An economic assessment of Salmonella control in the pork supply chain
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Salmonella are a main concern in public health and pig products can be at risk for human infection. This study aims at developing a tool useful for decision making process regarding Salmonella control measures throughout the pig supply chain. The mains levels considered are farm, transport-lairage and slaughtering process. A mathematical model has been developed in order to determine the influence of control measures implemented at several steps during the supply chain on the Salmonella prevalence on carcasses at the end of the slaughtering process. The model is parameterized using the outcomes of epidemiological models as well as expert knowledge. Using economic parameters, mathematical simulations (Monte Carlo simulations) are then performed to determine which measures implemented at which step(s) are the more cost-effective for Salmonella control. The performed cost-effectiveness explicitly includes a Salmonella prevalence target to achieve at the end of the slaughtering process. To illustrate this approach, a numerical application is given. Simulation results enabled us to highlight the incidence of the heterogeneity of Salmonella prevalence between batches of slaughter pigs on the choice of an intervention strategy. For each considered strategy, the probability to overcome the prevalence target can also be assessed. This study enabled us to develop a flexible tool, which can be parameterized to take into account the diversity of field situations (levels of Salmonella infection, slaughter processes). It can also be adapted to specific stakeholders’ needs for instance by ex ante assessing incentive systems.