

# Phages for fight against Listeria

First bacteriophage product for industrial use due for commercial release

To fight Listeria and other pathogens by means of simple biology even in a product, without the use of antibiotics or disinfectants, might sound a bit like science fiction. But applied bioscience has turned the imaginary into reality. The concept seems simple at first glance: breed bacteriophages in high numbers and use their specificity to combat harmful bacteria and other contaminants. Even though this idea might have crossed the minds of people working in the cheese making industry, only EBI Food Safety headquartered in The Hague, The Netherlands, has turned this concept into reality. First product now arriving in the market is Listex P100, a suspension of concentrated phages that are specific to Listeria. Tests on laboratory and pilot plant scale have shown that the phages in Listex have a broad spectrum for the whole species of Listeria.

But how Listex P 100 is manufactured remains a secret. EBI's CEO Mark Offerhaus only says: "We are the first to have managed to grow Listeria in high numbers, to let bacteriophages grow inside these bacteria, to concentrate the resulting phages and to make that concentrate available as a pure product for use in the food industry."

He adds that Listeria contamination is causing enormous damage each year. Product recalls in the US as well as in the EU are estimated to cost each continent's food industry about € 2.5 bn annually, health treatment costs associated with Listeria add an annual € 5 bn, while the damage to brands involved in Listeria contamination cannot be expressed in monetary terms. "This potential market validates the ten years EBI Food Safety has devoted to the fight against pathogens", says Offerhaus (41), a lawyer and former banker.

EBI Food Safety has been independent since one year now. The company which



**With Listex we have an absolutely "Green" approach. Phages occur naturally and we are using them now for application in food manufacturing. Harmful bacteria are killed by phages without the use of antibiotics or chemicals, says EBI's CEO Mark Offerhaus**



**Dirk de Meester (left) and Martin Warmerdam expect that their concept of biologically eliminating contamination will turn into a multi-million € market**

employs some 20 people is developing and marketing solutions based on phage technology for the food industry and aims at making the use of bacteriophages an industry standard. EBI is owned by Eco Investment Partners, a venture capital fund owned by Offerhaus including several financial partners. There is no link to any of the established food ingredients or culture producing companies, confirms Offerhaus.

EBI develops its products on its own but has sourced out specific R&D to a network of specialists. Most well-known is Prof. Martin Loessner from ETH Zurich, who is regarded as the bacteriophage expert world-

**Listex P100 is a suspension of Listeria-specific bacteriophages. It can be sprayed, added to the brine bath or be applied to the cheese surface. It can also be mixed into ripening cultures or in washing solutions.**



wide. Other R&D partners are also well known, such as ENSAIA in France and NIZO in the Netherlands, and work on applications, while the food microbiology department of the University of Gent (Belgium) adds its knowledge in meat processing technology and Centro Sperimentale del Latte in Lodi, Italy, is working on applications for typical Italian cheeses. Currently, EBI is assessing another partner in Germany.

Martin Warmerdam (44) who has recently joined EBI as director marketing, sales & distribution and who has been working for DSM before, reports that first publications in specialist trade media have generated enormous interest in the dairy and meat industry. "Companies phone us on their own account and want to learn all about our new product." Warmerdam is positive that the use of Listex will be booming soon.

In summer 2005, EBI has completed a regulatory and safety dossier for the FDA. In the dossier, which describes the product in maximum detail, EBI has documented the total genome of the type of phage they use and reports the analyses of the allergenicity and toxicity features.

With this dossier EBI's COO Dirk de Meester (37) expects that GRAS will be



affirmed by the FDA next spring. This would allow the unrestricted use of Listex both in the US and in Canada, although the data compiled are sufficiently encouraging and complete to allow EBI to market the product already today without legal limitations. EBI is seeking regulatory approval in the EU in the interest of the cheese industry.

Therefore, it concentrates on countries where there is high demand and where distribution does not present problems. Italy, Spain and Portugal are high on EBI's list.

At the moment EBI is working to convince the industries it targets, i. e. manufacturers of relevant types of cheese, meat- and fish-processors as well as manufacturers of ready meals, demon-

strating that its phage product really works. According to Warmerdam, EBI makes independent institutes in various EU countries test and evaluate Listex, while the results are made available to potential clients. But there are also tests at customers' sites, f. e. in cheese and meat plants. As demand is growing, EBI will expand its production. Warmerdam says: "Our concept is really very simple. If it's about cultures, phages are the industry's foe.

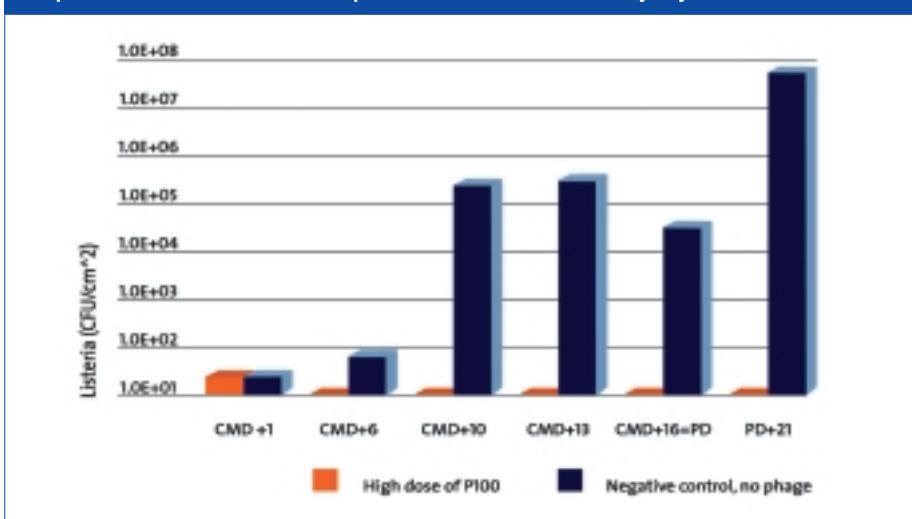
But if it's about contamination, phages become manufacturers' best friends." He continues: "We have sufficient production capacity and product available today to allow us to offer customers the services of the product and our staff in order to help out processors prevent Listeria outbreaks. We can also demonstrate that the product is working under the most challenging conditions of all."

While already working on phage products against Salmonella, Campylobacter and E. Coli, Offerhaus and his colleagues are convinced that phage technology will become a huge market, making phage technology a serious contributor to food safety. At relatively low costs producers can help protect consumers against Listeria while eventually reducing production expenses, product recalls and brand exposure.

This also explains why especially Chief Executives in the food industry are extremely interested in EBI's solution, says Offerhaus. But one should never forget that using phage technology will never be a substitute for GMP, good hygiene and HACCP. Only those plants that produce at best practice will be able to exploit the whole benefit of phage technology.



Listex P100 kills up to 99 % of all *L. monocytogenes* strains. The concentration is crucial for the product's effectiveness and for prevention it is best used every day



## NEWS

### 75 years European beverage cartons

75 years ago, Günter Meyer-Jagenberg applied for the patent for a pioneering idea: the "perga" packaging, the first beverage carton in Europe. The development of this idea laid the foundations for the world-wide success story of SIG Combibloc.

Meyer-Jagenberg had discovered the American beverage cartons which had so far been widely unknown in Europe and invented the folding boxes. In 1929, he applied for the registration of the trademark for a paraffin-coated "conical fat bag". One year later, on 18th November 1930, he applied for the patent for "perga", a water-resistant paper receptacle with folding closure as well as the equipment for its production. "Perga" is the first flexible

packaging in Europe and the predecessor of today's packaging systems from SIG Combibloc.

The packaging became a mass product only after World War II. Based on the "perga" idea, "bloepak" was a new packaging system established in 1962 to meet the growing demand and the requirements of the market – e. g. with regard to stability. "bloepak" became the company's first large-scale production packaging. The former paraffin coating of the carton is replaced by a polyethylene coating.

The company had its international breakthrough in 1976 with the introduction of "combibloc" as a packaging system for the aseptic filling of long-life foods. □



75 years ago, Günter Meyer-Jagenberg applied for the patent for "perga", a water-resistant paper receptacle with folding closure as well as the equipment for its production. "Perga" was the first flexible packaging in Europe and the predecessor of today's packaging systems from SIG Combibloc (Photo: SIG Combibloc)