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COMPARISON OF THE METHOD OF DEFROST OF PRE-COOKED FROZEN PRODUCTS FOR MICROBIOLOGICAL ANALYSIS

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SUMMARY

To face the problem of preparing a sample of frozen food to microbiological analysis two alternatives have been choosed: either a quick defrost at a relatively high temperature for a short period or a slow one at a fairly lower temperature for a frankly longer time. The frozen sample was considered as the pattern. It was determined the enumeration of the following microorganisms: aerobic mesophilic, psychrotrophic, yeasts and moulds.

The analysis concerned a total amount of 20 samples formed by wraps of small pastry or pies which had previously been baked, then frozen and then re-baked before consuming.

Results indicate that the method of slow defrost usually presents higher enumeration of microorganisms than the quick defrost. This is most pronounced with the mesophilic and psychrotrophic microorganisms.

INTRODUCTION

The first problem we face in the microbiological analysis of frozen food is the taking and preparation of samples

We pretend to get a sample for analysis which besides being representative of the whole food is also obtained aseptically. These two requirements often need the whole defrosting of the nourishing product or the use of special equipment for the aseptical sampling of the frozen food.

The method using frozen products is in principle the less exposed to changes in the microflora values. Since it is possible to work in the required aseptical conditions, the whole sample or some of its parts do not need to be submitted to temperatures which may cause microbial multiplication.

On the other hand when it is necessary to defrost the product in order to get a correct sampling, there are two technics which may be used: the slow defrost at about +5°C for the time necessary to complete defrost (in some cases for 18 hours) and the quick defrost at about 45°C for fairly shorter periods (some minutes).

Both defrosting methods have been recommended, recognizing in any of them advantages and disadvantages, considering the possible multiplication or destruction in the product existing microflora. And this may happen because there are always some parts of the sample which reach less advisable temperatures before the whole sample is completely defrosted. When using the quick defrost we may even obtain a pasteurization of the sample surface if the external temperature exceeds 45°C, due to the extreme sensibility to heat acquired by the frozen food flora. In the two defrosting methods the sample surface temperature may permit the microbial multiplication before the sample inside defrost.

Nevertheless this risk may be controlled or even avoided, considering the short period during which that temperature is maintained in quick defrost and because the highest temperature reached in slow defrost requires a very long latency period.

However, as we had not experimented all these theo tical knowledges yet, we still had some doubts a the best option when analysing frozen food. Somet the structure and size of the food require a c tain type of the sample preparation, but in the c of pre-prapared frozen food, such as croquettes, p try, etc., of small size, it is possible to use an the referred methods. What has been suggested is a parative study.

MATERIAL AND METHODS

We have analysed 20 samples of Wraps of Small Pas and Pies.

Each sample was formed by a wrap containing sever unities of the same product.

Calculations in microbiological analysis are most posed to changes by the method of the sample prep tion:

- Counting of Microorganisms at 30°C (mesophilic)
- Counting of Microorganisms at 6,5°C (Psychrotroph
- Counting of Moulds
- Counting of Yeasts

Samples preparation

Each wrap, containing several unities of the same pr duct, was divided into 3 equal parts distributed by sterilized containers.

One of them was immediately submitted to microbiol cal analysis (frost product), another was put in a ol chamber at about 5°C, for 18 hqurs (slow defros and the other was put in a water-bath at about 45° for 30 minutes (quick defrost).

And then they were immediately submitted to microbi logical analysis.

For the samples preparation we have used tryptone sa as solvent which was left in contact with the samp for about 30 minutes after they were homogenize with Ultra-Turrax.

Technics used

For the Mesophilic Microorganisms counting we used IS Standard 2293.

For the Psychrotrophic Microorganisms we adapted IS DIS Standard 6730.

For the Moulds and Yeasts counting we followed the technic described in the Portuguese Standard 3277/1, according to which the Cooke Rose Bengal Agar mediu is used added by chlorotetracycline (35 mg/l) and Ka namycine (50 mg/l) surface inoculated. Counting is carried out after 5 days.

RESULTS

Microbial Contents (Averages)

Microorganisms	Frozen	Quick defrost	Slow defrost
Mesophilic	$2,2 \times 10^6$	$2,8 \times 10^6$	$1,1 \times 10^7$
Psychrotrophic	$2,0 \times 10^6$	$2,1 \times 10^6$	$8,6 \times 10^6$
Moulds	$2,5 \times 10^3$	$3,1 \times 10^3$	$6,3 \times 10^3$
Yeasts	$1,0 \times 10^4$	$1,0 \times 10^4$	$1,3 \times 10^4$

DISCUSSION AND CONCLUSIONS

Considering the frozen sample as a standard, we notice that the samples submitted to slow defrost show almost always higher quantities of microorganisms than those submitted to quick defrost. This difference is more significant for the Mesophilic and Psychrotrophic Microorganisms. This may result from the fact that the defrost period is long enough to permit some bacterial growth in the parts having reached higher temperatures. As to the Moulds and Yeasts we have not noticed so significant differences in any of the methods we used.

REFERENCES

Egziabher, A.G. et al., 1982. Destruction of Microorganisms During Thawing of Skim Milk. Journal of Food Protection, Vol. 45, Nº 2, Pages 125-126.

Lait - Denombrement des Microorganisms Psychrotrophes - Technique par Comptage des Colonies ~6,5 °C. Project de Norme Internationale ISO/DIS 6730, 1983.

Quinta et al., 1985. Estudo de Meios Selectivos para Contagem de Bolores e Leveduras em Carnes Picadas. Revista Portuguesa Ciencias Veterinárias. Vol LXXX Nº 474 Abr/Jun.

Robinson, R.K., 1985. Microbiology of Frozen Foods. Elsevier Applied Science Publishers. London and New York.

Viandes et Produit à Base de Viande. Dénombrement des Germes Aérobies à 30°C (Méthode de reference). Norme International ISO 2293, 1976.