Search for and quantification of micro-organisms in processed food

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Introduction

Micro-organisms are indispensable for humans and the environment because they carry outa vital role in ecosystems. They are useful but they can also be harmful. Bacteria are separated in three categories: pathogens which are responsible for more or less serious infectious diseases, microbes which indicate a lack of hygiene, and finally the ones that cause significant fermentation leading to a possible explosion in a factory.
The objective of microbiological analysis is to search for microorganisms and quantify them in processed food in order to protect consumers' health.

Materials methods

The classical technique of microbiological analysis consists in cultivating bacteria present in the analyzed sample on a specific nutrient substrate, in optimal conditions in order that they reproduce.
In a ready-cooked meal, total microorganism, enterobacteria and sulfite-reducing bacteria are quantified.
Food is first ground with water containing a buffer solution to revive the bacteria which were stressed. For each bacterium studied, norms indicate the necessary dilutions of the homogeneous sample obtained that permit the microbiologist to quantify them. One milliliter is poured into a sterile Petri dish with a pipette. An appropriate culture medium is added for each. Petri dishes are incubated at specific temperatures and over a set period for the bacteria to multiply, as can be seen in Table 1.

Bacteria	Culture medium	Dilutions	Incubation temperature	Incubation period
Microorganisms	PCA	10^{-4} ; 10^{-5}	30 ± 1°C	72 h
Lactic flora	MRS	10^{-4} ; 10^{-5}	30 ± 1°C	72 h
Enterobacteria	VRBG	10^{-1} ; 10^{-2}	37 ± 1°C	24 h
ASR	Basic TSC	10^{-1} ; 10^{-2}	37 ± 1°C	24 h

Results

After a certain time, bacteria colonies may be sufficient to be identified and visually counted. The number of colonies is compared with references; see the examples given in table 2.

Bacteria	Methods	Units	Results	Standards
Microorganisms (TF)	NF EN ISO 4833	/g	19 000 000	<300 000
Lactic bacteria (LB)	NF ISO 15214	/g	10 000 000	
Ratio TF/LB			<10	<10
Enterobacteria	NF V 08-054	/g	17 000	<1000
Bacteria sulfite-reductive anaerobic	NF ISO 15213	/g	<10	<30

Table 2 : *results obtained and supplied in the client report*

The results given in table 2 refer to a fish terrine which has been analyzed. It contains milk and lactic flora colonies are present. The ratio of total microorganisms and lactic flora colonies is under the standard. Therefore this product is authorized to be eaten. However, enterobacteria colonies are higher than the number mentioned in the norm. Knowing that they have faecal origins, the sample is unsatisfactory in terms of hygienic process.

Conclusion

To conclude, microbiological analyses allow the search for some bacteria and the quantification of others depending on the type of micro-organism and method used. These analyses are simple to implement but can be long prior to obtaining results. The latter are used to determine if the meal is satisfactory to be eaten safely by consumers.