

Dynamics of bioaccumulation and depuration of *Escherichia coli* in mussels (*Mytilus galloprovincialis*): effects of temperature and food availability.

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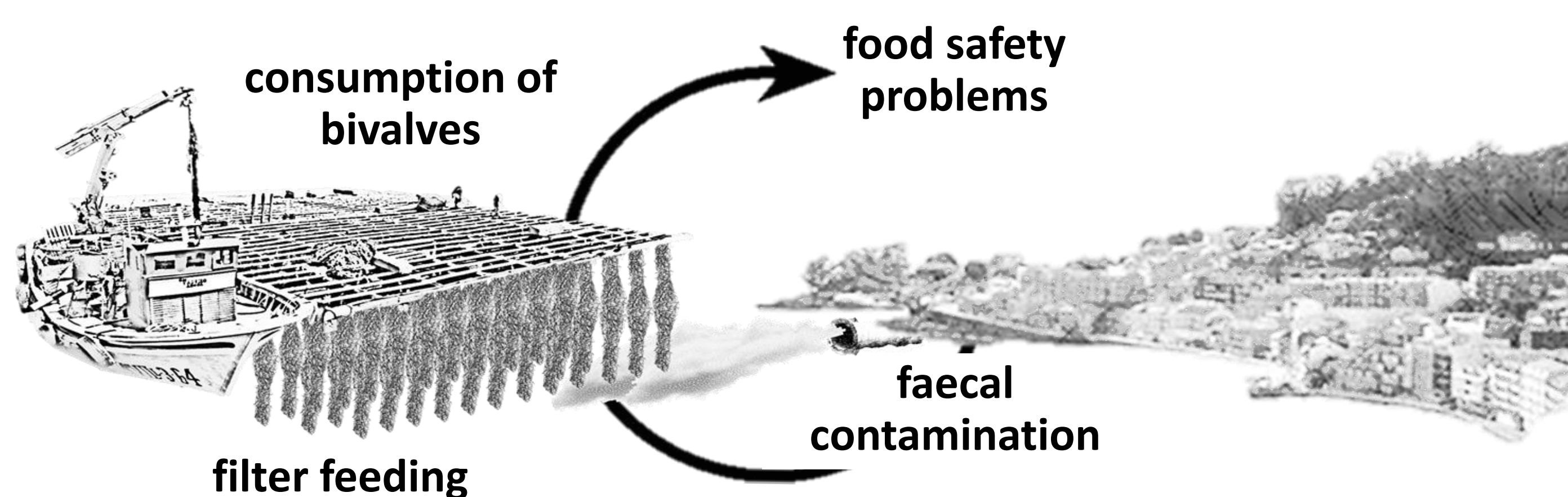
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INTRODUCTION

Galicia (NW Spain) is the main production area for bivalves in the EU, accounting for about 40% of production. The coastline is highly populated and industrialized and millions of cubic metres of wastewater are generated. Although it passes through treatment plants before being discharged, faecal contamination occasionally occurs.

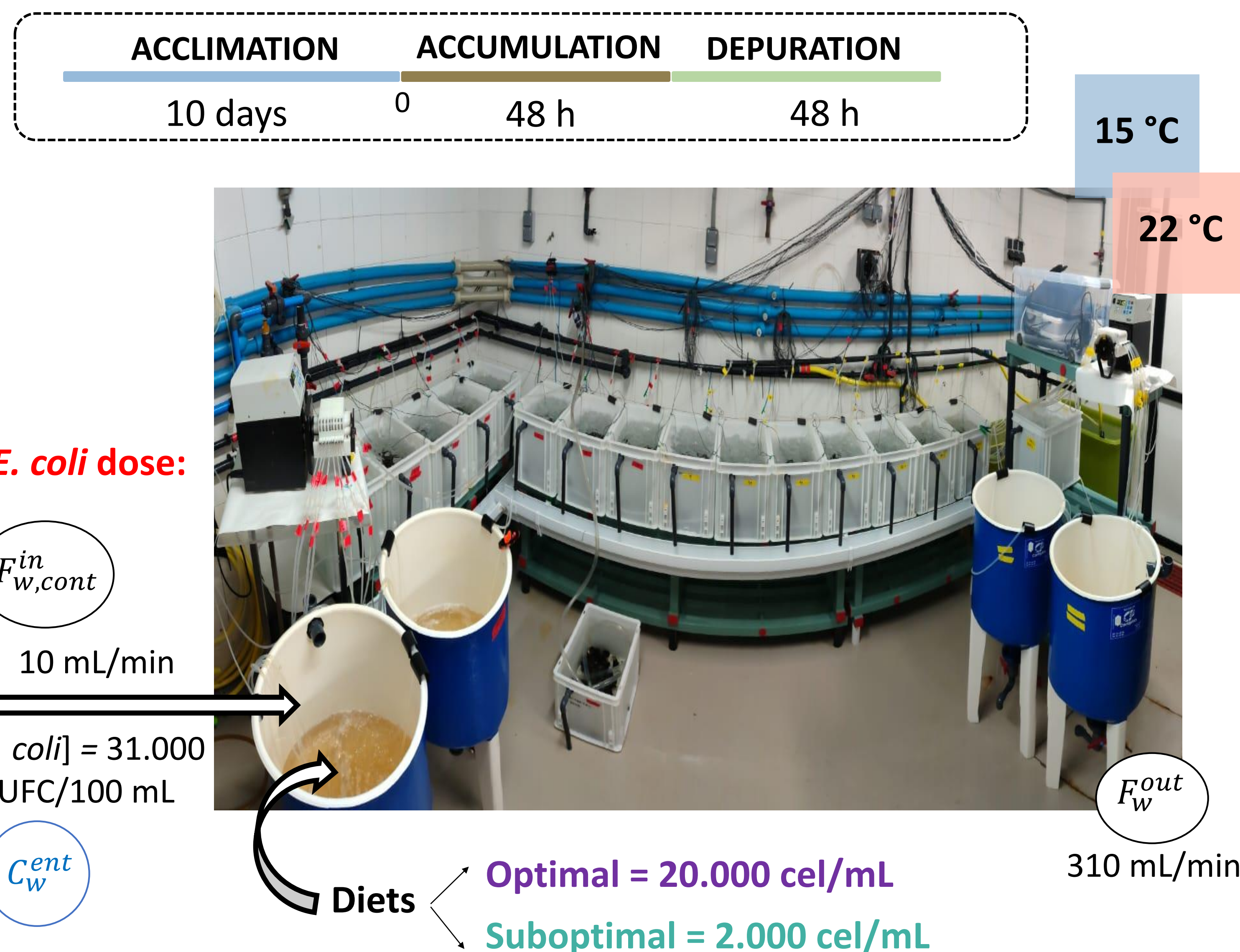


OBJECTIVES

To characterize the effects of temperature and food availability on the dynamics of accumulation and depuration of *E. coli* in mussels, and on their physiological response.

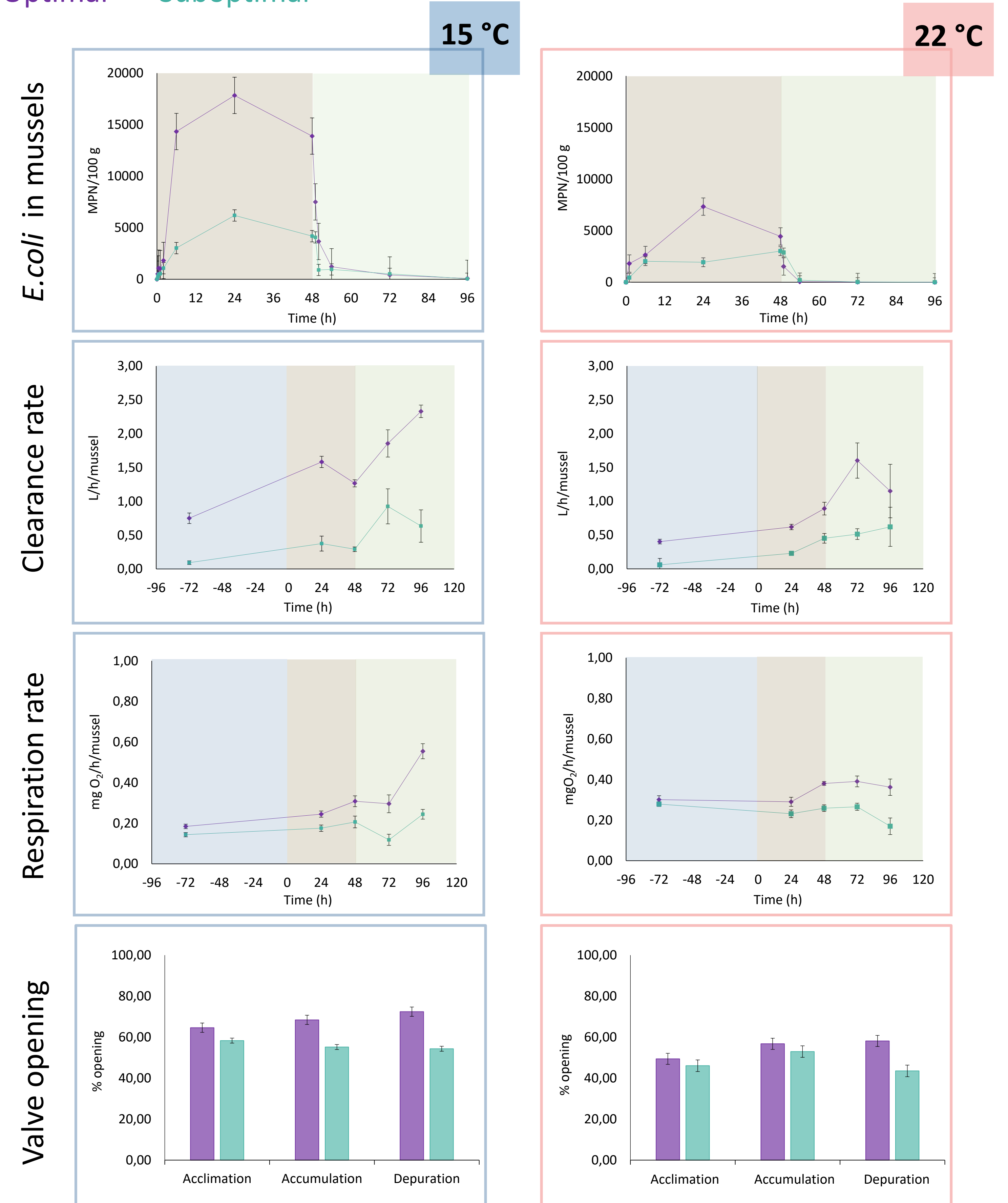
To propose a first numerical model linking *E. coli* concentration in water and mussels for future high-frequency monitoring in the marine environment.

METHODS



RESULTS

◆ Optimal ■ Suboptimal



First approach to link *E. coli* load in water (C_w) and mussels (C_m)

$$\frac{dC_w}{dt} = \frac{F_{w,cont}^{in}}{V} C_w^{ent} - \frac{F_w^{out}}{V} C_w + \frac{M_m}{V} k_d C_m - (k_u + k) C_w$$

$$\frac{dC_m}{dt} = \frac{V}{M_m} k_u C_w - k_d C_m$$

k : decay rate
 k_u : accumulation constant
 k_d : depuration constant

WORK IN PROGRESS: integration of experimental measurements in a numerical model that dynamically predicts *E. coli* concentration in mussels

CONCLUSIONS

Mussels bioaccumulate *E. coli* rapidly when come into contact with contaminated water. Food availability is of great importance in the process. With optimal diet, physiological and metabolic activity increases, as does bioaccumulation. Temperature seems to condition mussel behavior due to its effects on respiration and filtration rates and thus bioaccumulation dynamics.

To sum up, abiotic drivers and physiological response would need to be integrated into models in order to predict *E. coli* bioaccumulation.