

Post-mortem management and microbiological presence as quality factors along the beef value chain in Colombia

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Introduction

- The cattle value chain in Colombia is characterized by high levels of informality in both production (e.g. extensive systems, un-balanced diets) and commercialization (e.g. no/little added value, mostly rural markets, low quality control).
- The demand for animal source food is increasing and consumers expect to buy high quality products both in terms of taste and food safety.
- For being able to access those markets, it is critical that the value chain stakeholders follow strict food safety protocols and that effective and efficient control mechanisms are taken in place.
- The factors that influence the quality of the final product can be either internal (e.g. animal genetics) or external (e.g. ante- and post-mortem management). Yet the information about the above is very limited in most of Colombia's beef value chains.

Objective

With the goal of determining the food safety along the beef value chain in Colombia, this study assessed the beef management practices and contamination levels with microorganisms at post-mortem value chain stages in the Cauca Department (Popayán, Patía and Mercaderes municipalities). The assessment follows the Good Manufacturing Practices concept (GMP), including an evaluation of contamination levels with *Escherichia coli*, *Coliform bacteria* and *Pseudomonas*.

Methodology

Data was obtained in a two-stage process between 2016 and 2017: The first stage was the application of a checklist for different types of meat sellers (n=63) and meat transporters (n=4), which is based on the current Colombian food safety regulations. In the second stage, microbiological tests (3M[®] protocol; n=27; each sample (=10g of meat) evaluated for 24 hours) were carried out to determine and quantify the presence of *E. coli*, *Coliform bacteria* and *Pseudomonas* in the final product.

Results

4.1 Evaluation of the compliance with Colombian food safety regulations through a checklist

- Compliance with the Colombian food safety regulations was obtained for meat sellers and meat transporters.
- Meat transporters comply 55% of the current regulations (Figure 1). Meat transport is organized in a very informal way through motorcycles or cars also used for public transport.

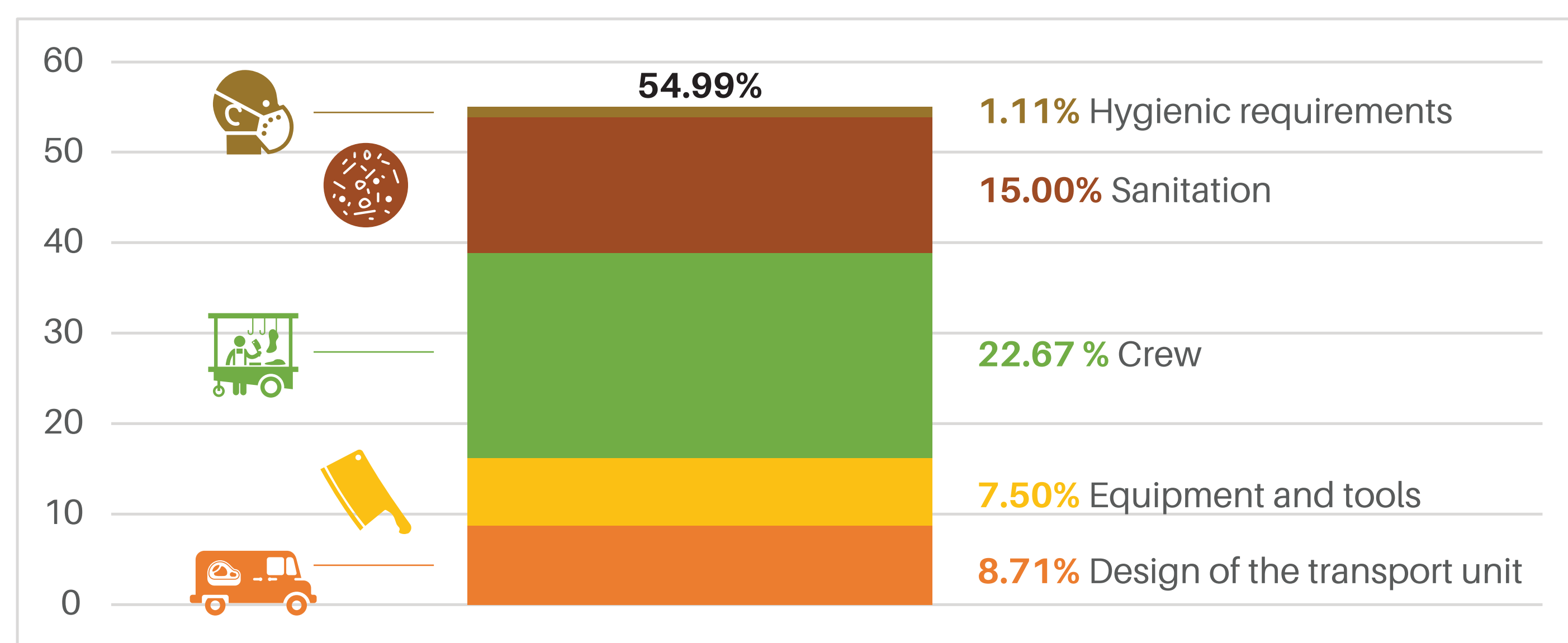


Figure 1. Cumulative percentage of compliance of the three types of establishments

Meat sellers were grouped into three different types of establishments: small grocery shops, butcher shops, and meat sellers at the local markets.

All types of establishments show low levels of compliance with the current regulations (Figure 2):

- Small grocery shops: 49.78%.
- Butcher shops: 48.70%
- Meat sellers at the local market: 33.59%

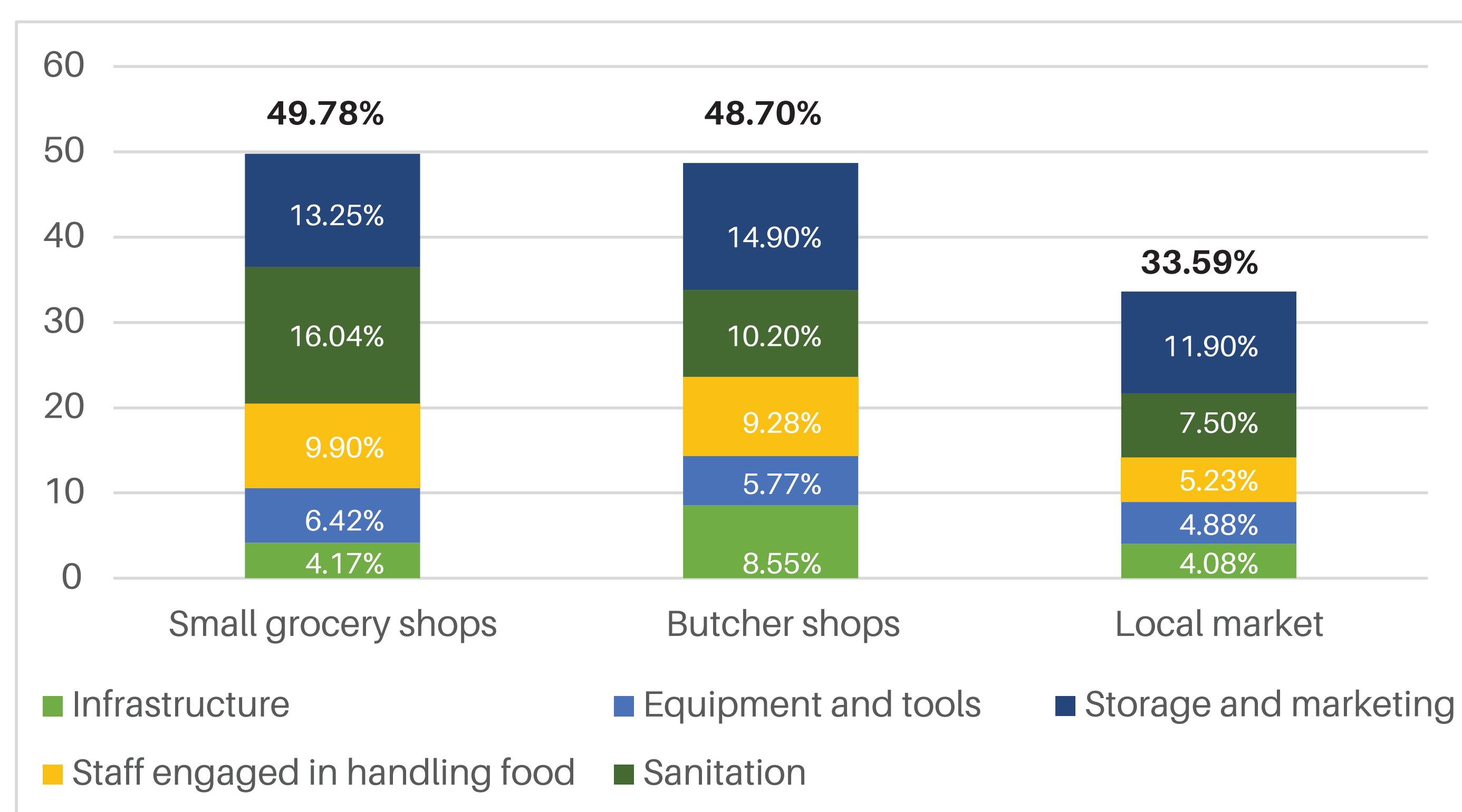


Figure 2. Cumulative percentage of compliance of the three types of establishments.

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4.2 Evaluation of microbiological contamination

Microbiological tests reveal high *Coliform bacteria* contamination (100%) for all meat selling establishments in Popayán and also contamination with *E. coli* and *Pseudomonas* (>90%) in small and larger establishments.

- Coliform bacteria* levels: from 67×10^1 to more than 150×10^5 Colony Forming Units (CFU)
- E. coli* levels: from 20×10^1 to more than 150×10^5 CFU
- Pseudomonas* levels: 28% of the samples

Microbiological tests were negative for the Mercaderes municipality showing the positive effects of applying GMP and a cold chain for quality assurance.



Figure 1. b) Microbiological tests Mercaderes municipality. a) Microbiological tests other places. Right side: transportation and distribution of meat in Mercaderes.

Conclusions

- The study shows that compliance with Colombian food safety regulations is low among meat transporters and meat sellers affecting the final product quality and exposing the consumer at risk.
- However, the case of Mercaderes municipality shows that following GMP and applying cold chain management can significantly reduce contamination levels and help to sell a product of higher quality.
- The results helped to identify critical points in terms of food safety along the value chain and will facilitate the development of adequate food safety measures, protocols and control mechanisms by the value chain actors and the corresponding authorities, as a first step towards the development of a safer beef value chain and compliance with national and international standards.
- However, to reach a higher level of compliance and lower contamination of the end product, it is necessary to link the different value chain stakeholders with each other in order to create a common vision, strategies for value chain improvement and shared values.

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