



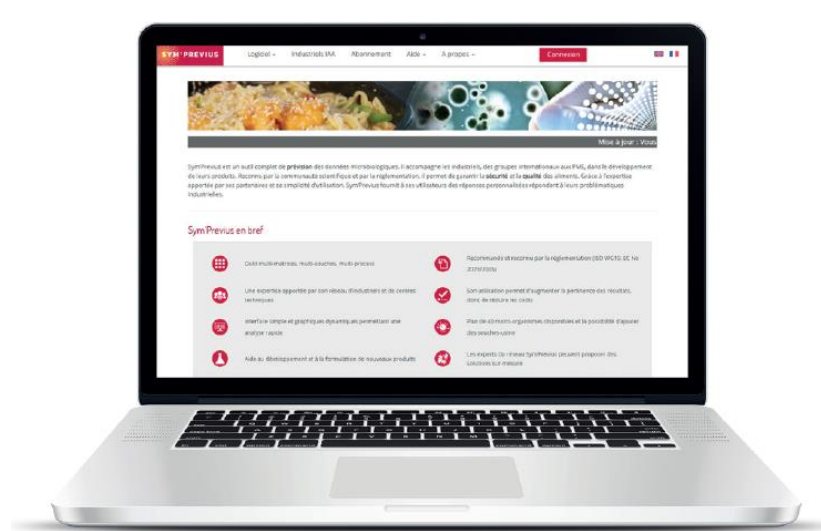
# SYM'PREVIUS, a user-friendly predictive tool for the food industry

Have a look!  
Go to SYM'PREVIUS webpage

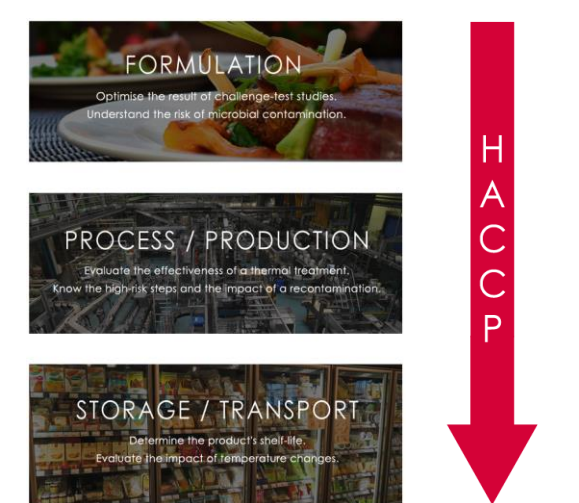


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Sym'Previus is a complete on-line tool for microbiological data prediction. Recognized by the scientific community for more than 20 years, it helps manufacturers to guarantee food safety and quality. Thanks to the expertise provided by its partners, Sym'Previus tools provide users with customized solutions to their industrial issues.



## Microorganisms

### Pathogens

*Listeria monocytogenes*  
*Bacillus cereus*  
*Escherichia coli*  
*Salmonella*  
*Staphylococcus aureus*  
*Clostridium botulinum*  
*Clostridium perfringens*  
*Clostridium haemolyticum*  
*Cronobacter sakazakii*  
*Yersinia enterocolitica*

### Spoilage

*Bacillus amyloliquefaciens*  
*Bacillus coagulans*  
*Bacillus*  
*weihenstephanensis*  
*Bacillus licheniformis*  
*Bacillus subtilis*  
*Citrobacter freundii*  
*Enterococcus faecium*  
*Lactobacillus casei*  
*Pseudomonas fluorescens*,  
Etc.

## Simulation tools

- **Growth simulation:** predict the bacterial growth during process and/or storage
- **Growth/ no growth interface:** prediction of the growth boundaries of bacterial species as a function of temperature, pH and water activity (and lactic acid for *L. monocytogenes*)
- **Thermal inactivation:** prediction of the bacterial thermal inactivation as a function of heating temperature, pH and water activity
- **HACCP Assistant:** identify microbiological hazards associated with food processing

## Optional modules

- **Fungal simulation:**
- **germination:** simulation of fungal germination during product storage or a process step.
- **Fungal simulation, radial growth:** simulation of radial growth during product storage or a process step
- **MAP Optimisation:** simulation of bacterial growth during product storage in a modified atmosphere

## Fitting tools

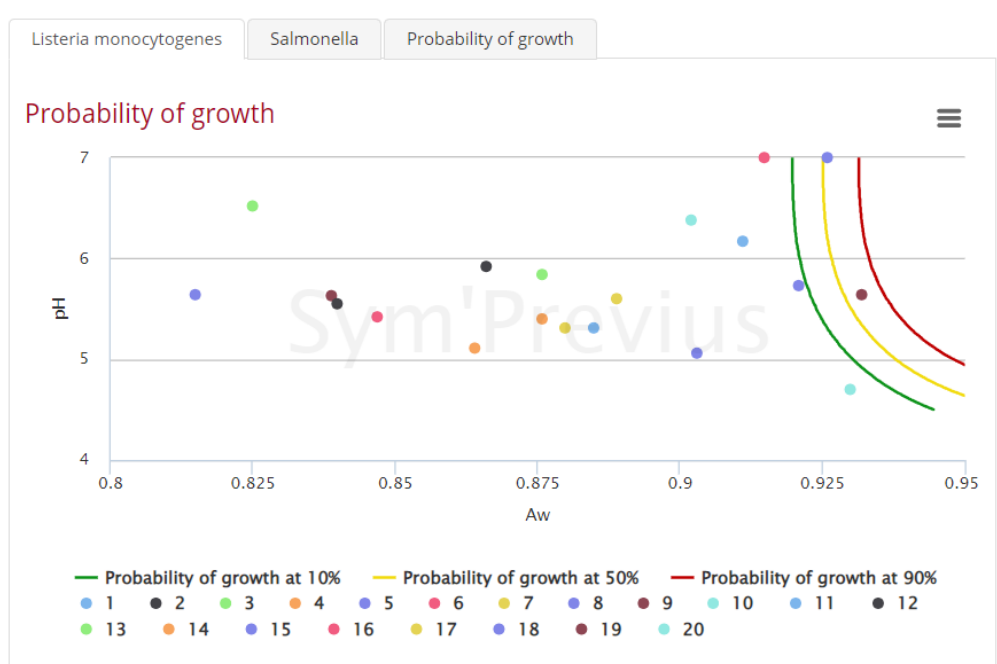
- **Growth curve fitting :** determination of the bacterial lag time and growth rate from growth kinetic data
- **Secondary growth model fitting:** determination of secondary growth model parameters related to temperature, pH or water activity (minimum, optimum and maximum values for growth) from a series of growth rates
- **Inactivation curve fitting:** determination of heat resistance parameters (e.g. D or  $\delta$  value) from an inactivation curve
- **Secondary inactivation model fitting:** determination secondary inactivation model parameters (e.g. z values) related to temperature, pH or water activity

## CASE STUDIES

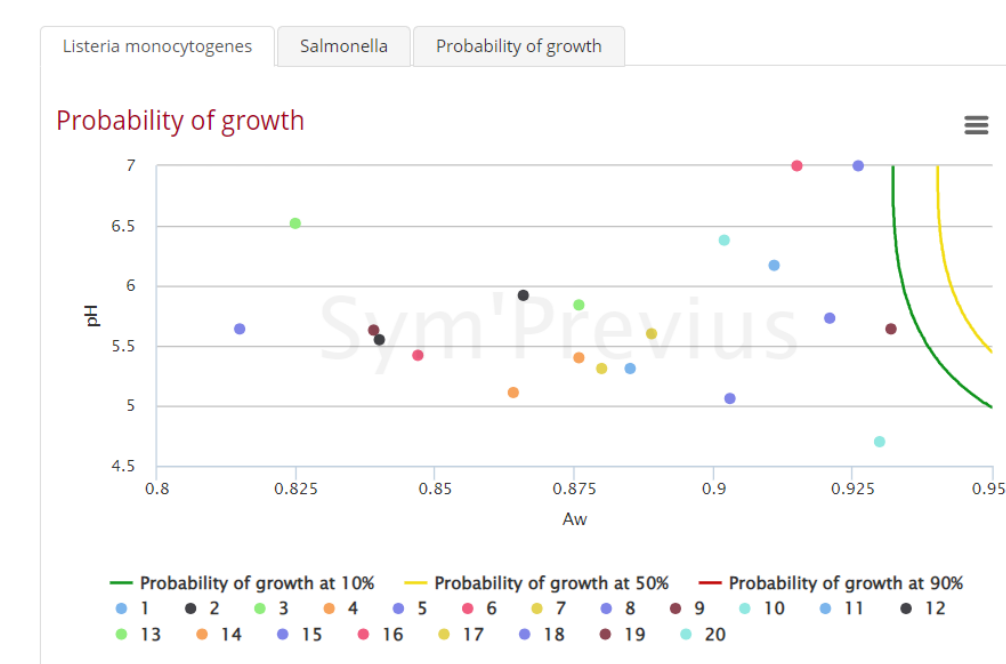
### Growth/No growth interface module

► Evaluation of *L. monocytogenes* and *Salmonella* growth probability in dry fermented sausages (DFS).

Simulations at 21 °C



Simulations at 6 °C

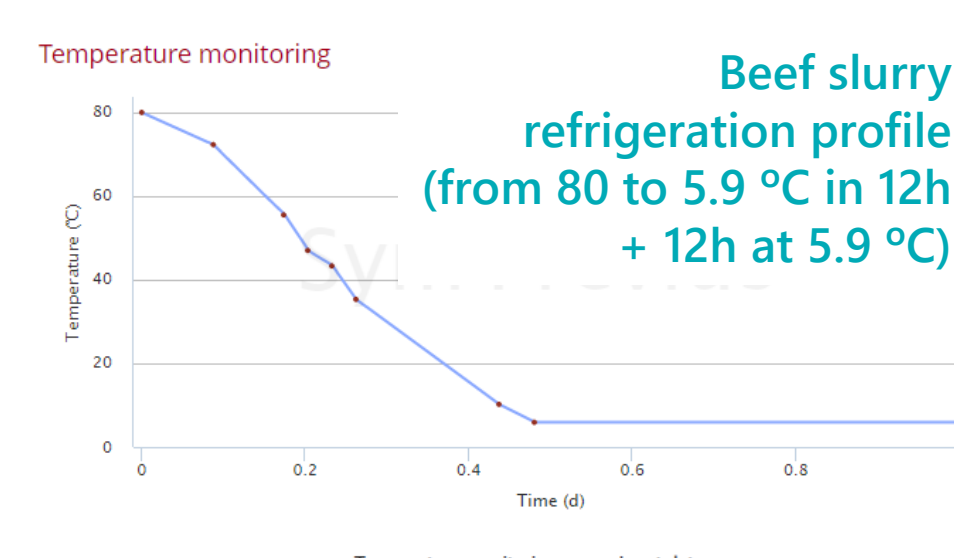


- In the evaluated DFS the probability of growth of *L. monocytogenes* and *Salmonella* is in general below 10%.
- Only two DFS show a 50-90% probability of growth of *L. monocytogenes* at room temperature (21°C), that decrease to <10% under storage at 6°C.

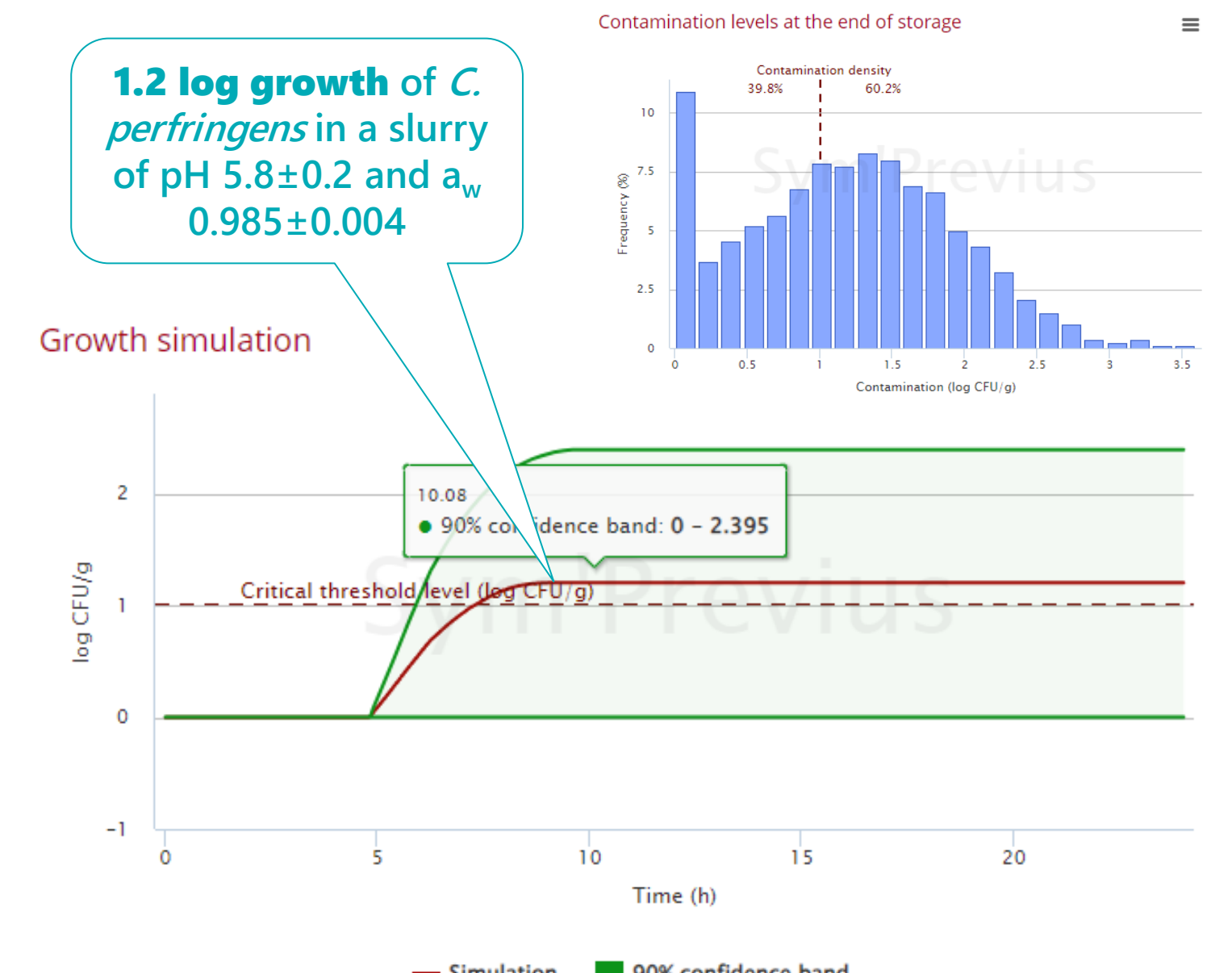
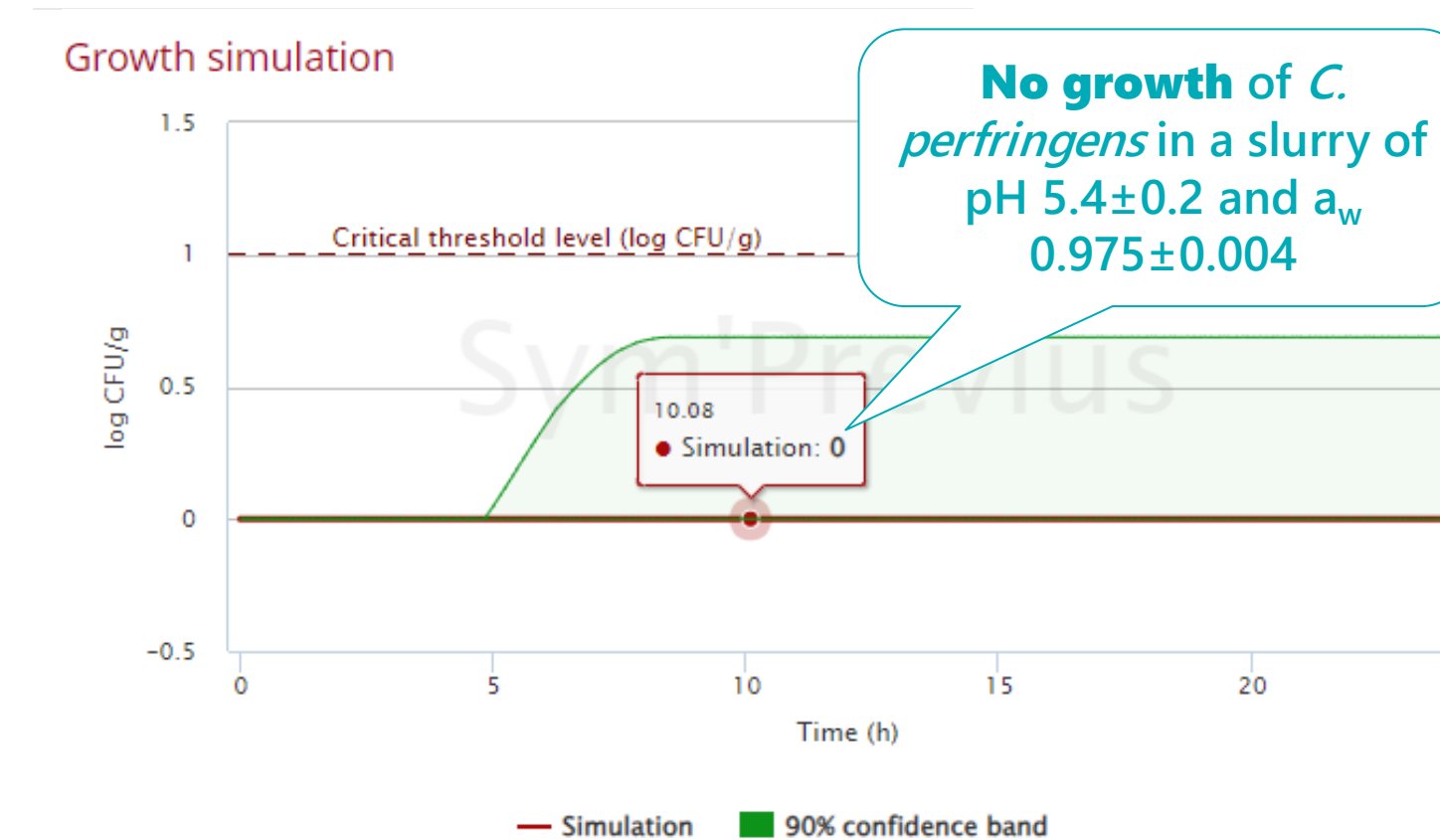
Experimental values. Custom points for pH and  $a_w$  of 20 different dry fermented sausages

### Growth simulation module

► Growth of *C. perfringens* in a post-pasteurization refrigeration profile of beef slurry

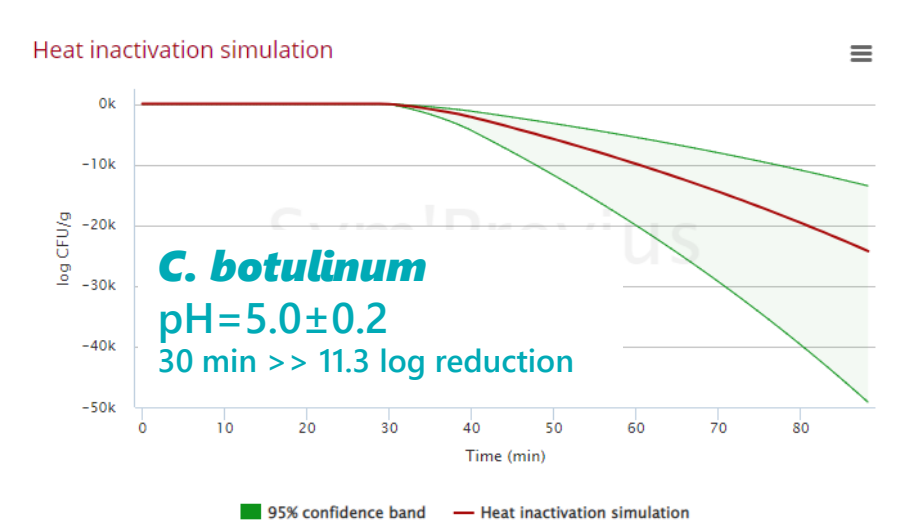
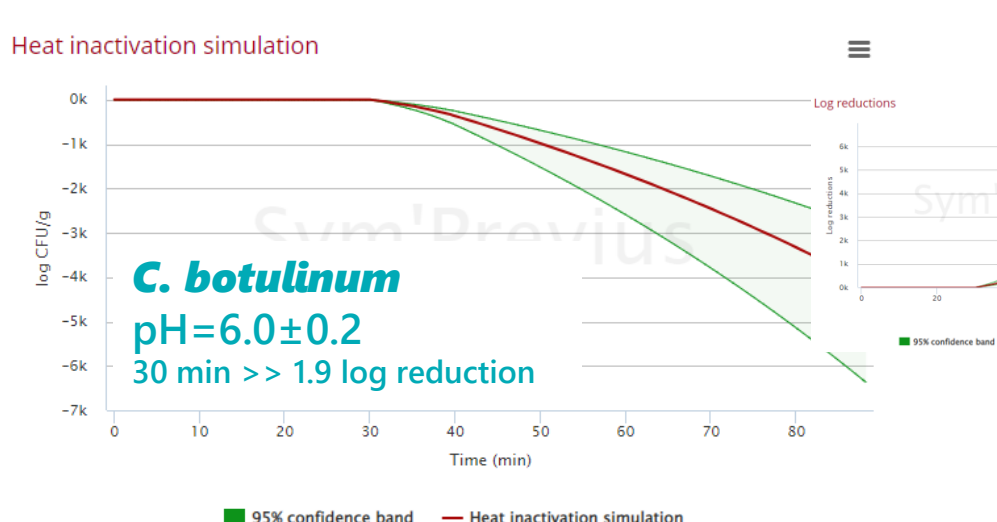


- Growth of *C. perfringens* in beef slurry during refrigeration is affected by the physicochemical properties of the products.

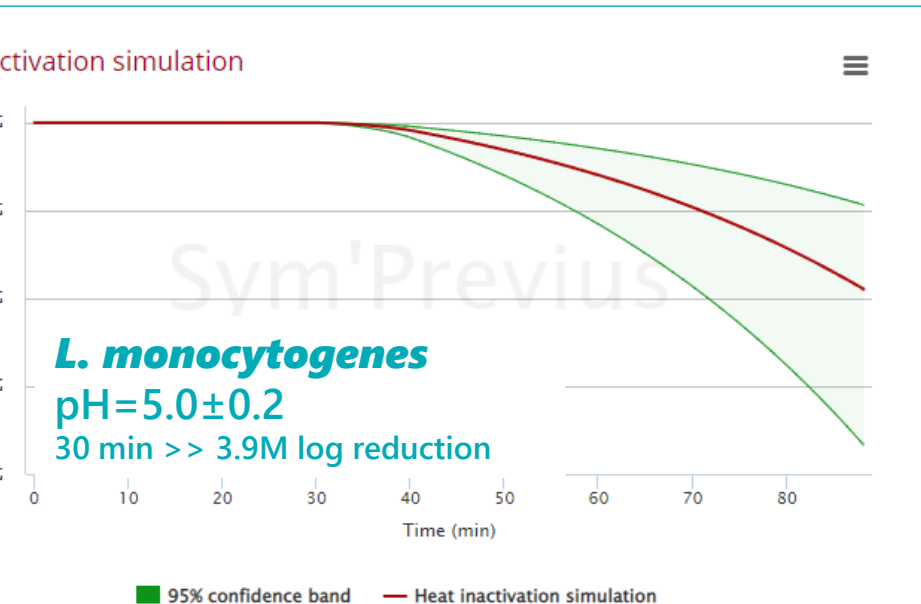
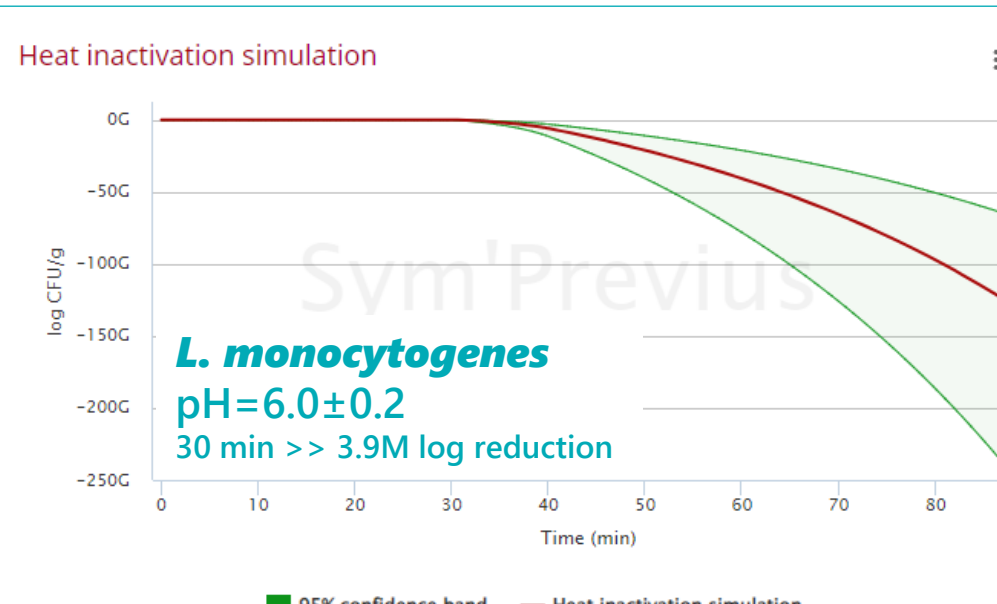


### Thermal inactivation module

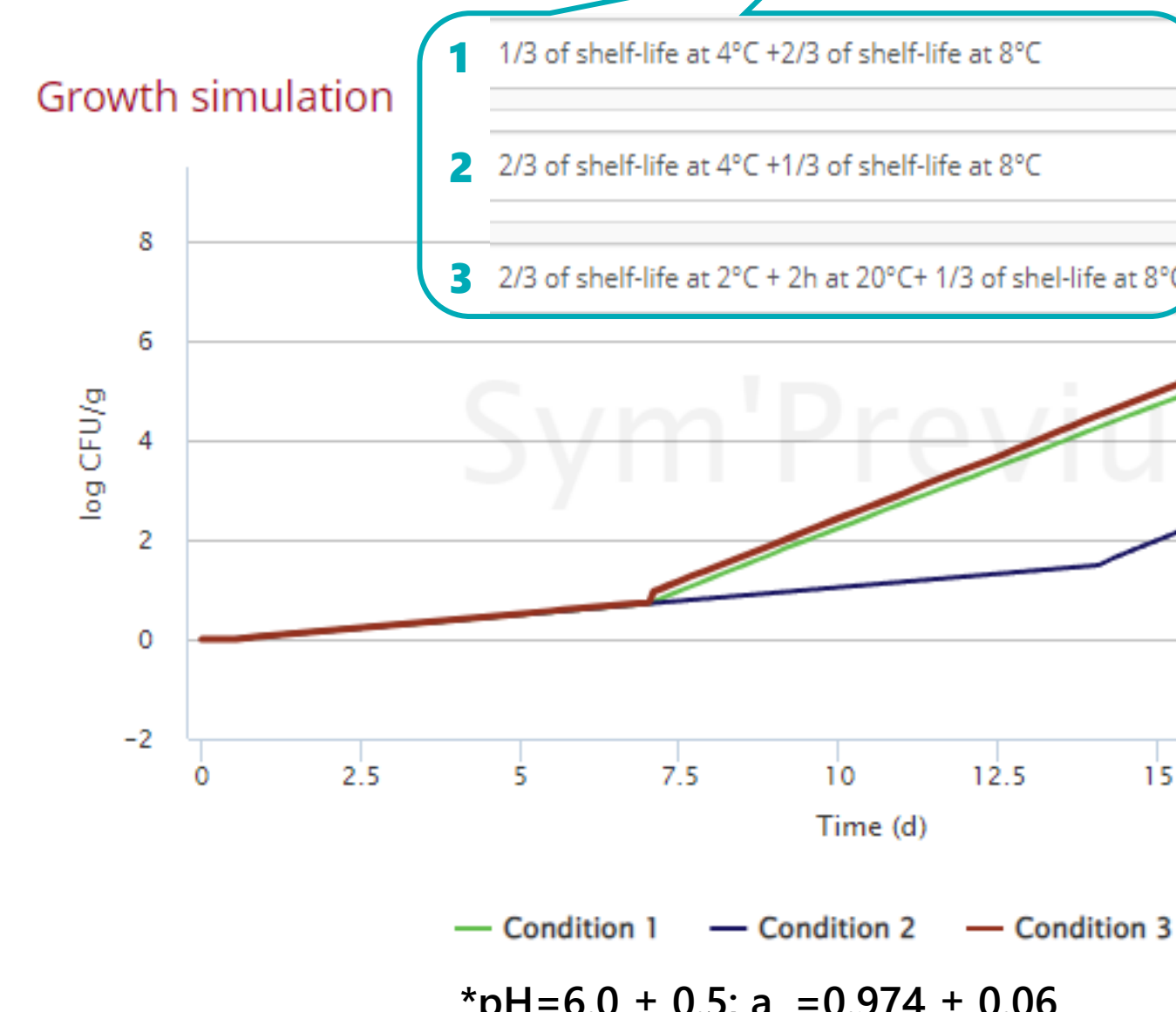
► Prediction of the inactivation of *L. monocytogenes* and type II *C. botulinum* in cooked meats ( $a_w=0.974$ ) to evaluate the impact of different pH



- Inactivation of *L. monocytogenes* and type II *C. botulinum* is affected by modifications in the formulation affecting pH and  $a_w$



► Growth of *L. monocytogenes* in cooked ham\* during shelf-life storage at different predefined dynamic conditions



- ✓ *L. monocytogenes*, predictions allow to compare the safe shelf-life under different foreseeable storage temperature scenarios (static, dynamic, predefined)

*L. monocytogenes* Log increase at the end of shelf-life:  
Condition 1: 7.7 log  
Condition 2: 5.0 log  
Condition 3: 7.9 log

Sym'previus is a predictive tool providing outputs that be used to support decision making during the design of products and it is frequently updated with new tools as the prediction of fungal growth or bacterial growth under modified atmosphere

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**SUBSCRIPTION**  
Sym'Previus is available in both a **free** and a **Premium** version (from 250€/year)  
In French and English