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“CLEANER PRODUCTION FOR ACHIEVING SUSTAINABLE DEVELOPMENT GOALS”

## Evaluation of the Potential Environmental Impacts Generated in the Production of Chicken (Meat) Using the Methodology of Life Cycle Analysis "LCA" by Attributes from Door to Door

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### Abstract

The methodology of Life Cycle Analysis (LCA) according to the typology by attributes, was implemented to the general poultry process (transport of fertile egg and chicken meat, laying hens farm, broilers and / or reproduction farm, Plant of profit or sacrifice, wastewater plant and storage and distribution plant for chicken meat). The purpose of the LCA analysis was to identify, classify and evaluate the potential environmental impacts (PEI) generated in the different unit operations that make up the life cycle of chicken meat in Santander, Colombia. The construction of the inventory was carried out with data from the poultry industry of a confidential nature (consumption of chemicals, natural resources, fuel and the generation of liquid and atmospheric waste) and literature (emissions associated with the generation of chicken manure, consumption of electric energy and fossil fuel). The scope of the LCA includes the evaluation of the PEIs from door to door, and the impacts associated with the consumption of raw materials such as: water, electricity, natural gas, chemical inputs (additives, coagulants, disinfectants, etc.) and the final disposal of waste (liquid, solid and gaseous). The ACV methodology took as reference the Colombian Technical Standards (NTC-ISO 14040 and NTC-ISO 14044), which establish the criteria for the identification and creation of the environmental inventory, the analysis and interpretation of results, all with the help of the tool (SimaPro software 7.1, available version) according to the EDIP evaluation method 2003. The functional unit of production was 1 ton of chicken meat. The consumption of the mass and energy flow was quantified with a calculation base of 1 hour (mass in ton, energy in MJ). From the analysis obtained, alternatives were proposed to improve the process under study. The processes that contributed most to the generation of environmental impacts were in a 50.84% Reproductive farm associated with the consumption of energy and chemical inputs, followed by the Incubation plant (27.16%), the storage and distribution area (10.63%), the benefit plant (8.93%), the fattening farm (1.71%) and finally the transportation by 0.73%. An analysis was carried out based on a modification of the overall process, which consisted in suppressing the housing subprocess (laying hens) that contributed an environmental contribution of 47.1% (88% of 53.4%), as a result of the energy consumption in the Reproduction Plant; obtaining the following results; the order of maximum energy consumption was obtained by the beneficiation plant, with a percentage of participation of 39.5%, evidenced by the treatment of wastewater generated in the processes by 20% and by the consumption of energy. From the above, the importance of using alternative energies was inferred, as well as controlling the consumption of energy in the different processes that make up the poultry industry.

**Keywords:** Life Cycle Analysis, Potential Environmental Impact, Environmental Impact Category, poultry, greenhouse gases.

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