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*La seguridad alimentaria en América Latina*

**Can the carbon footprint of Brazilian pig production be reduced by using co-products in diets?**

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**Resumo**

The environmental impacts of livestock system, especially pig production, have come under increase debate in recent years. The challenge is meeting the growing demand for food at an affordable cost, without compromising the environmental integrity. Previous studies have shown that feed production is responsible for the majority of CO<sub>2</sub>-eq. emission resulting from pig farming system. Furthermore, due to the concern on food-feed competition, there is an increased interest in using alternative feedstuffs in livestock diets. The implications of using co-product from food processing in pig diets for the environmental impacts were examined using Life Cycle Assessment (LCA), under Brazilian pig systems. The pig fattening in South Region of Brazil was considered to carry out the LCA, including production and transport of feedstuffs and complete feeds, raising of pigs, and manure management. Impacts were estimated at farm gate and the functional unit was one kg of body weight gain (BWG) over fattening. We considered a fattening pig farm using diets based on maize and soybean meal, with amino acids inclusion, in a 4-phases feeding program. Soybean was assumed to be produced without deforestation. The following diets were evaluated: diet with soybean meal as protein rich ingredient (Control); diet with soybean meal and meat and bone meal as protein rich ingredients (Co-product). Diets were formulated at least cost. Performance and excretion of pigs from 30 to 115 kg BW on average, were simulated for each protein source scenario using InraPorc population model (24,000 pigs/scenario) and considering between-animal variability. The LCA calculations were performed for each pig, according to its individual performance and excretion, using a model developed with SAS software and the results were subjected to variance analysis. The climate change impact of pigs fed with Control diet was 2.45 kg CO<sub>2</sub>-eq. per kg BWG, while estimated potential impacts of eutrophication and acidification were 17.5 g of PO<sub>4</sub>-eq. and 58.4 g of SO<sub>2</sub>-eq. per kg BWG, respectively. The Co-product used in pig diets reduced by 4% the potential impacts of climate change compared with the Control, with mean value of 2.36 kg CO<sub>2</sub>-eq. per kg BWG. Conversely, for eutrophication and acidification, Co-product strategy slightly increased the impact by about 1 and 3%, respectively. Results indicated that the inclusion of co-products, as meat and bone meal, in growing-finishing diets can reduce the carbon emissions in pig farming system, whereas it has no benefit for other impacts such as eutrophication and acidification.

**Palavras-chave:** climate change, environmental impact, global warming potential, life cycle assessment, pig