

Re.: Efficiency assessment of microwave sterilizer operation in retentate sterilization in [REDACTED] (with special attention paid to spore-forming microorganisms) in terms of microbiology and storage

### Microbiologic analysis results:

No.	Sample designation/process temperature	Total number of microorganisms [cfu/ml]*	Total number of spores of mesophile aerobic bacteria [cfu/ml]**
1	retentate	$4,5 \times 10^6$	$9,4 \times 10^5$
2	110 <sup>0</sup> C	$2,4 \times 10^2$	
3	115 <sup>0</sup> C	$1,0 \times 10^2$	
4	120 <sup>0</sup> C	$4,7 \times 10^1$	
5	125 <sup>0</sup> C	$2,0 \times 10^0$	
6	130 <sup>0</sup> C	Absent in 1 ml	
7	132 <sup>0</sup> C	Absent in 1 ml	
8	136 <sup>0</sup> C	Absent in 1 ml	

\* according to PN-93/A-86034/04, PCSMA medium (Merck, cat. no. 1.15338), incubation in 30<sup>0</sup>C/72h

\*\* inoculation after heating the sample to 80<sup>0</sup>C/10 minutes, PCSMA medium (Merck, cat. no. 1.15338), incubation in 30<sup>0</sup>C/72h

### The results of sensory testing after 24 hours of storage in the temperature of 6<sup>0</sup>C:

No.	Sample designation/process temperature	appearance	smell	taste
1	110 <sup>0</sup> C	White colour, no flocculation	Characteristic, without foreign smells	Characteristic, slight milk heating aftertaste without foreign tastes
2	115 <sup>0</sup> C			
3	120 <sup>0</sup> C			
4	125 <sup>0</sup> C			
5	130 <sup>0</sup> C			
6	132 <sup>0</sup> C			
7	136 <sup>0</sup> C			

After 3 days of storage in the temperature of 25<sup>0</sup>C there was curd and whey in samples treated with 110<sup>0</sup>C and 115<sup>0</sup>C. In other samples there was neither curd nor whey even after 5 days of storage in the above-mentioned conditions.

The results obtained enable drawing the following conclusions:

1. The retentate contained rather small total number of bacteria ( $4.5 \times 10^6$  cfu/ml) and number of spores ( $9.4 \times 10^5$  cfu/ml), what proves very high quality of raw milk or thermal treatment (pasteurisation) of the retentate.
2. Temperature of  $130^{\circ}\text{C}$  and higher applied in the microwave steriliser caused elimination of all spores in the retentate.
3. Retentate sterilization process performed in microwave sterilizer has not caused deepening of sensory changes (heating aftertaste) despite the fact of sterilization temperature increase, which is a very favourable feature of this sterilization method.
4. The initial results obtained suggest potential application of this sterilisation method for retentate sterilisation without worsening of its sensory characteristics.
5. Maillard reaction (taste of strong heating) is minimal in this type of sterilisation.
6. The initial results obtained are no basis for any contraindication of this process' application. However, it must be stressed that the results are based on one technological trial only.