UMR1213 Herbivores

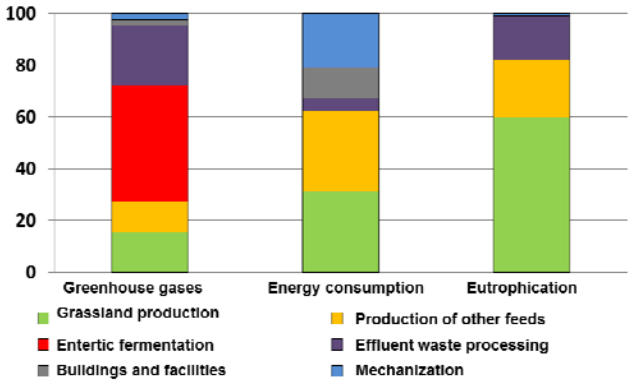
Microbial digestion and absorption Team (DIMA)

Ways to mitigate greenhouse gases emission and other environmental impacts in beef systems

A raft of management changes is needed for beef production systems to improve their environmental performances.

Livestock farming is a driver of some damaging effects on the environment, including greenhouse gas emission. This major issue requires analysis of the root causes and proposals for mitigation solutions. For this purpose, we carried out a life-cycle assessment on beef cattle systems.

A first study compared 3 bull fattening diets, based either on maize silage, hay plus concentrates, or concentrate-rich rations. The latter system results in a strong decrease in enteric methane compared to the other two diets, but the difference is partially lost when taking into account all greenhouse gas emissions. This system presents the highest energy demand and the highest risk of eutrophication, whereas the maize silage diet results in the lowest energy demand, and the hay/concentrate diet in the lowest eutrophication risk.



A second study was designed to analyze the environmental impacts of the whole beef cattle system. The cow-calf herd with heifers contributes to 90% greenhouse gas emissions and risk of eutrophication and 83% of energy demand. The main contribution to greenhouse gas emissions is enteric methane. The risk of eutrophication is primarily related to the use of forages (as pasture or conserved).

Eight proposals have been analyzed in order to improve environmental performances. None of them, taken alone, has a significant effect. The simultaneous application of several techniques (2-year calving, decreasing Nitrogen fertilization and grass losses when grazing, replacement of soybean meal by rapeseed meal, and diet enrichment with omega-3 fatty acids during fattening) makes it possible to achieve a roughly 15% cut in environmental impacts.

Taken together, these studies show that the effect of beef farming on the environment is due to diet composition for bull fattening, but that diet ranking varies according to the nature of the impact. It is more difficult to mitigate impacts for the whole system, but simultaneously applying several management techniques can tangibly improve environmental performances.

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