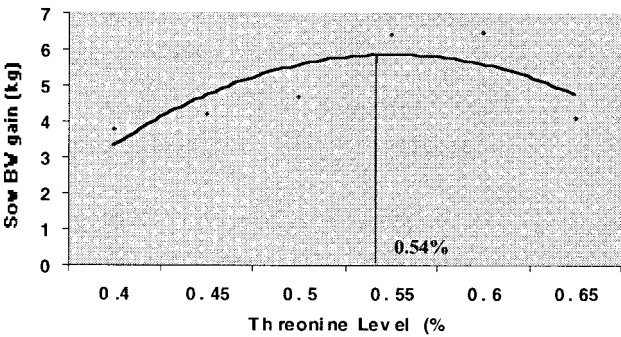


Figure 1. Effect of dietary total threonine level (%) on sow BW changes in lactation (kg).

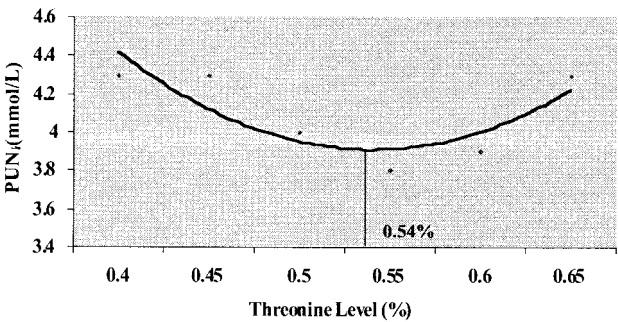


Figure 2. Effect of dietary total threonine level (%) on plasma urea nitrogen levels (mmol/L) in lactation.

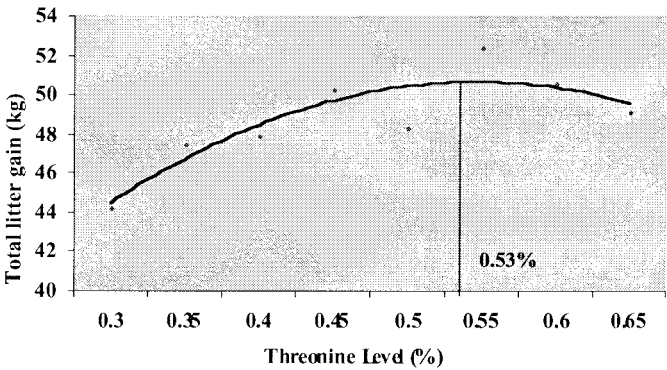


Figure 3. Effect of dietary total threonine level (%) on total litter gain (kg) in lactation.