Comparison of destructive and nondestructive sampling techniques of bullfrogs (Lithobates catesbeianus) carcasses for identification of Salmonella spp.

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Brazilian frog production stands out on the world stage due to the efficiency of the bullfrog's intensive production, with the meat of this species being highly valued in Europe and the United States. As with other products of animal origin, the slaughter and processing of these animals is defined by the Regulations on Industrial and Health Inspection of Products of Animal Origin. Despite this, this production chain still suffers from a lack of standardization in several stages of production and especially slaughter and processing. Although well established for other species, it is not known, for example, what is the best sample collection method for microbiological analysis of frog carcasses. This lack of standardization can expose consumers to various microorganisms associated with foodborne illnesses such as Salmonella spp. Therefore, the objective of this work was to evaluate different methods of obtaining samples to identify Salmonella spp. in bullfrog (Lithobates catesbeianus) carcasses. 30 bullfrog carcasses were subjected to sample collection using destructive (skin and muscle incision) and non-destructive (rinsing and superficial swabbing) methods. The collections were carried out in three stages of slaughter: skin collection after skinning; collection of viscera, head, and fingers; and carcass collection after final toileting. At each stage, the materials were individually packaged in sterile plastic bags, with a numerical identification (1-30) for each animal. This procedure was necessary to calculate the total weight of the animal and adequately size the 25g or ml used to research Salmonella spp. The skin of each animal was used for collections by rinsing (ExP), excision (EcP), and superficial swabbing (EsP), while the carcass was used for collections by rinsing (ExC) and superficial swabbing (EsC). The samples were tested for Salmonella spp. according to the ISO 6579 protocol. Suspicious colonies were subjected to confirmation by PCR targeting the ompC and invA genes. The frequency of positive samples for Salmonella obtained with each methodology was compared using the chi-square test and McNemar test ($P<0.05$). Considering the results obtained by all the methods evaluated, two bullfrogs were positive for Salmonella spp. (6.66%). Among the methods that evaluated the skin, EcP identified a positive sample (3.33%), and among the methods that evaluated the carcass, ExC identified another positive sample (3.33%), with no statistical difference between the methods evaluated ($P >0.05$). Furthermore, the results indicated a coincidence of results between the methods used for skin evaluation and between the methods used for carcass evaluation ($P>0.05$). Thus, the comparison between the different methodologies used to obtain samples for research into Salmonella spp. revealed that there was no difference between them, allowing the researcher to choose one of the methods according to their previous experience, cost, or practicality of each methodology.

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