

Proceeding Paper

# Evaluation of the Effects of Food Safety Training on the Microbiological Load Present in Equipment's, Surfaces, Utensils, and Food Manipulator's Hands in Restaurants <sup>†</sup>

Miguel Castro <sup>1,\*</sup>, Kamila Soares <sup>1</sup>, Carlos Ribeiro <sup>2,3,4</sup> and Alexandra Esteves <sup>1,5,6</sup>

<sup>1</sup> Department of Veterinary Science, School of Agrarian and Veterinary Science (ECAV), University of Trás-os-Montes e Alto Douro (UTAD), 5000-801 Vila Real, Portugal; email1@email.com (K.S.); email3@email.com (A.E.)

<sup>2</sup> Department of Agronomy, ECAV, UTAD, post code City, Country; email2@email.com

<sup>3</sup> Centre for the Research and Technology of Agro-Environmental and Biological Sciences, CITAB, post code City, Country

<sup>4</sup> Inov4Agro Associated Laboratory, post code City, Country

<sup>5</sup> Veterinary and Animal Research Center (CECAV) UTAD, post code City, Country

<sup>6</sup> Al4AnimalS Associated Laboratory for Animal and Veterinary Science, post code City, Country

\* Correspondence: miguelcastro505@gmail.com; Tel.: +351-914070089

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**Abstract:** A single paragraph of about 100 words to give a brief introduction to your work.

**Keywords:** Microbiological analysis, hygiene, food safety, training

## 1. Introduction

Restaurants are a place where a lot of people go to have a delicious meal and have a good time however it's in the hands of the restaurant staff to proportionate that good environment and ensure the tasty meals are microbiologically safe. Food training comes a long way in this regard to help give that quality to the consumer but there is a lot of restaurants that the workers don't have the proper training for handling food or to keep the establishment food safe. This study was aimed to proportionate the knowledge of food safety and to help the workers follow the right path. It was evaluated if the training given to the food manipulators was helpful and had a significant impact in reducing the load of microbiological contamination present during the work.

## 2. Material and Methods

For the present work were carried out four moments of analyses at four restaurants, two moments analyses were done before food safety training and the other two were done after food safety training. In each visit, thirty-two swabs were performed from the equipment's, surfaces, and utensils all together and eight swabs were performed of four manipulators (right and left hand). Also, we evaluated the presence of *Listeria monocytogenes* in drains using absorbent sponges. This study analysed mesophilic microorganisms in Plate Count Agar<sup>®</sup> (PCA), *Enterobacteriaceae* in Violet Red Bile Glucose Agar<sup>®</sup> (VRBG), *Escherichia coli* in Tryptone Bile X-Glucuronide Agar<sup>®</sup> (TBX), *Staphylococcus aureus* in Baird Park Agar<sup>®</sup> (BP) and *Listeria monocytogenes* in Chromagar *Listeria* and enrichment medium Fraser I and Fraser II. The results were analysed based on the microbial criteria of Pablo., B. Moragas, M. [1] K. Soares et al. [2] and Labović et al. [3].

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### 3. Results

It was evaluated global hygienic conditions among the four restaurants. Of the 208 swabs performed, before food safety training, to equipment's, surfaces, and utensils, 15% of the results for Enterobacteriaceae and 26% of the results for mesophilic microorganisms weren't compliant with the hygienic safety limits and for the 64 swabs done to the hands of the food manipulators 31% of the Enterobacteriaceae and 64% of the mesophilic values were well above the safe limits. In this study we also searched for the presence of *Listeria monocytogenes* in the drains of 4 restaurants turning out 25% of the analysis to be positive. After the training the presence of *Listeria monocytogenes* on the drains was absent. Using Statistica software we determined the existence of significant positive differences when comparing the analysis before training and after training with  $p$ -values below 0.05. On average across the 4 restaurants there was a reduction of more than 90% of the load of microorganisms like Enterobacteriaceae and Mesophilic microorganisms on the surfaces referred above and on the manipulator's hands.

### 4. Conclusions

With these results we can conclude that food safety training is vital in the food industry, mainly, in catering units. There is always something new that the food handlers can learn, and it can have a huge impact in serving meals with a better quality and safety.

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#### Data Availability Statement:

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#### Conflicts of Interest:

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