Animal performance and methane emission: directly proportional

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The increase of greenhouse gases (GHG) in the atmosphere has been considered to be as the major cause of the global warming. In this context, agribusiness, especially the Brazilian livestock production sector, has been one target of concern. This is because cattle represent 83.9% of all livestock production in Brazil; moreover, the country has the second largest cattle herd in the world. Optimizing animal productivity is achieved by intensifying production systems in a way that makes conscious use of resources such as plant, animal and environment. The aim of this work is investigating the effects of intensification of livestock production systems on the methane emission by Nellore bulls. Thus, this study will allow pointing out which, among the most productive systems available, have the greatest potential to mitigate GHG. The experimental design compounding four animals (Nellore bulls – 18-24 months) in each grazing system, being 1 animal for performance evaluation, 1 animal for ruminal parameter, 2 animals for methane evaluation whereby grazing systems consists: The treatments consisted of five different grazing systems, with two replications, being: 1) intensively managed and irrigated *Megathyrsus maximus (syn. Panicum maximum)* Jacques cv. Tanzânia with high stocking rate (IHS); 2) intensively managed rainfed *Megathyrsus maximus* cv. Tanzânia, with high stocking rate (RHS); 3) rainfed pasture with a mix of *Urochloa (syn. Brachiaria) decumbens* Stapf cv. Basilisk and *Urochloa (syn. Brachiaria) brizantha* (Hochst ex A. Rich) Stapf cv. Marandu, with moderate stocking rate (RMS); 4) livestock-forestry system with *Urochloa decumbens* cv. Basilisk and Brazilian native trees, with moderate stocking rate (LFS); and 5) degraded pasture of *Urochloa decumbens* cv. Basilisk, under extensive management (DP). A randomized block design and to calculate de parameter was used linear regression. All pastures were grazed by Nellore steers and submitted to stocking rate adjustments using the "put and take" technique, to maintain the specific stubble height for each forage species. In this study, the animal performance (kg d^{-1} per animal) and methane emission in kilograms per year per animal (kg $animal^{-1}$ y^{-1}) of two of the four testers in each system were evaluated. The animals had an initial weight of 383 kg as a covariate. Depending on the intensification system and the daily weight gain, it tends to emit more or less methane. However, the heavier the animals (IHS = 111.48; RHS = 100.68; RMS = 100.19; DP = 90.64; LFS = 89.51 kg $animal^{-1}$ y^{-1}), more methane they will emit (R^2 = 0,766) (IHS = 0.81; RHS = 0.58; RMS = 0.67; DP = 0.40; LFS = 0.25 kg d^{-1}). Therefore, this does not mean that it is an inefficient system.

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