

Carbon footprint of beef cattle in five different Galician production systems: comparing intensive and extensive management.

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Abstract

Statement of the Problem The carbon footprint (CF) of beef cattle is used in developing countries in order to evaluate of reduction the greenhouse gas (GHG) emissions originated for the livestock production. The type of farming system, the location and the type of management practices are fundamental contributions to compare the life cycle of the meat productions. The purpose of this study is to compare the results of CF calculation of five contrasting production scenarios in Galicia, in the north of Spain: extensive (ES), semi-extensive (SME) and intensive system (IS), moreover two with adult bovine: adult female intensive (AFI) and adult male extensive (AME).

The CF should be seen as an opportunity for Galician meat sector and the origin for improving the competitive of our beef farm.

Methodology: The evaluation of the GHG emissions was estimated throw "cradle to gate farm" by a Life Cycle Assessment (LCA) approach and the calculation of CO₂e per 1 kg of live weight (LW) meat of farm located in the north of Galicia. The categories of feeding were: 1) not-stabled animals feed with natural grass (ES); 2) semi-stabled ones with natural grass supplemented conventional feed (SME), 3) stabled calves with regular feed (IS), 4) stabled cows from dairy farms (AFI) and 5) not-stabled adult steers (AME). **Findings:** The complexity has been in obtaining the primary data being small farms. The obtained data is part of the CF study most completed that has been made in the Galician meat sector to date. **Conclusion:** The results of CF calculation of the different management show that ES (20.98 kg CO₂e/kg LW) produces more GHG emissions than SME one (17.78 kg CO₂e/kg LW) and much more than IS (3.009 kg CO₂e/kg LW). Regarding to adult bovine production, the emissions were highest in AME (20.66 kg CO₂e/kg LW), followed by AFI (2.187 kg CO₂e/kg LW). The enteric fermentation is the more ponderous contribution, with values ranged between 77%(ES)-46%(SME)-20% (IS) of the global result and it followed by the raw material consumption with a range of 19%(ES)-45%(SME)-25% (IS). The Galician case presents similar results that were recently proposed in literature. This study contributed to identify the points of Improvement of the cattle production chain and indicate mitigation priorities in Galicia.

Image

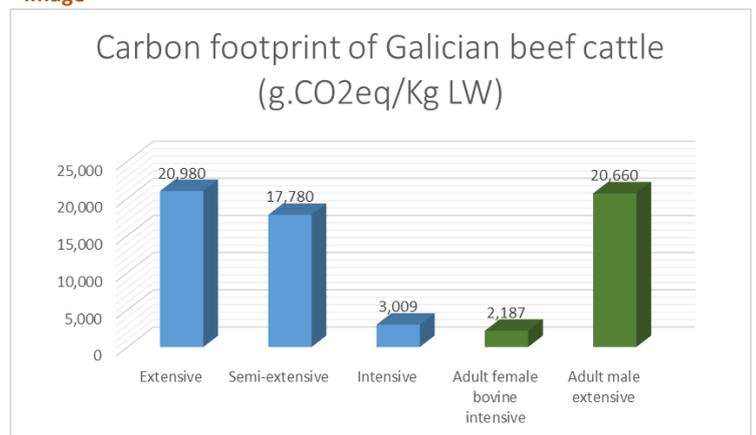


Figure 1. - Estimation of the carbon footprint of beef cattle in five contrasting production scenarios in Galicia, north of Spain.

Recent Publications

1. Florindo, T.J., Florindo, G.I.B.D.M., Talamini, E., (...), Pinto, A.T., Ruviaro, C.F. (2018) Application of the multiple criteria decision-making (MCDM) approach in the identification of Carbon Footprint reduction actions in the Brazilian beef production chain. *Journal of Cleaner Production* 196, pp. 1379-1389.
2. De Figueiredo, E.B., Jayasundara, S., de Oliveira Bordonal, R., (...), Wagner-Riddle, C., La Scala, N. (2017) Greenhouse gas balance and carbon footprint of beef cattle in three contrasting pasture-management systems in Brazil. *Journal of Cleaner Production* 142, pp. 420-431.
3. Florindo, T.J., de Medeiros Florindo, G.I.B., Talamini, E., da Costa, J.S., Ruviaro, C.F. (2017) Carbon footprint and Life Cycle Costing of beef cattle in the Brazilian midwest. *Journal of Cleaner Production* 147, pp. 119-129.
4. Buratti, C., Fantozzi, F., Barbanera, M., (...), Chiorri, M., Cecchini, L. (2017) Carbon footprint of conventional and organic beef production systems: An Italian case study. *Science of the Total Environment* 576, pp. 129-137.
5. Desjardins, R.L., Worth, D.E., Vergé, X.P.C., Maxime, D., Dyer, J., Cerkowniak, D. Carbon footprint of beef cattle (2012)

Biography

She is agronomist engineer and currently works in the Project Office of the Meat Technology Center since 2009, developing R&D&i, transfer and dissemination management tasks. She has knowledge in business management with more than ten years in the private sector. Outstanding experience in cross-border cooperation projects and business collaboration through technological funds. She has participated in more than 40 R&D&i projects along with others for tax deduction, has published a book of dissemination and various communications to congresses. She is currently doing her PhD in Food Science and Technology at the University of Vigo.

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