



Exploring the idea of using “good” bacteria to prevent the spoilage of meat

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Project Title:

Exploring the potential of using *Carnobacterium maltaromaticum* A5 as a bioprotective agent in meat plants to improve the safety and shelf life of meat

Researchers:

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Background

Canada has continued to make major improvements in beef safety and shelf life with advancements in how both carcasses and individual cuts of meat are handled. Even so, sporadic recalls associated with *Escherichia coli* (*E. coli*) O157 do still occur and storage life of different products continues to be variable. Lactic acid bacteria (LAB) are food safe and naturally occurring in vacuum-packaged meat. They tend to become the most common bacteria in beef that is stored for longer periods of time under vacuum packaging. Previous studies have shown that *Carnobacterium maltaromaticum* strain (A5) can inhibit the growth of pathogenic and spoilage bacteria in a petri dish and broth cultures at high levels.

Objective

Assess whether the inhibitory effect of a *Carnobacterium maltaromaticum* strain (A5) on pathogenic and spoilage bacteria can be reproduced with meat.

What they did

To see how *C. maltaromaticum* A5 strain reacted on meat, researchers introduced low levels of *C. maltaromaticum* A5 to steaks that had no pathogen contamination, and *E. coli* and *Salmonella* contamination. Low levels were used to keep the treatment cost effective. The steaks along with steaks that had not been inoculated with *C. maltaromaticum* A5 were vacuum packaged and stored at 2°C for up to 12 weeks. After 12 weeks the meat was tested for the presence of spoilage bacteria as well as other indicators of spoilage such as odour.

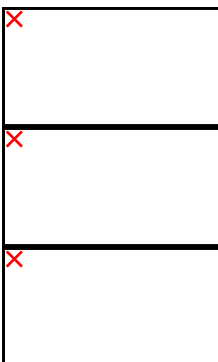
What they learned

The majority of steaks that weren't inoculated with *Carnobacterium* were negative for the organism. This suggests that the *Carnobacterium* detected in inoculated steaks were primarily from inoculation, rather than bacteria that naturally occurred in the meat. The number of *C. maltaromaticum* A5 continued to increase as the trial went on up to some point but by the end of the trial there were no differences in the number of spoilage bacteria between the meat that had been inoculated and the meat that hadn't. Initially all the steaks had a very diverse group of bacteria on them but after 4 weeks spoilage bacteria began to predominate in all steaks. When tested by a consumer panel for off odour only small differences could be detected between the steaks that were inoculated and those that were not.

What it means

This suggests that at these low concentrations *C. maltaromaticum* A5 is unable to prevent spoilage microbes from taking over. Since *C. maltaromaticum* A5 was able to establish at these low levels inoculation at higher levels could be looked at in future research. If inoculation at higher amount could reduce total spoilage bacteria this would result in meat that could be stored longer without the use of preservatives.

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