

**TITLE:** MICROBIAL ECOLOGY IDENTIFICATION AND CHARACTERIZATION RELATED TO THE PRESENCE OR ABSENCE OF *Listeria monocytogenes* AND *Salmonella* sp. FROM DAIRY INDUSTRY – A CASE STUDY

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#### **ABSTRACT:**

There is limited information about microbial ecology as responsible for tolerance to cleaning processes and its relationship with pathogenic microorganisms in food industry. The objective of this case study was to identify the presence of *Listeria monocytogenes* and *Salmonella* sp. on different surfaces of a dairy industry and comment the relationship between the microbiota and the presence of these pathogens. A hundred and sixty samples were collected from surfaces of equipment and utensils after the pre-operational cleaning process for detection of *L. monocytogenes* and *Salmonella* sp., through ISO 11.290-1 (ISO, 2017) and ISO 6579 (ISO, 2017) standard methods, respectively. Of these samples, 12.5% (n=20) were submitted to DNA extraction, sequencing and bioinformatics analysis based on the taxonomic classification of V3-V4 region in 16S RNA gene for identification and characterization of their microbial ecology. *L. monocytogenes* was detected on the surface of cheese vat (0.6%) and *Salmonella* sp. on the plastic maturing surface of Parmesan cheese (0.6%). Assessing the accompanying microbial ecology of these pathogens, 33 bacterial genera composed by *Kocuria* sp. (48%), *Staphylococcus* sp. (33.5%), *Enterococcus* sp. (9.6%), *Moraxella* sp. (3.1%) and *Rothia* sp. (2.3%) were detected. Moreover, 58 bacterial species were characterized, being *Kocuria kristinae* (48%), *Staphylococcus equorum* (17.9%), *S. aureus* (15.6%), *Enterococcus faecalis* (9.6%), *Moraxella osloensis* (3.1%) and *Rothia endophytica* (2.3%) the main ones. In the absence of pathogens, 44 genera were identified, with a greater predominance of *Pseudomonas* sp. (78.2%), *Enterobacter* sp. (15.2%) and *Cobetia* sp. (3%). Among the 81 characterized species, the main ones were *Pseudomonas putida* (77.4%), *Enterobacter cloacae* (13.4%) and *Cobetia marina* (2.9%). The results presented in this study indicate the existence of pathogens on essential surfaces inside the dairy industry, as well as the identification of bacterial genera and species that are able to interfere not only in the formation and maintenance of biofilms but also in the persistence of these microorganisms. Additionally, we presented relevant information regarding the control of pathogenic microorganisms on surfaces in the dairy industry, which can be used to improve hygiene protocols.

**Keywords:** food industry; foodborne pathogens; microbiome; 16S RNA gene

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