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Atypical bacteriophages attacking *Streptococcus thermophilus* - an underestimated risk for thermophilic starter cultures?

Horst Neve, Yahya Ali, Natascha Lüth and Knut J. Heller
Max Rubner-Institut, Department of Microbiology and Biotechnology (MBT), Kiel, Germany

Many dairy strains of *Streptococcus thermophilus* starter cultures (required for production of yoghurt, mozzarella and *Swiss*-type cheeses) are susceptible to infection by lytic bacteriophages. *S. thermophilus* phages have been isolated and characterized world-wide and are currently grouped into two distinct subgroups on basis of their unrelated phage structural proteins. Representatives of both phage groups cannot be differentiated morphologically, as they reveal the same morphotype (i.e, *Siphoviridae* phages). For their simultaneous detection and differentiation, a PCR system has been established on basis of DNA regions of their non-related *mhp* genes coding for the major head protein. This multiplex PCR system allows both the detection of lytic phages in whey and product samples and furthermore the identification of prophages in lysogenic cultures as well.

When the multiplex PCR tool was tested with a broad set of lytic phages, one phage (i.e., phage P738) failed to generate a PCR amplicon. By electron microscopy it was shown that this new phage differed morphologically from all other *S. thermophilus* phages. It is notable that phage P738 also exhibited a number of unusual physiological characteristics unrelated to other *S. thermophilus* phages. In order to improve the PCR-based phage detection system with respect to this new phage isolate, DNA sequence analysis was performed for the region flanking the major head protein gene. Surprisingly, the P738 phage genome revealed high DNA homology to *Streptococcus pyogenes* phages, therefore phage P738 represents a new type of *S. thermophilus* phages. As judged by its uncommon physiological characteristics and DNA sequence analysis, this new phage has crossed the host species barrier and originates from an *S. pyogenes* host background. The standard multiplex-PCR for comprehensive and reliable detection of *S. thermophilus* phages was finally updated with a DNA primer pair specific for the *mhp* gene of the new phage.