

## Changes in microbial nitrogen synthesis in the rumen of lactating Holstein cows by exposure to hot condition

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### Abstract

The changes in microbial nitrogen synthesis in the rumen of lactating dairy cows by exposure to hot condition were examined using four Holstein cows. The cows were kept under thermoneutral temperature(18°C) for fourteen days and then exposed to hot temperature(28°C) for the following two weeks; the relative humidity in both temperatures was 60%. The results showed that urinary allantoin excretion correlated with dry matter intake ( $r=0.76$ ,  $P<.05$ ) and nitrogen intake ( $r=0.71$ ,  $P<.05$ ), while concentration of urinary creatinine correlated with decreased body weight ( $r=0.83$ ,  $P<.05$ ) as a proof of body tissue mobilization. In the hot environmental temperature, allantoin excretion in urine decreased. However, the utilization rate of nitrogen for microbial nitrogen synthesis during heat exposure increased on average from 63.4% (at 18°C) to 75.6 % (28°C). Microbial nitrogen synthesis per digestible organic matter intake increased on average from 20.4 (at 18°C) to 23.0 gN (28°C). The utilization rate of nitrogen and digestible organic matter intake for microbial nitrogen synthesis during the heat exposure increased as the heat exposure was prolonged.

Key words: Allantoin, microbial nitrogen, hot temperature, digestibility, dairy cow