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Microbiological evaluation of vegetable salads in school canteens

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INTRODUCTION:

Currently bacteria are the main responsible for infections and food poisoning, being a huge public health problem worldwide. Vegetables are potential vehicles of these microorganisms and their consumption, especially raw, increases contamination risk.

It has been reported an increase in diseases associated with microbiological contamination by vegetables consumption. Vegetable cultivation and growth process makes them vulnerable to contamination sources that may act at any stage from planting to consumption. *Salmonella*, *Escherichiacoli*, *Staphylococcus* and *Listeria* are the microorganisms most commonly isolated from vegetables responsible for food borne diseases.

OBJECTIVES:

To observe microbiological standards of vegetable salads served in school canteens.

MATERIALS AND METHODS:

We conducted a cross-sectional study using the results from the microbiological study of 188 vegetable salads from school canteens in the North of Portugal, performed in a public health private laboratory.The microbiological study consisted in the determination of colony forming units (CFU) of total microorganisms grown at 30 ° C (CFU/g), faecal contamination biomarkers count (total coliforms (CFU/g), *E. coli* (CFU/g), and coagulase-positive *Staphylococci* (CFU/g)),and pathogens screening (*Salmonella* (CFU/25g) and *Listeria monocytogenes* (CFU/25g)), accordingly to the international standard methodsThe results were classified as "Satisfactory", "Acceptable" and "Non-Satisfactory", using national guidelines.

RESULTS AND DISCUSSION:

We analysed 188 salads results for: microorganisms at 30°C, total coliforms, E. coli, coagulase-positive Staphylococci; Salmonella and Listeria monocytogenes. Our results showed a considerable number of “Non-Satisfactory” samples for microorganisms at 30ºC (10%) and total coliform counting (13%). Regarding E. coli and Listeria monocytogenes detection we found a small percentage of "Acceptable" samples (2% and 1%, respectively) and a large number of "Satisfactory" samples (98% and 100% respectively). For Staphylococcus coagulase positive and Salmonella detection we observed a "Satisfactory" result for all samples. Comparing raw salads (n = 113), and mixed salads (n = 78), we observed a higher number of “Non-Satisfactory” salads for total microorganisms at 30°C in raw salads (15%). The same happened for total coliform counting with a frequency of "Not-Satisfactory" of 14% in raw and 12% in the mixed salads.

CONCLUSION:

In conclusion the salads evaluated do not represent risk of serious disease resulting from their ingestion, since, in general, microbiological values are within the acceptable parameters defined by national guidelines. The microorganisms at 30 °C and coliforms found, despite having some health impact, these are not described as potentially dangerous such as the pathogenic microorganisms.

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