

Influence of Antibiotics Added in Milk over Yogurth Quality

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Abstract

Large spectrum antibiotics used in different cow diseases leads to their release in milk altering its proprieties during processing. Knowing the inhibitory effect of antibiotics upon lactic bacteria development and multiplying we followed the effect of gentamycin, a large spectrum antibiotic added in different doses in milk used for yogurth processing. In our research, besides the effect of antibiotica we followed also the influence of milk fat content upon milk clotting time, while antibiotics added in milk increase the clotting time of yogurth. Clotting density deceases proportional with the dosis of antibiotics added to milk.

Keywords: yogurth, gentamycin, milk

1. Introduction

It is known that antibiotics that reach milk accidentally have a negative influence upon the quality of acid products which are obtained during its processing [1, 2]. It is also known that from milk with a higher fat content we can obtain yogurth with higher consistency and of very good quality compared to the one produced from low fat milk. We know less about the influence of fat content upon the activity of antibiotics that reach accidentally milk. The purpose of our work was to quantify, experimentally and indirectly, to what extent the milk fat content can block or increase the activity of an antibiotic with a broad spectrum over milk microorganisms, which contribute to a qualitative yogurth [3, 4].

2. Materials and methods

In order to show to what extent the different fat content has effects over a broad spectrum antibiotic like gentamycin and influence the quality of

yogurth, we used the following experimental model: For yogurth fabrication we used three types of milk with different fat contents: 0,1%, 1,5%, 3,5%. For each type of milk we achieved 5 variants with different content of gentamycin which was added deliberately in milk (5 mg, 10 mg, 20 mg, 40 mg gentamycin to 100 ml milk). One of the variants where we didn't add gentamycin constituted the control sample. Milk was heated at 39°C and was then inoculated with *Lactobacillus bulgaricus* and *Streptococcus thermophilus* at 39°C for 250 minutes. We appreciated indirectly the antibiotic dose over lactic bacteria activity and its influence over yogurth quality, by organoleptic characteristics determination of yogurth (clotting time, consistency and compaction of clot, whey expression).

The appreciation of organoleptic characteristics of yogurth was performed in order to detect the optimal timing of clotting in each probe. For this we verified each probe during thermostat preservation every five minutes, over a period of 250 minutes.

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3. Results and discussion

Figure 1 and 2 show our results regarding the influence of milk fat content and also the gentamycin dosis from milk with 0,1% fat upon its clotting time and its transformation to yogurth are shown in fig. 1 and 2.

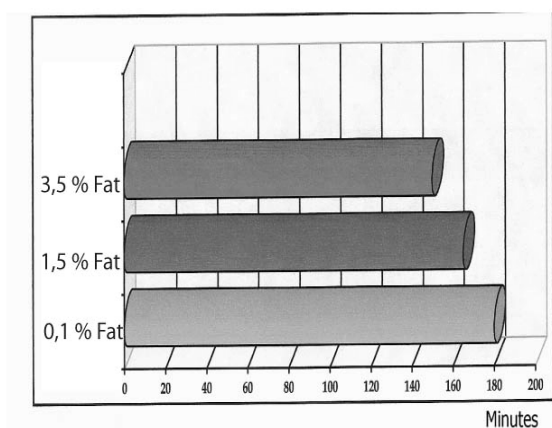


Figure 1 Influence of milk fat content over yogurth clotting time

In figure 1 we showed the milk clotting times that were registered in the three milk samples with different fat content (1,2%, 1,5% and 3,5% fat). From here we can observe that milk in which we added the same quantity of *Lactobacillus bulgaricus* and *Streptococcus termophilus* but which contained different fat quantities, coagulates in different periods of time. At 39°C milk with lowest fat content (0,1%) coagulates in 180 minutes, compared to the one with 3,5% fat which coagulates in 150 minutes. The prove that yogurth clotting time is backward proportional with fat milk content is the fact that milk with a fat content of 1,5% has an intermediary clotting time compared to milk with 0,1% and 3,5% fat (165 minutes).

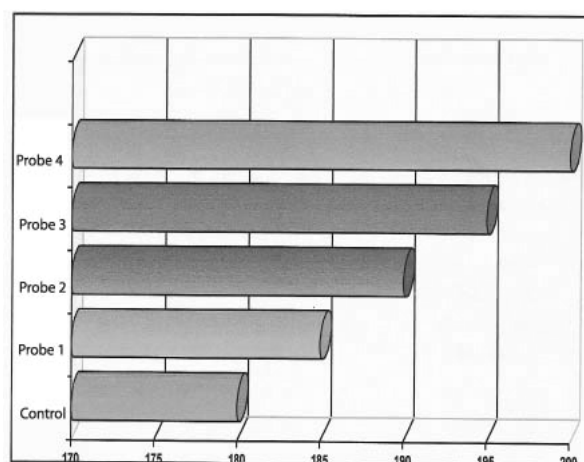


Figure 2 Influence of different gentamycin drafts upon yogurth clotting time

Figure 2 represents the clotting time of milk with 0,1% fat, depending on gentamycin dosis added to milk. From here we can observe that the more we increase the gentamycin dosis in milk, the longer the clotting time of milk. Control milk where gentamycin is absent has clotted after 180 minutes. The sample which contained only 5 mg gentamycin in 100 ml milk clotting took place after a longer period, after 185 minutes. The clotting time of milk in probes which contained gentamycin in larger proportion (10 mg, 20 mg, 40 mg and 100 ml milk) increases proportionally with the antibiotic dosis.

Milk inseminated with yogurth bacteria which contained more than 10 mg gentamycin in 100 ml, is clotting in a time which overtakes the normal value obtained for the quality yogurth.

In order to evidence in what measure milk fat content can diminish the bacterial activity of gentamycin, we used for yogurth preparation, under the same technologic conditions, a milk with 0,1%, 1,5% and 3,5% fat content to which we added 5 mg, 10 mg, 20 mg and 40 mg gentamycin. Comparative results regarding the clotting time of milk and its transformation to yogurth are showed in figure 3.

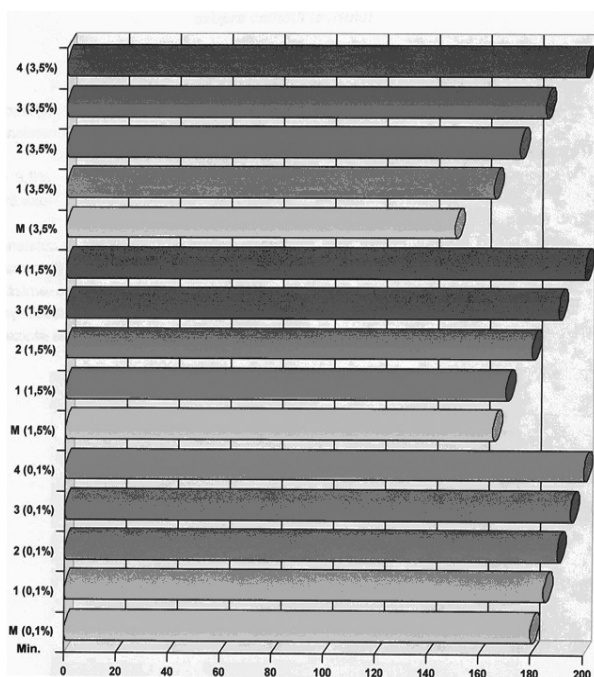


Figure 3 Influence of milk antibiotic drafts upon the clotting time in the three yogurth samples, harvested from milk samples with different fat content

From the graphic mentioned above we can observe that increased dosis of gentamycin have the same effect upon yogurth preparation like the one mentioned above, regardless to the milk fat content from which it is prepared. The only difference between them is the initial status at processing start. Milk with 0,1% fat in the control probe which doesn't contain gentamycin is clotting under 180 minutes, the one with 1,5% fat is clotting after 150 minutes and the one with 3,5% fat is clotting after 150 minutes.

All milk probes where gentamycin was present in a larger proportion than 10 mg in 100 milk, presented an extremely increased clotting time, making it impropriate for yogurth preparation. From here we conclude that the antibiotic which is found in milk can kill lactic bacteria and milk doesn't clot anymore.

The aspect of the clot, its consistency and the whey release from the clot accompanys constant the modifications of the milk clotting time described at each variant of the experimental model, underlining our conclusions.

4. Conclusions

From our experiments we conclude the following:

- 1) Fat milk concentration determines the milk clotting time in yogurth processing. The richer the milk fat content, the shorter the clotting time.
- 2) Gentamycin in milk influences negatively the obtaining of a quality yogurth. A dosis of 5 mg gentamycin determines an increase of milk clotting time over the admitted level. More than 10 mg gentamycin added to 100 ml milk leads to the fact that milk doesn't clot anymore and becomes unappropriate for yogurth processing.
- 3) The percentage of milk fat cannot influence the bactericid activity of gentamycin upon lactic bacteria.

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