Interaction between *Listeria monocytogenes* and spoilage microorganisms in sea bream fillets and model fish substrate stored in air and modified atmosphere package at 5ºC

Foteini F. Parlapani and Ioannis S. Boziaris*

Department of Ichthyology and Aquatic Environment, School of Agricultural Sciences, University of Thessaly, Volos, Greece. e-mail: boziaris@uth.gr

Introduction

Undoubtedly physical and chemical parameters are the most important factors influence in growth and selection of microorganisms in a food ecosystem. However, the selection of the microbiota during food spoilage depends not only on the environmental conditions, but also on microbial interactions. The competitions for nutrients (e.g. glucose) or chemical elements (e.g. iron) affect the physiological attributes and growth of microorganisms. As a consequence, the microorganisms interact and influence the growth of one-another.

Methodology

Fate of *Listeria monocytogenes* and its interactions with the main spoilage bacterial species in a sterile fish juice agar model system and in sea bream fillets stored under air and Modified Atmosphere Package (MAP) (CO_2: 60%, O_2: 10%, N_2: 30%) at 5ºC was investigated.

The predominant spoilage microorganisms isolated in a previous study (*Pseudomonas* spp., *Aeromonas* spp. and *Shewanella putrefaciens*) and a cocktail of 6 *Listeria monocytogenes* strains were used for the inoculation of model substrate. Sterile Fish Juice Agar model system was prepared. The initial inoculum for all microorganisms tested was adjusted at 10^3 cfu/g.

Results

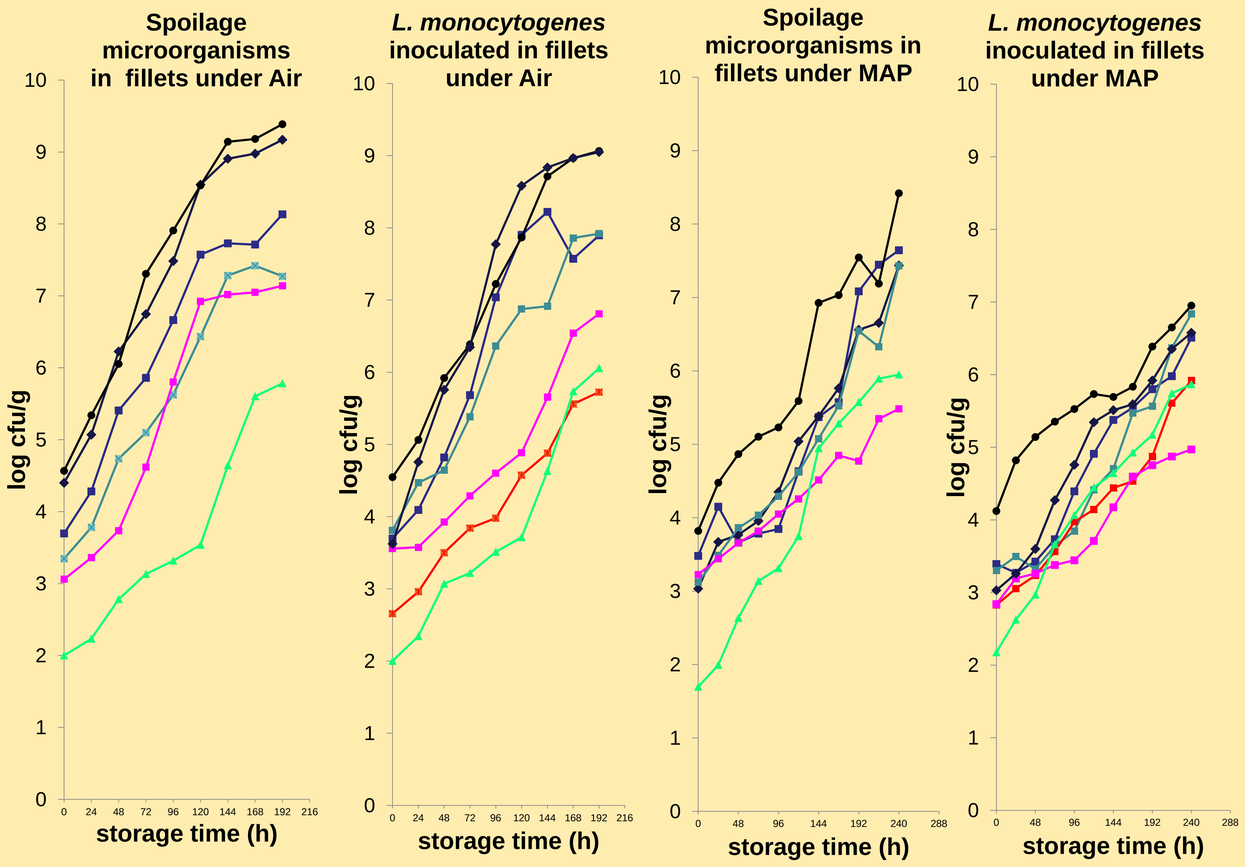
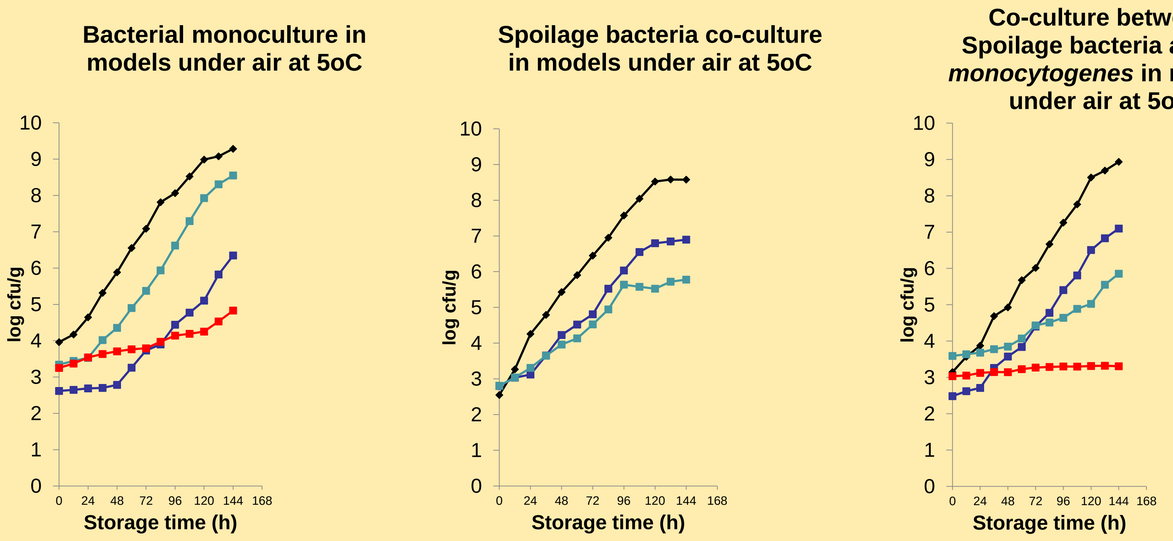


Figure 1. Population changes of spoilage microorganisms, *Pseudomonas* spp. (◆), *Aeromonas* spp. (■), *Shewanella putrefaciens* (■), Enterobacteriaceae (■) and Lactic Acid Bacteria (▲), TVC (●) and inoculated *Listeria monocytogenes* (■) in sea bream fillets stored in air and MAP at 5ºC



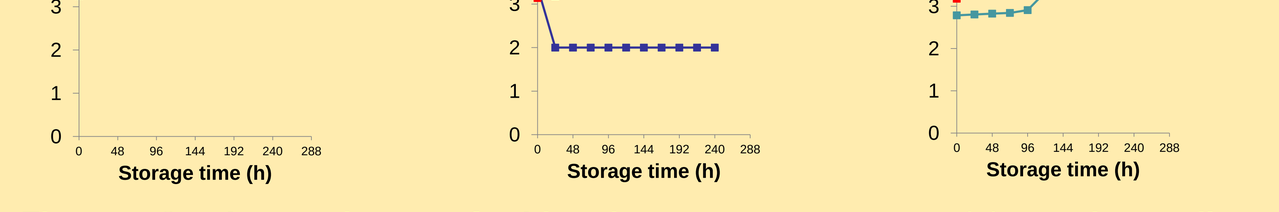


Figure 2. Interactions of *Listeria monocytogenes* (■) and spoilage microorganisms populations, *Pseudomonas* spp. (◆), *Aeromonas* spp. (■) and *Shewanella putrefaciens* (■) in sea bream model substrate stored in air and MAP at 5ºC

Conclusions

- MAP did not actually affect growth of *Listeria monocytogenes*, but the inhibition of spoilage bacteria under MAP conditions allowed better growth of *Listeria monocytogenes*.
- MAP can extend product shelf life but it may allow pathogens to reach higher numbers compared to traditional package under air.

This research has been co-financed by the European Union (European Social Fund – ESF) and Greek national funds through the Operational Program "Education and Lifelong Learning" of the National Strategic Reference Framework (NSRF) - Research Funding Program: Heracleitus II. Investing in knowledge society through the European Social Fund.

FOOD MICRO 2012
ISTANBUL, 3-7 September