



## INTRODUCTION

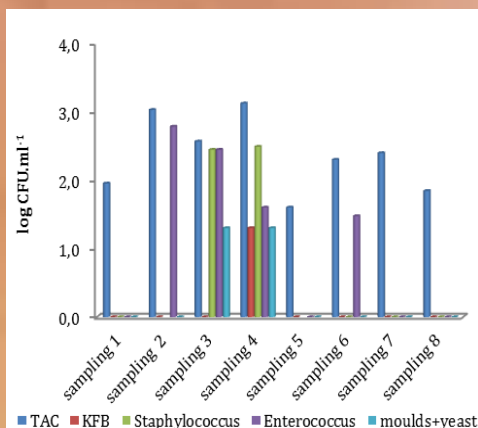
Demand for shell eggs has recently declined whereas egg liquid products have attracted increasing interest in food industry. The term 'egg products' means liquid whole eggs (blend), egg whites and enriched, sweetened or salted egg yolks or blends. Microbial contamination on the shell eggs is one of the major factors to indicate egg quality, affecting the level of exogenous microbial contamination in the egg contents. It poses a fundamental problem in the production of eggs intended for consumers, particularly with regard to the total aerobic count and contamination with Gram-negative bacteria from the family *Enterobacteriaceae*. Egg liquid products are responsible for a high number of foodborne illnesses every year.

## MATERIAL AND METHODOLOGY

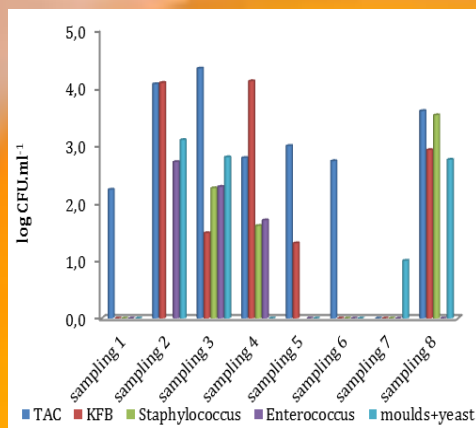
Analysis was performed with the samples of egg liquid products. Analyses were performed in the microbiological laboratory of the Department of Food Technology, MENDELU, during one year (April - February). A total of 24 samples were analyzed from each egg liquid products (overall 72 samples). The following microbiological parameters were determined in egg products:

- The total aerobic count (TAC). Culture on the growth medium Plate Count Agar (NOACK, France) according to CSN EN ISO 4833 at 30 °C for 72 hrs.
  - Coliform bacteria. Culture on the growth medium Violet Red Agar (VRBL, NOACK, France) according to CSN ISO 4832 at 37 °C for 24 - 48 hrs.
  - Coagulase-positive staphylococci: Culture on Baird-Parker Agar (NOACK, France) according to CSN EN ISO 6888, at 37 °C for 24 - 48 hrs. Confirmation was performed by adding rabbit fibrinogen (Fibrinogen Plasma Trypsin Inhibitor Supplement, Oxoid).
  - Enterococci. Culture on the growth medium Compass-enterococcus agar (NOACK, France) at 37 °C for 24 - 48 hrs.
  - Moulds and yeast. Culture on the growth medium Chloramphenicol glucose agar (GKCH) according to CSN ISO 21527-1 at 25 °C for 5 days.
- Samples were collected and processed according to CSN ISO 7218 and CSN EN ISO 6887-1.

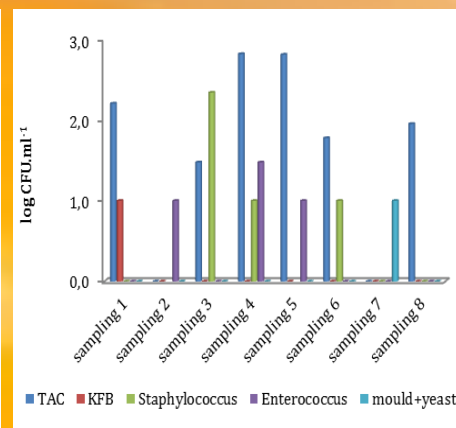
## RESULTS AND DISCUSSION



**Fig. 1** The counts of microorganisms (log CFU.ml<sup>-1</sup>) in samples of liquid pasteurized egg white collected in 8 time points (April - February)



**Fig. 2** The count of microorganisms (log CFU.ml<sup>-1</sup>) in samples of pasteurized sweetened egg yolk, collected in 8 time points (April - February)



**Fig. 3** The counts of microorganisms (log CFU.ml<sup>-1</sup>) in samples of pasteurized egg blend collected in 8 time points (April - February)

## CONCLUSION

Microbiological analysis revealed the highest ( $P < 0.05$ ) total aerobic count 2.8 log CFU.ml<sup>-1</sup> and the highest ( $P < 0.05$ ) incidence rate of coliform bacteria (1.7 log CFU.ml<sup>-1</sup>) in egg yolk. In contrast, egg white and whole egg contained coliform bacteria only at very low counts. The highest ( $P < 0.05$ ) number of enterococci was found in egg white (1.0 log CFU.ml<sup>-1</sup>). Staphylococci, moulds and yeast were present at highest levels ( $P < 0.05$ ) in egg yolk (1.2 log CFU.ml<sup>-1</sup> and 1.1 log CFU.ml<sup>-1</sup>, respectively). Statistical analysis ( $P > 0.05$ ) showed no correlation between the season and the counts of monitored microorganisms for any of the egg liquid products.

It follows from our results that all analysed egg products comply with the TAC limit defined by Council Directive (EC) 89/437/EEC on hygiene and healthy problems affecting the production of egg products, and correspond with other studies that deal with liquid egg substances. However, all egg products analysed in our study would fail to meet the required criteria for other groups of microorganisms. Bacterial contamination in egg products caused by staphylococci, KFB, enterococci, moulds and yeast probably results from insufficient heat treatment during pasteurization or subsequent contamination caused by poor hygiene and sanitation practices or storage at unsuitable conditions.