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Evaluation of meat products mesophilic microrganisms count - Reduction of time elapsed

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INTRODUCTION

The meaning of the test which allows to evaluate the collection of microrganisms able to develop at mesophilic temperatures (25 to 40ºC), is well accepted even if it is under discussion (1). This microflora contains almost all the pathogenic bacteria and almost all the microrganisms responsible for the food alterations and specially for meat products.
In these products we detect, by this test, all the viable microrganisms, that are able to make alterations and also to develop colonies after three days of incubation at 30ºC on an nutrient agar (2).
From technological point of view, a high number of mesophilic microrganisms is connected with a microbial alteration if the product is not obtained by fermentation techniques (3). From hygienic point of view this correlation is not so easy. But this test, if it is well understood, in function of the characteristics of the product, is still the best one to estimate the general quality of the product. So, it is always accepted to determine the total colony count at 30ºC to evaluate the microbiological quality of a meat product as well as to follow the technological process (4).
Several other technics are used that give quicker answers, but however the colony count is still the reference method (7).
Sometimes we need a rapid method to estimate the global quality of a product, specially if we need to evaluate a process condition in study. But we know that some of the rapid methods such as the direct microscopic examination (5) or the measurement of some physico-chemical parameters of the microrganisms cultures have not a correct correlation with the reference method because they don't count only the viable microrganisms or because they evaluate better the activity of the microflora on the substracts than the quantification of that microflora.
They have also some technical difficulties such as for the direct microscopia examination the distinction of the microrganisms cells on a meat preparation.
So, we thought that the method which reproduces the conditions of the reference technique (viable colony count and not the detection of the effects of microbial activity on a meat production) and gives less delay, because the incubation is made at higher temperatures (5), deserves to be studied.

METHODS

Method 1 - Reference method

1 cm^3 of decimal dilutions of sample homogenate are mixed with plate count agar on Petri dishes.
Incubation at 30 ± 1ºC for 72h.
Counting of the colonies and calculation of number of microrganisms per gram of original sample is made.

Method 2 - in study

With the same procedure as for method 1 but the incubation is made at 37 ± 1ºC for 24h.

RESULTS

We tested by the two methods at the same time, 10 samples of frozen pre-prepared meat foods, 10 samples of sausage products and 10 samples of meat meals.

Frozen pre-prepared foods			Meat meal			Sausage products		
Sample	Method 1 (References)	Method 2 (in study)	Sample	Method 1 (References)	Method 2 (in study)	Sample	Method 1 (References)	Method 2 (in study)
1	$1,8 \times 10^4$	$6,0 \times 10^3$	1	$9,8 \times 10^4$	$2,8 \times 10^4$	1	$1,3 \times 10^5$	$1,1 \times 10^5$
2	$1,9 \times 10^7$	$5,0 \times 10^6$	2	$1,3 \times 10^3$	$1,4 \times 10^3$	2	$8,6 \times 10^4$	$7,5 \times 10^4$
3	$2,3 \times 10^6$	$6,0 \times 10^5$	3	$9,7 \times 10^4$	$1,2 \times 10^5$	3	$8,0 \times 10^5$	$5,0 \times 10^5$
4	$8,0 \times 10^5$	$5,0 \times 10^5$	4	$9,2 \times 10^5$	$7,5 \times 10^4$	4	$8,0 \times 10^6$	$6,3 \times 10^6$
5	$3,2 \times 10^6$	$1,7 \times 10^6$	5	$2,4 \times 10^4$	$1,5 \times 10^4$	5	$3,2 \times 10^5$	$4,7 \times 10^5$
6	$1,2 \times 10^5$	$6,6 \times 10^4$	6	$4,7 \times 10^5$	$5,7 \times 10^5$	6	$3,2 \times 10^6$	$1,3 \times 10^6$
7	$2,3 \times 10^5$	$3,2 \times 10^5$	7	$3,6 \times 10^3$	$3,5 \times 10^3$	7	$5,4 \times 10^6$	$5,8 \times 10^6$
8	$1,0 \times 10^5$	$4,3 \times 10^4$	8	$4,2 \times 10^3$	$1,5 \times 10^3$	8	$7,1 \times 10^4$	$7,9 \times 10^4$
9	$1,2 \times 10^7$	$5,6 \times 10^6$	9	$1,2 \times 10^5$	$6,6 \times 10^5$	9	$1,2 \times 10^5$	$9,7 \times 10^4$
10	$8,8 \times 10^4$	$4,0 \times 10^4$	10	$3,6 \times 10^5$	$3,5 \times 10^5$	10	$4,7 \times 10^7$	$3,2 \times 10^7$

DISCUSSION AND CONCLUSION

As we can see by the presented results the method in study gives a good correlation with the reference method for the sausage products and for the meat meals.
But for the frozen foods the results are quite different for the two methods. We think that this difference is due to an adaptation of the mesophilic microflora to psychrothrophic conditions. So, this adapted microflora can't develope so quickly as wanted by the method (24h) at 37°C.
We think also that the microflora detected in the method 2 is not exactly the same detected in method 1.
But the results are similar enough to accept the alternative method for routine controle of the processing, if it doesn't include freezing.
Nevertheless the reference method is the one to employ when we need the utmost rigor.

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