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Environmental impact assessment of an Italian vertically integrated broiler system through a Life Cycle approach

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## **ACCEPTED MANUSCRIPT**

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- 9 Abstract

10 Poultry meat represents one of the most popular meat products in the world and its production is expected to increase significantly in the next decades. In this perspective it is important to carefully 11 assess the environmental impact of poultry meat production and investigate the possible mitigation 12 strategies The Italian broiler sector is characterized by a vertically integrated intensive production 13 system and a high final weight of broilers in comparison to the other European countries. The 14 present study involved The Life Cycle Assessment method was used to estimate environmental 15 impacts (Global Warming Potential; Acidification; Eutrophication; Terrestrial ecotoxicity; Non-16 renewable fossil energy) of 1 kg of broiler carcass weight at slaughterhouse gate in an Italian 17 integrated broiler group. Moreover, the effects of final live weight and stocking density on the 18 impacts were studied. Broiler fattening resulted the most impactful phase for all the impact 19 categories, contributing on average for 87% of impacts. Conversely, the hatchery, breeder rearing 20 21 and slaughtering phases moderately concurred to impact categories whereas hatchery load was negligible. Heavy broilers (roasters) showed the higher impacts per kg live weight compared to 22 light and medium live weight broilers mainly due to the higher feed conversion ratio. The main 23 contribution to environmental impacts in the fattening phase was feed production and processing; in 24 particular purchased protein feeds, represented mainly by soybean meal, were the greatest single 25 contributor to all impact categories. For soybean meal land use change impacts were included in the 26

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