



Acidification and reduction of *Listeria* in fermented dried sausage with SafePro® F-LC and B-LC-35

The presence of *Listeria monocytogenes* in fermented dried sausages is an increasing problem in the sausage industry. Often the raw materials are highly contaminated from the very beginning and even if the concentration of *Listeria monocytogenes* due to the formation of lactic acid, the pH-drop and the drying out, a considerable number of *Listeria monocytogenes* could survive. This may cause safety problems in sausages where the water activity is relatively high at the end of the ripening period or the pH has only been slightly lowered. Additionally, some countries have a zero-tolerance regarding *Listeria monocytogenes*, even if the product is stabilized towards growth of *Listeria*.

In order to reduce presence of *Listeria monocytogenes* in the final fermented sausage, SafePro® F-LC was developed. Now SafePro® B-LC-35 has been added to the product range to fulfil certain customers need to obtain a similar reduction of *Listeria monocytogenes* with a milder acidification.

A comparative study of B-LC-35 and F-LC was conducted in model sausages inoculated with approximately 4000 CFU/g of a *Listeria monocytogenes* 5 strain cocktail and either B-LC-35, F-LC or no starter culture (control). The model sausages were fermented 7 days at 24 °C (75.2 °F) or 32 °C (89.6 °F), respectively. The course of pH was followed continuously and the listeria cell count was determined after 0, 1, 3 or 7 days respectively.

Figure 1a and 1b shows the development of pH over the first 2 days of fermentation in model sausages added F-LC, B-LC or no starter culture (control). At both temperatures B-LC-35 showed slower initial acidification compared to F-LC.

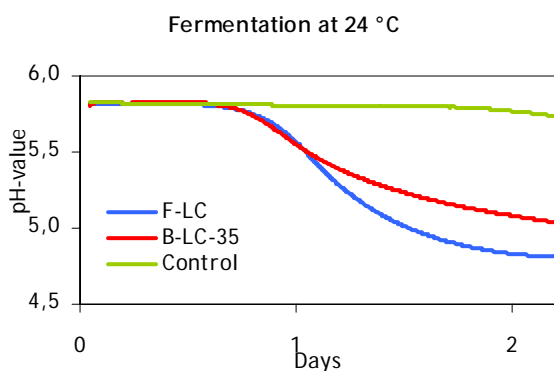


Figure 1a: Development of pH in model sausages at 24 °C (75.2 °F)

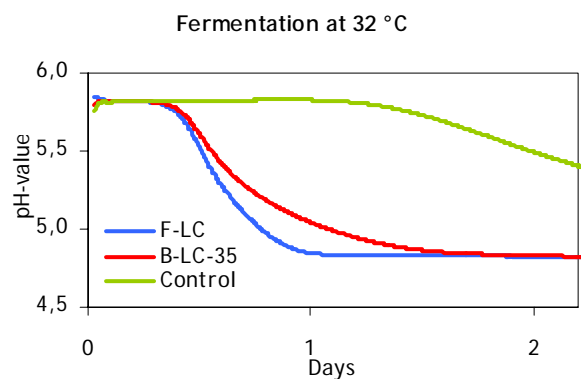


Figure 1b: Development of pH in model sausages at 32 °C (89.6 °F)

Figure 2 shows the development of *Listeria monocytogenes* in the model sausages. F-LC and B-LC-35 show a comparable anti-listerial effect, whereas *Listeria monocytogenes* grows very well in model minces without starter culture (control). Other studies have already documented F-LC's pronounced anti-listeria effect compared to normal starter cultures. Please contact your local Chr. Hansen representative for further information.

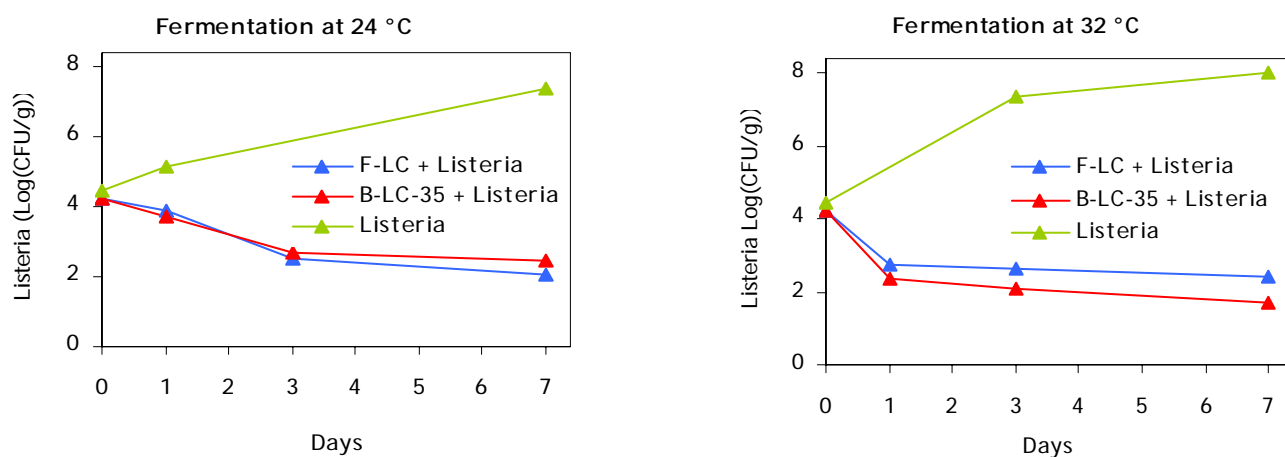


Figure 2a: Development of *L. monocytogenes* in model sausages added F-LC, B-LC-35 or no starter culture (control) at 24 °C (75.2 °F)

Figure 2b: Development of *L. monocytogenes* in model sausages added F-LC, B-LC-35 or no starter culture (control) at 32 °C ((89.6 °F)