

## Lysozyme supplementation reduces methane emissions in Italian Holstein Heifers

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The objective of the study was to assess the effect of lysozyme supplementation at various concentrations on enteric methane emissions, performance, rumen metabolism, and overall health of Italian Holstein heifers. The trial was performed at the Research center (CZDS) in Lodi on 36 heifers housed in a free stall barn. The trial lasted 42 days and the animals were divided into 4 homogenous (age, weight) experimental groups (n=9). Each group was fed with an experimental diet: a control diet (C), a diet supplemented with 2,000 U of lysozyme (T2), a diet supplemented with 4,000 U of lysozyme (T4), a diet supplemented with 10,000 U of lysozyme (T10). Heifers were fed with a total mixed ration (TMR) diet *ad libitum* once daily (12 am). Feed intake and dry matter intake were measured daily and individually thanks to the Roughage Intake Control (RIC) system. Live body weight (LBW), body condition score (BCS), withers height, and heart girth were measured weekly. At day 0, 21 and 42 of the trial, samples of urine and blood were collected. Ruminal fluid samples were collected at day 0 and 42 of the trial. Concurrently, methane emissions were recorded using the Laser Detector Methane System. Data were analyzed by mixed procedure of SAS for repeated measurements. Significance was set up for  $p < 0.05$ . No significant differences were observed among the experimental groups for feed and water intake, LBW, BCS, withers height, heart girth, and feed conversion ratio. The administration of lysozyme did not influence urinary and ruminal pH, nor did it affect the parameters of blood analysis, maintaining the ruminal, metabolic and overall health of the animals. Regarding the enteric methane emissions, instead, our study demonstrated that the administration of 10,000 U and 4,000 U of lysozyme significantly reduced ( $p < 0.05$ ) the enteric methane emission peaks at day 42, compared to C. We can conclude that under our study conditions, the inclusion of lysozyme in heifers' diet significantly reduced methane emissions after 42 days of treatment, without negatively impacting performance and health status of the animals.

Keywords: methane production, lysozyme, heifers

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