Ambient temperature do not affects branched-chain amino acids
postprandial metabolism in growing pigs

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The branched-chain amino acids leucine, isoleucine and valine are indispensable amino acids because they
cannot be synthesized by the pig and therefore must be obtained from the diet to maintain growth and health.
In hot conditions, pigs decrease nutrients intake to reduce heat production associated with digestive and
metabolic processes. Therefore, ambient temperature is supposed to induce changes on amino acids partitioning
and utilization. In this regard, the objective of this study was to evaluate the effects of ambient temperature on
leucine, isoleucine and valine postprandial metabolism. Twenty-eight growing pigs equipped with a jugular
catheter were divided into two groups and housed in thermo-neutral (TN, 24ºC) or high (HT, 30ºC) ambient
temperature-controlled rooms. Pigs remained in the temperature-controlled rooms for a period of 21 days
divided in a 14 days adaptation period and a subsequent seven days experimental period (from day 1 to 7).
On day 4, all the animals received 300 g of feed after a fasting period overnight, and serial blood samples
(4 mL) of each animal were collected over a period of four hours in order to measure plasma amino acids
concentrations. Amino acids postprandial concentrations were analyzed using the linear MIXED procedure of
SAS including the fixed effects of ambient temperature. The analysis of postprandial amino acids variations
suggests negligible direct effects of high ambient temperature on leucine, isoleucine and valine. This absence
of significant effects might be explained by the prior acclimation of pigs to the high ambient temperature.
Accordingly, previous studies have demonstrated that adaptation of pigs to an ambient temperature of 30ºC
required three to four days.

Keywords: heat stress, isoleucine, leucine, nutrients, valine

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