

Ensuring bacteriophage efficacy against bacterial threats in pigs

Post-weaning diarrhoea is a gastrointestinal disease and is considered one of the most serious threats to the global swine industry. It affects pigs after weaning and can be caused by various types of bacteria, including *Escherichia coli*, *Salmonella typhimurium*, *Salmonella enteritidis*, and *clostridium*.

by Jake Jeong, PhD, Marketing Team Lead, Pathway Intermediates.
www.pathway-intermediates.com

The disease is characterised by severe diarrhoea, dehydration, growth retardation, and can even lead to sudden death. Traditionally, pig producers have utilised multiple approaches to control these pathogenic bacteria, and the provision of antimicrobials is the most commonly applied option.

However, the use of antimicrobials poses a serious threat to the health of both humans and animals, as it contributes to the development of antimicrobial resistance (AMR). Given the growing concerns about sustainability, conventional strategies involving antimicrobial use are no longer considered viable.

Exploring alternatives to antibiotics

Antibiotic use has been restricted in several nations globally in an effort to combat AMR-related issues.

The World Health Organization (WHO) pointed out that administering antibiotics to farm animals is one of the leading causes of AMR, thus creating the greatest threat to food security and global health at current times.

Meanwhile, the One Health approach integrates multiple sectors to put regulations in place to prevent devastating AMR outbreaks.

The Organization for Economic Co-operation and Development (OECD) recommends safe and sustainable alternatives to antimicrobials, including probiotics, prebiotics, and bacteriophages, which have the potential to reduce infections and enhance animal health.



Safe and sustainable alternatives to antibiotics

Bacteriophages have emerged as a highly recommended strategy for reducing and eliminating harmful bacteria in livestock production.

With the declining effectiveness of antibiotics due to the rise of AMR, bacteriophages have gained significant attention as a potential alternative.

Bacteriophages infect bacteria by adhering to the bacterial cell membrane and injecting their genetic material into the bacterial host.

They then multiply using the bacterial host's machinery, eventually causing the bacterial cell to rupture. In contrast to antibiotics, which can be non-selective, bacteriophages exhibit excellent specificity in targeting hosts.

They can precisely recognise and attack only pathogenic bacteria, without causing harm to humans or other living organisms.

Pathway Intermediates' bacteriophage solution

The US Food and Drug Administration (FDA) has confirmed the safety of using bacteriophages, and has approved them as a Generally Recognised as Safe (GRAS) substance.

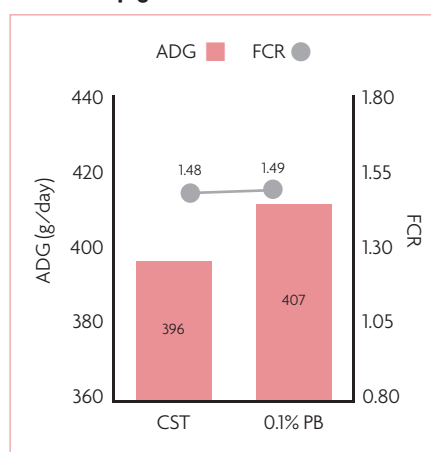
Consequently, Pathway Intermediates, along with Optipharm, its affiliate company leading in the field of animal diagnosis and biomedical research, is exerting efforts toward the development and commercialisation of a new bacteriophage solution known as ProBe-Bac.

ProBe-Bac is the latest bacteriophages solution developed by Pathway Intermediates. It is a cocktail product containing a powerful mixture of bacteriophages precisely selected to target specific disease.

The newly developed ProBe-Bac exhibits improved stability and coverage, optimising its effectiveness in eradicating bacterial

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Fig. 1. Effect of ProBe-Bac SE supplementation on growth performance in weaned piglets.



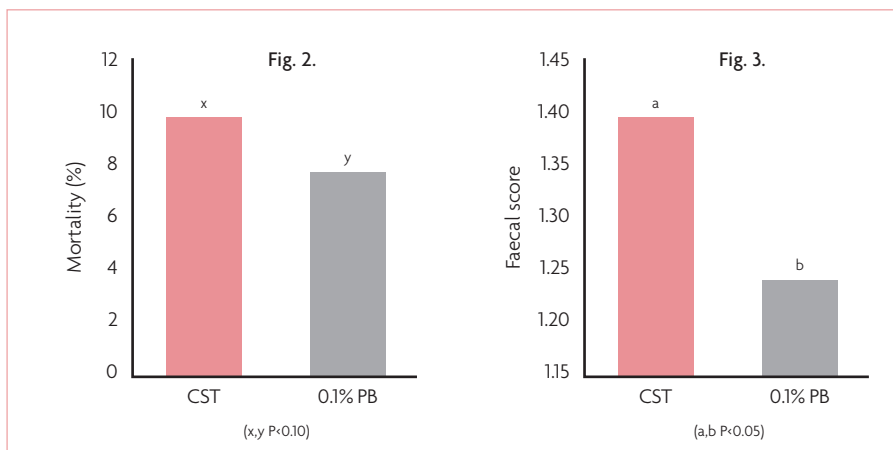


Fig. 2. Effect of ProBe-Bac SE supplementation on mortality in weaned piglets. Fig. 3. Effect of ProBe-Bac SE supplementation on faecal score in weaned piglets. Faecal score: 0 = normal; 1 = soft; 2 = mild diarrhoea; 3 = severe diarrhoea.

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pathogens. Furthermore, ProBe-Bac SE is one version of the product designed specifically for swine. It targets diseases that lead to systemic edema, colibacillosis, salmonellosis, and diarrhoea. The bacteriophages within ProBe-Bac settle within the animal's intestines upon ingestion.

They selectively eliminate pathogenic bacteria in a specific-manner, promoting an improved intestinal environment, and enhancing feed efficiency.

Effect growth performance and faecal score

A recent study investigated the beneficial effects of ProBe-Bac SE on growth performance and faecal score of weaned piglets.

The investigation was carried out with 800 weaned piglets and randomly allocated to two treatment groups: CST (basal diet + 160ppm colistin) and 0.1% PB (basal diet + 0.1% ProBe-Bac SE).

The feeding trial demonstrated enhanced average daily gain (ADG) in the group of animals supplemented with 0.1% ProBe-Bac SE (Fig. 1).

FCR showed no significant difference between the two treatments, suggesting the potential of ProBe-Bac SE as a viable antibiotic alternative.

Moreover, on final day of the feeding trial, weaned piglets supplemented with 0.1% ProBe-Bac SE in their diet showed a tendency to reduce mortality ($P<0.10$) and a significantly lower fecal score ($P<0.05$) compared to the group supplemented with colistin (Figs. 2 and 3).

Conclusion

The results revealed that the dietary supplementation of ProBe-Bac SE improved the growth performance and significantly reduced the faecal score among weaned piglets, demonstrating an even more favourable effect than antibiotic treatment.

Collectively, these findings indicate that ProBe-Bac SE could be considered a promising antibiotic alternative, contributing to growth promotion in weaned piglets. ■

References are available from the author on request