FOOD PROCESSING

BATTLING BACTERIA IN MEAT PRODUCTS

LONDON—A bacteriocin-producing *Lactobacillus* has prevented *Listeria monocytogenes* from growing in fresh Mettwurst (German sausages), report researchers at the Federal Centre for Meat Research's Institute for Microbiology (Kulmbach Bayern, Germany). Their work suggests that this and other *Lactobacillus* strains could be incorporated into meat products as a means of combatting food-borne infections caused by *Listeria monocytogenes*. The infections—collectively known as listeriosis—are potentially fatal and are increasing in many countries, not least because *Listeria monocytogenes* can grow at the comparatively low temperatures (down to 0.5° C) that are within range of those used in order to preserve pre-packed cook-chill foods. The organism, which is a particular threat to immunocompromised patients, is also relatively tolerant of low pH and high salt concentrations.

In a project financed by the Bavarian Ministry of Economic Affairs, Ulrich Schillinger in Kulmbach isolated a strain of *Lactobacillus sake*, which he labelled Lb 706, from vacuum-packaged meat. He found that it excreted into the growth medium a bacteriocin, sakacin A, which inhibited the growth of *L. monocytogenes* in laboratory media. He has now assessed the potential practical value of the organism in protecting sausages and minced meat against the proliferation of *L. monocytogenes*. The efficacy of Lb 706 was compared with that of a variant, obtained by curing with acraflavine, which did not produce the bacteriocin.

Inoculated into pasteurised minced meat, *Lactobacillus sake* Lb 706 inhibited the growth of *Listeria*. The effect was attributed to the sakacin A produced by the bacterium, because the bacteriocin-negative variant, which did not differ in its capacity to secrete acid, was ineffective. Schillinger found, however, that the action of *Lactobacillus sake* Lb 706 in meat was much less marked than when tested in broth culture, when it killed virtually 100 percent of *Listeria* within 24 hours. This could be due to the adsorption of sakacin A onto muscle and fat particles in the meat, and thus its inactivation, as well as to more limited diffusion of the bacteriocin through minced meat.

For reasons that are not yet clear, Schillinger has found that sausages are much more promising candidates for protection by *Lactobacillus sake* Lb 706. He has started with the variety known as fresh Mettwurst, which consists of comminuted-cured raw pork filled into casings, and is suspected of being a high risk product for listeriosis. Although sodium nitrite would be an effective preservative against *Listeria monocytogenes*, the law in Germany and most other European countries does not permit it to be incorporated into sausages at the requisite concentrations.

Investigating the reasons why Mettwurst seemed particularly prone to harbor *Listeria monocytogenes*, Schillinger found that pH value was the most important influence on multiplication of the organism. Whereas *Listeria monocytogenes* failed to multiply at the normal pH of meat (under 5.9), it grew very rapidly in Mettwurst at its characteristic pH of 6.3. However, inoculation of the *Lactobacillus* totally prevented this proliferation. Bacteriocin action was thought to be responsible, because the pH did not fall to the point that would inhibit the pathogen.

—Bernard Dixon

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