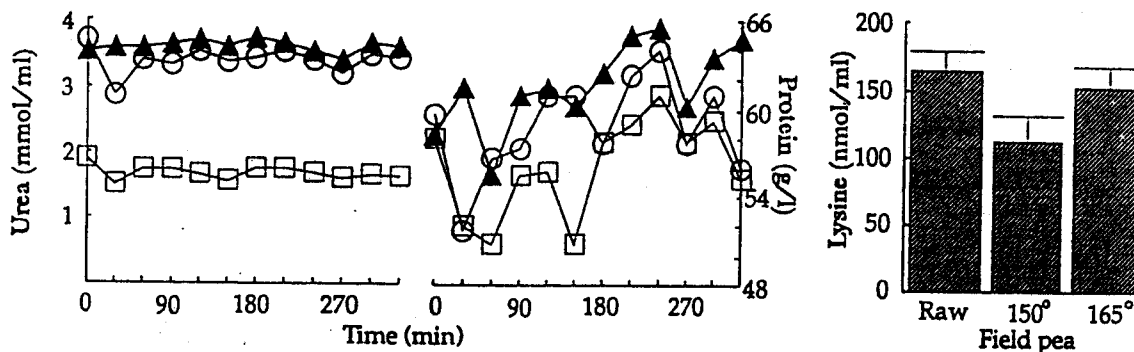


EFFECT OF HEAT ON FIELD PEAS ON SERUM UREA, SERUM PROTEIN AND PLASMA LYSINE LEVELS IN GROWING PIGS

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Although heat applied to protein concentrates significantly decreases the utilisation of ileal digestible lysine by growing pigs (van Barneveld et al. 1991) the mechanism by which amino acids can apparently be absorbed but poorly utilised is unclear. Low utilisation of amino acids from heated proteins may increase deamination of non-utilisable amino acids, and hence increase urea formation, or conversely, may increase protein and amino acid levels in the blood. The aim of this experiment was to determine the effect of heat on field peas on serum urea, serum protein and plasma lysine levels in growing pigs.

Three sugar-based diets containing field peas (*Pisum sativum* cv. Wirrega) or field peas heated to 150° or 165° were formulated to contain equal levels of ileal digestible (ID) nitrogen (1.15 g/MJ DE) and ID lysine (0.36 g/MJ DE). All other essential amino acids were added to at least a 0.15 surplus relative to lysine, in an identical balance, to ensure lysine was limiting. Six Large White female pigs (~38kg ± 2.5) were fitted with jugular catheters via peripheral ear veins. Each pig received two diets during the experiment (four reps/diet) allocated in an unbalanced incomplete block design with a 7 day change-over period. Pigs were fed frequently (eight times daily) to three times maintenance (0.5W_{kg}^{0.75}). Serial blood sampling was conducted at the end of each feeding period. Serum urea and serum protein was determined using a Beckman CX5-3 Biochemistry Autoanalyser. Plasma samples were collected 15 minutes following the first morning feed on the day of sampling and lysine concentrations determined using reverse-phase chromatography.



Significant reductions in serum urea and serum protein ($P < 0.001$) occurred in pigs fed peas heated to 165° (Fig. 1). There was no significant difference ($P > 0.05$) in plasma lysine levels (Fig. 2).

Lower serum urea and serum protein levels in pigs fed peas heated to 165° indicates that there was no apparent increase in the absorption of non-utilisable amino acids, and hence, no increase in deamination and urea formation. Ammonia production, from greater hind-gut fermentation of undigested protein in pigs fed raw peas and peas heated to 150° (van Barneveld et al. 1993) may account for the higher serum urea levels with these diets.

Similar plasma lysine levels suggest similar absorption of utilisable lysine following digestion for all treatments, or that plasma amino acids are insensitive to small changes in dietary amino acids.

The results suggest that either the non-utilisable lysine in heated peas is not being absorbed following digestion, or it is being absorbed and metabolised in the gut wall.

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