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# Microbiological quality of pre-cooked food: *Escherichia coli* and coagulase positive *Staphylococcus* prevalence

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## INTRODUCTION:

Recent changes in society's lifestyle lead food industries to invest in the production of pre-cooked foods for an increasingly demanding consumer, who values its easiness and convenience. (Oliveira, 2009). These new eating habits increased foodborne diseases incidence which represents a public health problem (Newell et al., 2010).

The main genera of bacteria responsible for foodborne diseases are: *Salmonella*, *Staphylococcus*, *Escherichia*, *Vibrio*, *Bacillus*, *Clostridium*, *Listeria*, *Shigella* and *Campylobacter* (Newell et al., 2010).

To ensure the microbiological food quality, companies must implement a hazards and critical control points (HACCP) system of identification, analysis and control, ensuring compliance with national and international guidelines (Bolton & Maunsell, 2004).

## OBJECTIVES:

To assess the prevalence of *Escherichia coli* and coagulase positive *Staphylococcus* in pre-cooked food; and to compare microbial load in the different categories of pre-cooked food.

## MATERIALS AND METHODS:

We conducted a cross-sectional study on the results of microbiological laboratory control of pre-cooked food, performed in a national public health laboratory throughout the year 2013. Each result is a sample of a batch. Results included *E. coli* and coagulase-positive staphylococci counts. These parameters were analyzed according to pre-cooked food category (meals, savory meat appetizers, savory fish appetizers, savory vegetables appetizers, and sweets and desserts) Samples were classified as "Satisfactory" (*E. coli* count <10 UFC/g, coagulase-positive staphylococci count <10<sup>2</sup> UFC/g), and "Non-Satisfactory" (*E. coli* count ≥10 UFC/g, coagulase-positive staphylococci count ≥10<sup>2</sup> UFC/g), according to laboratory guidelines (INSA, 2005).

## RESULTS AND DISCUSSION:

We studied 543 records. Results are summarized in table 1. Overall, we registered 15 non-satisfactory samples: 2 samples were considered non-satisfactory for *E. coli* (0,2%) and 13 (2,4%) for coagulase positive staphylococci, independently. Pre-cooked food category presenting higher frequency of non-satisfactory results was savoury meat and fish appetizers, of which 5.08% fried meat balls and 8.33% fried codfish balls showed microbiological contamination.

**Table 1** - Absolute and relative frequency of Satisfactory" and "Non-Satisfactory" samples regarding E. coli and coagulase-positive staphylococci counts, according to pre-cooked food category.

Pre-cooked food category	Coagulase-positive staphylococci counting (n, %)		E. coli (n, %)	
	Satisfactory	Non - Satisfactory	Satisfactory	Non - Satisfactory
savoury meat appetizers (n=260)	252 (96,9)	8 (3,1)	259 (99,6)	1 (0,4)
Meals(n=15)	15 (100,0)	0 (0,0)	15 (100,0)	0 (0,0)
savoury fish appetizers(n=250)	245 (98,0)	5 (2,0)	249 (99,6)	1 (0,4)
savoury vegetables appetizers (n=13)	13 (100,0)	0 (0,0)	13 (100,0)	0 (0,0)
sweets and desserts (n=5)	5 (100,0)	0 (0,0)	5 (100,0)	0 (0,0)
<b>TOTAL (n=543)</b>	<b>530 (97,6%)</b>	<b>13 (2,4%)</b>	<b>541 (99,6%)</b>	<b>2 (0,4%)</b>

## CONCLUSION:

The relative frequency of contamination by E. coli is much lower than for coagulase-positive staphylococci. This could relate to the contamination from food handlers and is even more likely if we consider that the most manipulated foods are those with a higher frequency of contamination. Despite the low relative frequencies, the high number of precooked meals enhances the danger of these events, which have important consequences in involved consumers. Moreover if we consider that each output represents a sample of a batch type of food. These results are important not only in the evaluation of health hazards but also from the economic point of view, since it can result in significant losses. Companies must implement a hazards and critical points (HACCP) system in order to ensure compliance with national and international guidelines.

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