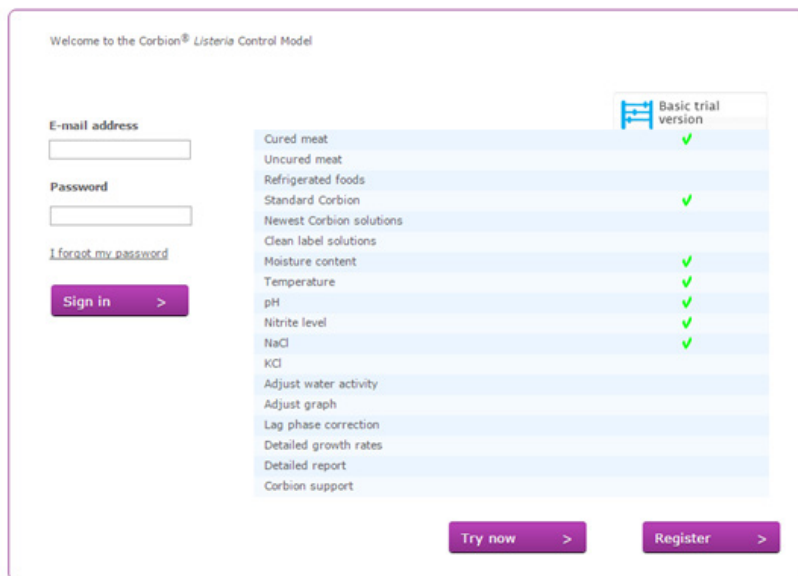


Introduction

This User Guidance document will help you navigate through the Corbion® *Listeria* Control Model. This guidelines document supports usage after signing in to the model. The model can be accessed by going to www.corbion.com/lcm Please make sure to read the 'best practices' before using the model. You can download this document on every page of the *Listeria* Control Model.

Starting Page

On the entry page three choices can be made: Sign in, Register or Basic trial (Try now). The table gives an overview of the functionalities available for the trail version. When registering more functionalities will become available to you. Both versions, the full *Listeria* Model and the Basic trial version, are at your disposal any time you visit our website.



Basic trial version	
Cured meat	✓
Uncured meat	
Refrigerated foods	
Standard Corbion	✓
Newest Corbion solutions	
Clean label solutions	
Moisture content	✓
Temperature	✓
pH	✓
Nitrite level	✓
NaCl	✓
KCl	
Adjust water activity	
Adjust graph	
Lag phase correction	
Detailed growth rates	
Detailed report	
Corbion support	

Register

Register to get full access. You will receive an e-mail containing the password you can fill in on the left of the entry page. Sign in with the acquired password and you will proceed to the model. Select the Basic trial and get a glimpse of what the model can do for you.

Supporting Tabs

The top of the page displays several tabs which support the use of the model online. A new window will open when you click on one of the tabs, so you can access the content during use of the model.

[Listeria Control Model](#)[Disclaimer](#)[About us](#)[Contact](#)[FAQ](#)

The **Corbion logo** will take you to the Corbion website home page.

'Listeria control model' is the model's tab.

Disclaimer shows the terms and conditions which you have accepted prior to usage.

About us provides a general overview of Corbion and what we can do for you.

Contact will allow you to send us an e-mail.

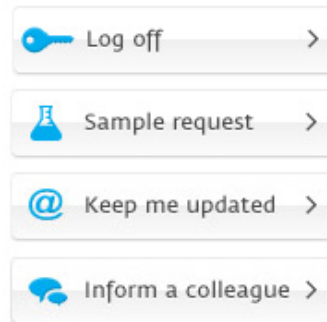
In the **FAQ** you find answers to the most frequently asked questions.



User Guidelines

Quick Menu

The quick menu is designed to perform some general swift actions and is always available for use.



'Log off' to exit the model. Closing the web browser will automatically log off your account.

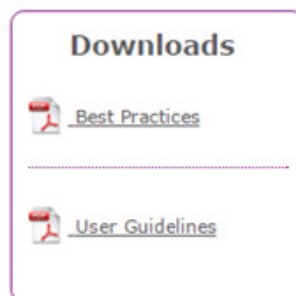
'Sample request' allows you to directly request a sample of the product of interest.

'Keep me updated' is to subscribe to the Corbion newsletter. This way you'll - always be up to date with the latest model developments and Corbion activities.

'Inform a colleague' allows you to send a mail to another person to advise the use of this model, with a personal message.

Downloads

This section provides documents which can be directly downloaded to support use or provide background information.



Using the Model

Step 1: Region & Foodtype

You now entered the model. Select the region where your company is located. Select the food type of interest: cured meat, uncured meat or refrigerated food. Specify a product name for your application. This is optional and will only be used in the PDF file which contains the detailed results of your prediction. Click on 'Next' to go to step 2 and enter the food characteristics.

Step 2: Food Characteristics

Specify the product characteristics based on total product formulation, before addition of Corbion products. Please fill in as many food characteristics as possible. If unknown you can leave the default value but this might make the prediction less realistic.



Using the Model

Food characteristics and storage conditions:

Moisture level is the amount of water in the product, expressed as volume percentage. **pH** is the acidity level of a product after cooking. **NaCl** and **KCl** are the sodium and potassium salt of chloride, expressed as volume percentage. **Sodium nitrite** level is ppm of total product formulation. Please recalculate addition level when you are using meat block concentrations. The **water activity** is relative availability of water. If unknown, the activity can be calculated by ticking on the 'calculate my water activity' box. The default value of the model (0.993) will be used to calculate water activity according to the entered food characteristics. **Temperature** is currently the only variable storage condition taken into account by the model. Please select Celsius or Fahrenheit as unit.

Moisture	<input type="text" value="70"/>	%
pH	<input type="text" value="6.2"/>	
NaCl	<input type="text" value="0"/>	%
KCl	<input type="text" value="0"/>	%
Sodium nitrite	<input type="text" value="100"/>	ppm (on total formulation)
Water activity	<input type="text" value="0.993"/>	
<input checked="" type="checkbox"/> calculate my water activity		
Storage conditions		
Temperature	<input type="text" value="40"/>	<input type="button" value="°F"/> <input type="button" value="°C"/>

The microorganism data:

The initial level projects an amount of *Listeria* bacteria (in log CFU) at day 0. The maximum allowed level marks the amount of *Listeria* (in log CFU) which you want to prevent from occurring during shelf life. Graph scaling is used to manually set the X-axis of the graph in days. e.g. if you enter 120 days, the X-axis will be 120 days in length, regardless of the predicted *Listeria* growth. When left empty the model will automatically determine the length of the axis, according to the predicted growth. When you click 'calculate' your prediction will be shown on the right hand side of the screen.

Food characteristics

Enter the characteristics of your finished cured meat product as specifically as possible, without any Corbion ingredients. If you are unsure of a food parameter, please use the default value. You may also select a Corbion ingredient and enter addition level

Moisture	<input type="text" value="70"/>	%
pH	<input type="text" value="6.2"/>	
NaCl	<input type="text" value="0"/>	%
KCl	<input type="text" value="0"/>	%
Sodium nitrite	<input type="text" value="100"/>	ppm (on total formulation)
Water activity	<input type="text" value="0.993"/>	
<input checked="" type="checkbox"/> calculate my water activity		

Storage conditions

Temperature

Corbion Solution

%

Microorganism data

Initial level log CFU/g
 Maximum allowed level log CFU/g
 Graph scaling days

Listeria growth

About this graph

Time to 1 log outgrowth in days

	Control	With no ingredient
Best fit	33	33
95% line*	15	15

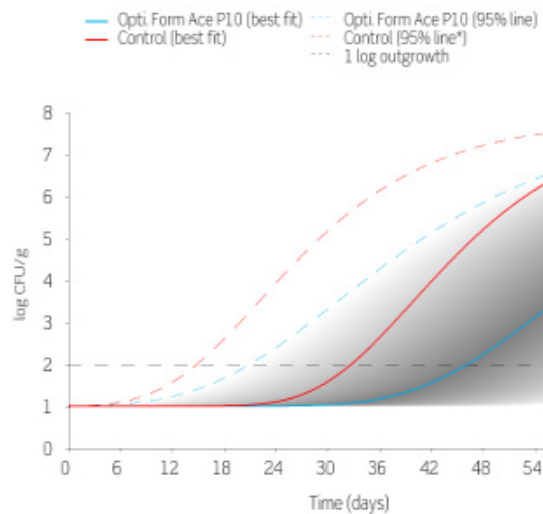
* The lines are based on specifically designed and validated Listeria challenge studies. According to these studies, 95% of growth is expected to be slower than the 95% line.



Using the Model Continued

You can also add a **Corbion solution** to your prediction. Please select the Corbion product of interest and enter the addition level. Click on 'Calculate' again to update the graph shown on the right. You directly see the predicted *Listeria* growth according to this formulation. Re-select a product or re-enter the addition level if the desired prediction is not achieved. When the water activity is calculated by the model (box ticked) the value changes automatically to the water activity calculated after addition of the Corbion product. The calculated water activity of the control situation (without Corbion product) can be found on the detailed results sheet. When the 'calculate my water activity' box is unchecked, the water activity can be overwritten with a measured value of a known formulation. When a measured water activity value is entered for a formulation with a Corbion product, the 'control' water activity is re-determined automatically by subtracting the water activity effect of the Corbion product from the measured water activity value. Enter a value and click on 'Calculate' to use this value. The 'Calculate' button updates the prediction according to all values entered. The graph shows the predicted growth of *Listeria* over time.

Listeria growth



About this graph

Time to 1 log outgrowth in days

	Control	With Opti. Form Ace P10
Best fit	33	46
95% line*	15	21




An explanation of the results and an explanation of how to interpret the 95% line and best fit can be accessed by clicking on the **'About this graph'** link. The red lines represents *Listeria* growth based on the Food Characteristics without Corbion solution (control). The blue lines represent the predicted growth with the addition of Corbion product. The grey area represents the area in which 90% of the growth is expected. Below the graph a summary of results is shown. The number of days until the maximum allowed level is shown according to the best-fit line or according to the 95% line. Please make a well-considered selection of these levels and consult the 'Best practices' document.

'Detailed results' will open a PDF report in a new window. This two page report provides an overview of the entered values, a description of the used product and a detailed description of the prediction. Also a figure is shown in which you can easily see what the effect of adding more or less of your Corbion product would be on the shelf life of your product. Explanation and definition of this report is provided inside the report and in the 'best practices'.

Advanced settings

The lag time can be adjusted. This option should only be used by advanced users and only when challenge studies indicate that adjusting the lag time is appropriate. On basis of our extensive data set the predicted growth will start after a predicted lag time. However, your own dataset might show a different lag time than predicted by the model. This option allows you to overwrite the calculated lag time in three ways:

- Fill in a correction factor. The correction factor is calculated by dividing the model's predicted time (in days) till log 2 outgrowth, by the time in your own data till log 2 outgrowth.
- Fill in fixed lag time in days as measured in your own data set.
- Use no lag time.

Lag time 

use calculated lag time

use correction factor:

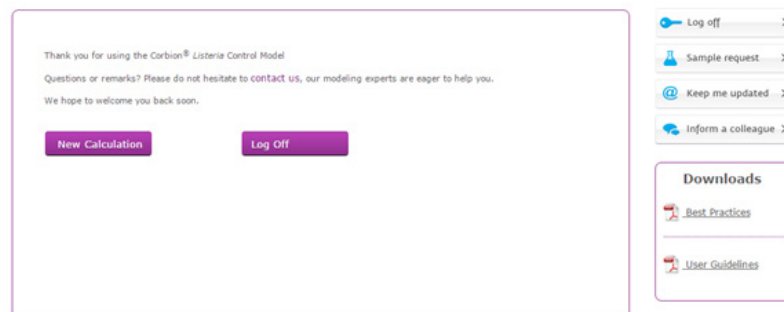
use fixed lag time: days

use no lag time

Click on **'Next'** to finish the calculation.

Log off or start a new calculation

Exit



The screenshot shows a user interface with a central message box and a sidebar. The message box contains the text: "Thank you for using the Corbion® Listeria Control Model. Questions or remarks? Please do not hesitate to contact us, our modeling experts are eager to help you. We hope to welcome you back soon." Below this text are two buttons: "New Calculation" and "Log Off". The sidebar on the right contains a list of navigation options: "Log off", "Sample request", "Keep me updated", and "Inform a colleague", each with a right-pointing arrow. Below these is a "Downloads" section with two links: "Best Practices" and "User Guidelines", each with a right-pointing arrow.

Interested in learning more about Corbion? corbion.com/food